(No Model.) 2 Sheets—Sheet 1.

F. H. RICHARDS.

TURRET LATHE.

No. 518,969. Patented May 1, 1894.

Fig. 7.

Fig. 6.

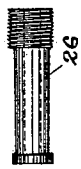


Fig. 3.

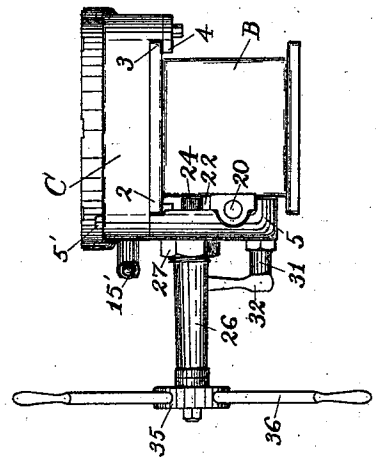


Fig. 1.

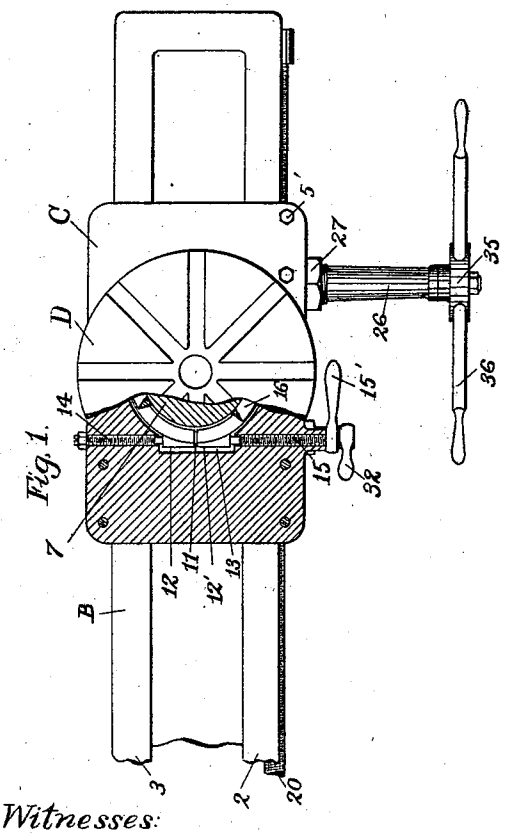
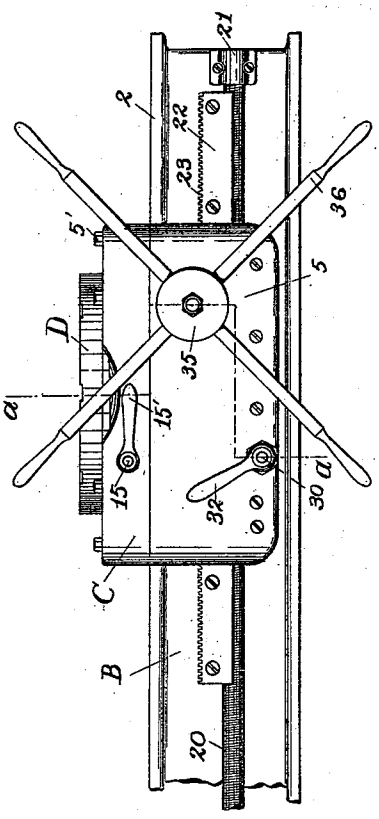


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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TURRET LATHE.

No. 518,969. Patented May 1, 1894.

Fig. 11.

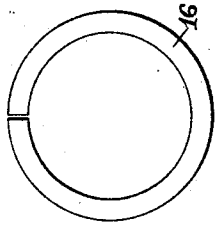


Fig. 12.

Fig. 9.

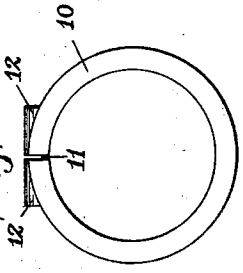


Fig. 10.

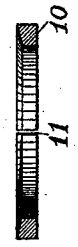


Fig. 8

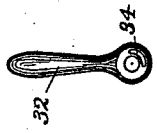


Fig. 4.

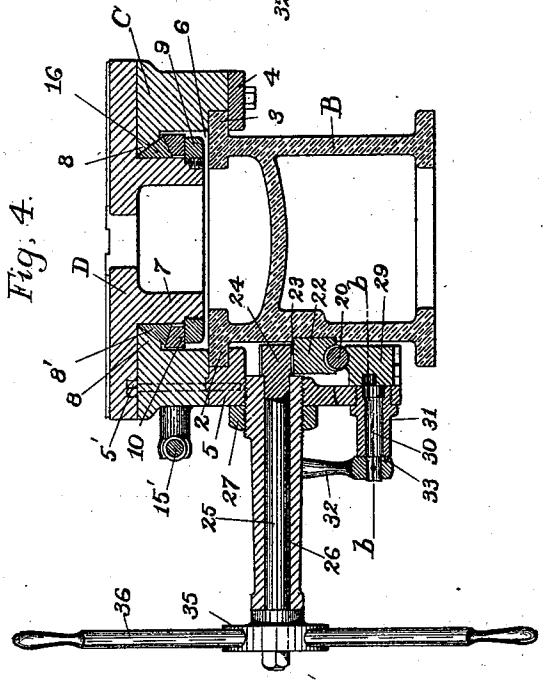
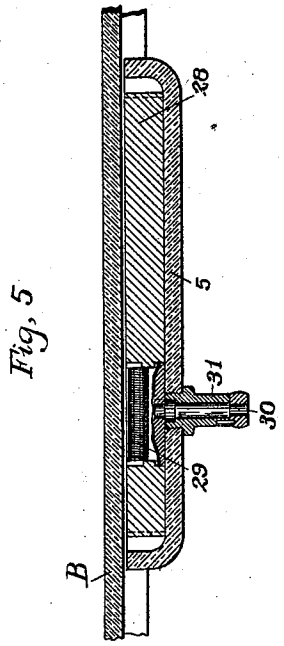


Fig. 5



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TURRET-LATHE.

SPECIFICATION forming part of Letters Patent No. 518,969, dated May 1, 1894.

Application filed December 7, 1893. Serial No. 493,067. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, 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 Turret-Lathes, of which the following is a specification.

This invention appertains to turret-lathes, and especially relates to improvements in turret-locking and slide-feeding mechanism for the particular type of machines known as "flat-turret lathes."

The chief object of this invention is to provide a simple and effective turret-locking device which is not dependent upon fine workmanship for efficiency, but will remain effective after it is considerably worn; also, to so construct the locking-mechanism, and so apply it to the turret, that it will occupy but comparatively little space relative to the height of said turret and be operable at one side thereof, to thereby adapt it for use with turrets in which the upper faces thereof lie very close to the bed of the machine.

Another object of the invention is to provide a simple and effective slide-feed mechanism operable by hand or "power," as will be hereinafter more fully described.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan or top view of a portion of a turret-lathe, showing my improvements as applied thereto, a portion of the turret and slide being broken away to show the turret-clamping mechanism more clearly. Fig. 2 is a side elevation of the same. Fig. 3 is an end view of the same, looking toward the left-hand in Fig. 2. Fig. 4 is a vertical cross-section of the turret-lathe on an enlarged scale, taken in line *a*—*a*, Fig. 2. Fig. 5 is an enlarged horizontal sectional detail of a portion of the feed-mechanism, in line *b*—*b*, Fig. 4. Figs. 6 and 7 are side and end views, respectively, of the pilot-shaft bearing. Fig. 8 is a side view of the feed-nut-actuating lever, showing the stop-groove for limiting the throw thereof. Figs. 9 and 10 are plan and cross-sectional views, respectively, of the wedge-shaped expansible turret-clamping ring. Figs. 11 and 12 are similar views of the supplemental wedge-ring.

Similar characters designate like parts in all the figures.

In the drawings only so much of a turret-lathe is shown as is necessary for a proper illustration of my present invention. The bed, B, of the lathe, which may be of any desired construction, is provided with the usual slide-ways, 2, 3, for supporting and guiding the turret-slide C. The turret-slide C is fitted for sliding movement upon the bed B, it being held in place upon the slide-ways of the bed at one side by the usual strap, 4, and at the opposite side by the depending apron, 5, secured to the turret-slide by means of a suitable bolt, 5′, as most clearly shown in Figs. 1, 2, 3 and 4. This turret-slide is centrally and vertically bored, as shown at 6, (see Fig. 4,) to receive the depending cylindrical column or stem, 7, of the turret D., which column is in the nature of an annular flange formed integral with said turret. The central bore 6 of the turret-slide, as will be seen by reference to the drawings, is of a diameter considerably greater than the external diameter of the turret-column 7, to permit the interposition of the turret-clamping devices between said column and slide, and the requisite lateral movement thereof, as will be hereinafter more fully described.

Referring to Fig. 4 of the drawings, which illustrates the preferred construction of turret-clamping mechanism: the turret-slide C has an internally-projecting annular flange, 8, at the upper end of the bore 6, the inner face of said flange being beveled or inclined as shown at 8′, on lines converging from the inner to the outer edge thereof, the outer edge of said flange being of but slightly greater diameter than the external diameter of the turret-column 7. The turret-column is shown, in the figure referred to, as provided at its lower end with an outwardly-projecting annular flange, 9. This flange may be in the nature of a ring internally screw-threaded, and screwed upon the turret-column at its lower end as shown, or, if desired, may be bolted thereto in any suitable manner. This ring, or flange, constitutes one member of the turret-clamping mechanism. Loosely surrounding the turret-column 7, and interposed between the flange 9, fixed to the turret-col-

umn, and the flange 8 of the turret-slide, is an annular clamp-ring-actuating wedge, 10, which is divided or slotted transversely at one side, as shown at 11, Figs. 1 and 9, the adjacent ends having formed thereon projecting bosses or hubs, 12, 12′, as most clearly shown in Fig. 9. The bore 6 in the turret-slide is recessed at one side, as shown at 13, Fig. 1, to accommodate and permit the movement of the projecting bosses upon the annular wedge 10, and the turret-slide is transversely bored from side to side in axial alignment with said bosses. This bore is screw-threaded and receives the clamp-screws 14 and 15, which extend therethrough from opposite sides of the turret-slide and bear at their inner ends against the hubs or bosses of the annular wedge-ring 10, as most clearly shown in Fig. 1. The upper face of the said wedge 10 is inclined from its outer edge inward and engages the correspondingly-inclined face of a turret-clamping ring, 16, which, as shown in Fig. 4, is triangular in cross-section, is interposed between the turret-column and turret-slide, and bears at its inner face against the turret-column and at its outer face against the inclined face 8′ of the flange 8 of the turret-slide, the said clamp-ring being divided or slotted transversely at one side to permit circumferential expansion and contraction. By this construction of turret-clamping mechanism, it will be seen that, when the clamp-screws 14 and 15 are loosened or screwed outwardly, the clamp-ring-actuating wedge 10 is allowed to expand, thus releasing the clamp-ring 16 from impingement between the turret-column and flange of the turret-slide, thereby permitting the turret to be freely rotated as desired. When it is desired to clamp the turret and lock the same against rotation with relation to the turret-slide, it is simply necessary to turn the clamp-screw 15 inward by means of the lever 15′ secured to its outer end, which forces the hubs 12 and 12′ at the ends of the annular wedge toward each other, thus contracting the said wedge diametrically, which, owing to its inclined upper face, forces the clamp-ring upward and inward into tight impingement between the turret-column and the flange of the turret-slide, thereby tightly clamping the turret against rotation with relation to said slide. By constructing the turret-slide with an annular internally-projecting flange, and tapering said flange on lines radiating from a common center, as shown in Fig. 4, to thus form a conical recess concentric to the axis of the turret, the accurate centering of the turret with relation of the slide-opening is positively secured as the clamp-ring is forced upward between said tapered flange-face on the turret-column during the operation of clamping the turret with relation to the slide.

Referring to the slide-feed mechanism, the necessary power for actuating the said mechanism is supplied by a worm-shaft or feed-screw, 20, which may be driven from the lathe-spindle (not shown) by gearing, or by pulleys and a belt in a well-known manner, said shaft being supported at its ends in suitable bearings, 21, (one only of which is shown) fixed to the bed of the machine. Secured to the side of the bed of the machine slightly above the said feed-screw 20, as shown most clearly in Figs. 2, 4 and 13, is a rack, 22, toothed at its upper face, as shown at 23; and meshing with said rack, is a pinion, 24, secured to the inner end of the pilot-wheel-shaft 25, journaled in the bearing, 26, supported in the apron 5 secured to and depending from the left-hand side of the turret-slide C. As a means for securing said pilot-shaft bearing to the apron 5, the bearing is externally screw-threaded at its inner end and fitted to a screw-threaded transverse opening formed through the apron, as shown most clearly in Figs. 4 and 13, a jam-nut, 27, being provided to prevent accidental turning thereof. Secured to the lower inner face of the apron 5, is a shaft-supporting bar, 28, having a smooth groove cut longitudinally in its upper face to receive and support the feed-screw 20 and prevent sagging or deflection thereof. This shaft-supporting bar 28 is grooved or transversely slotted near its left-hand end, as shown in Fig. 5, to receive a vertically-adjustable feed-nut, 29, which nut is adapted to be thrown into engagement with the feed-screw 20 when it is desired to feed the turret-slide by said screw. As a means for supporting and adjusting said feed-nut, the crank-shaft 30 is provided with an eccentric crank-pin at one end entering said feed-nut. This crank-shaft is supported in a bearing, 31, secured to the lower end of the slide-apron 5, and has a hand-lever, 32, secured to its outer end, by means of which the crank-shaft may be rotated to throw said feed-nut into and out of engagement with the worm-shaft 20, with which the threads formed in the upper face of the feed-nut mesh. Secured to the outer end of the crank-shaft bearing 31 is a detent stop-pin, 33, which enters a radial stop-groove 34, in the inner face of the crank-shaft lever, and limits the movement thereof. Secured to the outer end of the pilot-shaft, is a pilot-wheel, 35, having the usual arms, 36, by means of which the said shaft and its pinion 24 may be rotated to feed the slide said shaft and its pinion 24 may be rotated to feed the slide by hand, the feed-nut 29 being thrown out of engagement with the worm-shaft 20 during the hand-feed operation. By the construction and organization of feed-mechanism as herein described, I secure an effective feed of the turret-slide, operable by power through the shaft 20 or by hand through the medium of the pilot-wheel 35, securing simplicity in construction and effectiveness in operation. Another important feature of this construction is, that the parts constituting the slide-feed mechanism may be quickly set up or disas-

sembled, and are readily accessible for adjustment and repairs.

Having thus described my invention, I claim—

1. In a turret-lathe of the class specified, in combination, a vertically-bored turret-slide having an internal conically-tapered annular flange at its upper edge, a turret having an externally-flanged column extending into the bore of the slide, a clamp-ring interposed between the turret-column and slide-flange and having oppositely-disposed inclined faces, one of which bears against the tapered face of the slide-flange, and a split-ring interposed between the clamp-ring aforesaid and the flange of the turret-column and having an inclined face in bearing contact with one of the inclined faces of said clamp-ring, and means for contracting the last-mentioned ring, substantially as described and for the purpose set forth.

2. The combination with the vertically-bored turret-slide having the internally-projecting annular flange, of the turret revolubly mounted thereon and having the depending column projected into the bore of the slide with the external flange at its lower end, a clamping-ring wedge-shaped in cross-section interposed between the inner face of the slide-flange and outer face of the turret-column, an expansible or flexible wedge interposed between said clamp-ring and the flange of the column, and means, substantially as described, for contracting said wedge diametrically, substantially as and for the purpose set forth.

3. In a turret-lathe, the combination of the turret-slide vertically bored to receive a depending column upon the turret and having an internally-projecting flange conically bored from the inner side to form inclined faces, a turret having a depending stem extended into the bore of the slide, a ring or collar secured to the lower end of said stem to form an outwardly-projecting flange, a transversely-divided clamp-ring angular in cross-section and constructed to fit the space between the slide-flange and the turret-stem, an annular transversely-divided clamp-ring-actuating wedge having an inclined face and being interposed between the clamp-ring and turret-stem flange, and the wedge-contracting device consisting of the clamp-screws extended through screw-threaded openings in the turret-slide at opposite sides thereof and bearing at their inner ends against projections upon the adjacent ends of the annular wedge, which screws are adapted to contract the wedge to force the clamp-ring upward to clamp the turret with relation to the slide, substantially as described.

4. In a turret-lathe, the combination of the vertically and centrally bored turret-slide having the inwardly-projecting annular flange beveled substantially as described at its inner face, the turret having a depending stem of lesser external diameter than the internal diameter of the bore of the slide and having an outwardly-projected annular flange at its lower end, a series of transversely-divided annular wedges loosely surrounding the stem and interposed between the flange of the stem and flange of the turret-slide, one of said wedges coinciding in cross-sectional shape with the cross-sectional shape of the space between the slide-flange, turret-stem and adjacent wedge, and turret-clamping screws extending transversely through the turret-slide and directly engaging one of said wedges to contract the same and force the adjacent wedge outward in binding-contact with the turret, and means substantially as described for actuating said screw, all constructed substantially as and for the purpose set forth.

5. In a turret-lathe, in combination, the vertically-bored turret-slide having the internal conically-tapered annular flange at the upper edge thereof, the turret having a depending stem of lesser diameter than the internal diameter of the bore of the slide and having an external flange at its lower end, a series of transversely-divided annular rings loosely surrounding the stem and interposed between the flange of the stem and flange of the turret-slide, one of said wedges coinciding in cross-sectional shape with the cross-sectional shape of the space between the slide-flange, turret-stem and adjacent wedge, and means in connection with one of said wedges and adapted for contracting the same to clamp the turret, substantially as described.

6. In a turret-lathe of the class specified, in combination, a vertically-bored turret-slide having an internal conically-tapered annular centering flange, a turret having an externally-flanged stem extended into the bore of said slide, a split-ring interposed between the tapered face of the slide-flange and the stem of the turret, a split wedge-ring interposed between the first wedge-ring and the flange of the turret-stem, and clamping-mechanism in direct connection with said wedge-ring and adapted for contracting the same to clamp the turret, substantially as described.

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