UNITED STATES PATENT OFFICE.

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TAIL-STOCK FOR WATCHMAKERS' LATHES.


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To all whom it may concern:

Be it known that I, WILLIAM D. CLEMENT, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Tail-Stocks for Watchmakers' Lathes, of which the following is a specification.

This invention relates to lathes, and more particularly to the tail-stock construction of watchmakers' lathes.

The object of the invention is to provide for performing a greater number of operations with the tail-stock as an accessory than have been performed heretofore and to perform operations therewith which have heretofore involved the use of a slide-rest and various separate attachments.

The invention consists in the novel features of construction and arrangement which I shall now proceed to describe and claim.

Of the accompanying drawings, Figure 1 represents a front elevation of the tail-stock and part of the lathe-bed. Fig. 2 represents a rear elevation thereof. Fig. 3 represents a side elevation, partly in section. Fig. 4 represents a plan view. Fig. 5 represents a section on the line 5 5 of Fig. 3. Fig. 6 represents a section on the same line with the screw-feed detached. Fig. 7 represents a section on the line 7 7 of Fig. 6. Figs. 8 and 9 represent end elevations in different positions, and Fig. 10 and 11 plan views in different positions and with parts broken away and in section, of a tool-holder attachment for the dead-spindle. Figs. 12 and 13 represent side elevations, and Figs. 14 and 15 two positions in end elevation, of a polishing attachment. Fig. 16 represents a side elevation, Fig. 17 a plan, and Figs. 18 and 19 front and rear elevations, of a filing attachment. Figs. 20 and 21 represent end and side elevations, Fig. 23 a plan, and Fig. 25 a section on line 25 25 of Fig. 21, of a rounding-up tool or attachment.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, 1 represents the lathe-bed, and 2 represents the tail-stock, mounted to slide therelong toward or away from the head-stock, which is not herein illustrated.

The tail-stock 2 comprises a base 3, mounted on the guides or inclines of the lathe-bed, and an upper portion or frame 4, carrying the dead or tail spindle 5 and mounted to turn upon the base 3 on a vertical bolt 6 as a center. The head at the lower end of said bolt runs in the T-groove of the lathe-bed, and its upper end is provided with a clamping-lever 7, by turning which the tail-stock is 6 loosened on the lathe-bed, and the upper or frame part 4 of the tail-stock is also clamped to or loosened from the base part 3 thereof.

8, Fig. 4, is a stop-screw fixed in the base 3 and occupying a segmental slot 9 in the frame 4, whereby the angular movements of the frame 4 are limited. The rear vertical faces of the base and frame are arc-shaped or segmental in form on a radius from the center 70 bolt 6, and the frame-face is marked with a degree-scale 10, Fig. 2, cooperating with a mark 11 on the base-face to indicate the angular position of the tail-spindle.

12 is an arm forming a part of the tail-stock frame 4 and having a series of gage-tongues 13 13 at its upper end. 14 is a rock-frame mounted to oscillate on a horizontal pin 15 on the tail-stock frame 4 and carrying at its upper end a gage plate 80 or strip 16, parallel to the ends of the tongues 13. The tail-spindle 5 is carried by the rock-frame 14 at a point midway between the axis of oscillation of said rock-frame and the ends of the gage-tongues. If a jewel be placed between the gage-plate 16 and the end of one of the tongues 13 and a boring-tool be fixed to the tail-spindle 5, with its cutting edge in line with the axis of the tail-spindle, the tool will bore a hole in the setting or face-plate held in the chuck on the live-spindle which will just fit the jewel.

17 is a compound feed-screw by means of which the rock-frame 14 is oscillated.

The above-described construction is commonly known as a "jeweling attachment," and the manner of its operation is well known. When the gage-plate 16 is in contact with the tongues 13, the tail-spindle is then on the line of centers of the lathe, provided its position is parallel to said line, which will be the case when the scale 10 reads at zero degrees. The rear end of the spindle 5 has the usual knob 18 for adjusting its position by hand.
and is provided with an adjustable arm 19, engaged with a guide-rod 20 to prevent it from rotating. The arm 19 has a removable lower part 21, engaged with a compound feed-screw 22, which is mounted in the rock-frame 14, whereby a slow longitudinal feed or adjustment may be given to the spindle. The arm 19 also has the usual adjustable stop-screw 23.

By providing a horizontal angular adjustment for the tail-spindle I considerably enlarge the capabilities of the tail-stock, for with this adjustment it is possible to make many angular borings or cuts with tools mounted on the tail-spindle which are not feasible with the tail stocks as commonly constructed prior to my invention. The use of the jewel attachment in connection with the angular adjustment of the tail-spindle permits the attainment of different degrees of taper in off-center work. The tail-spindle being adjustable about a vertical axis and also adjustable in parallelism to its longitudinal axis in a path perpendicular to said longitudinal axis I am enabled to describe lines 25 or make cuts on a concave surface by means of a tool mounted on the spindle.

Figs. 3, 4, and 8 to 11, inclusive, show a novel form of tool-holder applied to the tail-spindle. Said holder has a shank 24, adapted to fit in the taper bore of the spindle, and a head at the outer end of said shank, having two ears 25, between which, on a pintle 26, is pivoted a block or holder 27. This block has provisions for holding two tools 28 29, which are brought into operative position alternately by swinging the block 27 on its pivot. The two positions of the block are exactly at right angles and are determined by means of two adjustable stop-screws 30 31, which abut against the head of the holder. The tools 28 29, as shown in the drawings, are for an inside and an outside cut, respectively, and when brought into operative position their cutting edges will be located on the center line of the spindle 5. By screwing up the pintle 26 the ears 25 may be sprung together and the holder 27 frictionally clamped in any of its positions. The tools, 28 29, are in a vertical plane parallel to the arbor 10.

Figs. 12 to 15, inclusive, illustrate a polishing device for pivots and other parts, which by a novel arrangement I mount on the tail-spindle. 32 is a collar which is slipped on the spindle 5 and held in place by a set-screw 33. Said collar has a perforated offset lug 34, which is embraced by two lugs or ears 35 36, formed on a block or plate 36. The joint is a friction-tight one and is bound by a screw 37, passing loosely through one ear 35 and the lug 34 and screwing in the other ear 36, said screw serving to spring the ears 35 slightly upon the lug. 38 is a frame pivoted to the plate 36 with a friction-tight hinge joint and having bearings for an arbor 39. To the latter, at its outer end, is affixed a polishing-wheel 40, and between the bearings is affixed to said arbor a belt-pulley 41, adapted to be belted to a counter-shaft, so as to rotate the polishing-wheel. A spring 42 presses the pulley and arbor in one direction, and a pivoted lever 43 is adapted to be manipulated by the operator to press the same in the opposite direction, whereby an axial reciprocating movement is given to the polishing-wheel, the extremes of position of the parts being indicated by full and dotted lines in Fig. 13. By swinging the frame 38 with respect to the plate 36 the polishing-wheel may be moved in the direction of the work or the line of centers, as represented in Fig. 14, or away therefrom, as represented in Fig. 15. The same collar which is employed in the above construction may be used to support a filing fixture upon the spindle, as represented in Figs. 16 to 19, inclusive. The link or rocker-bar 44 of the fixture carrying the rolls 45 for guiding the file is in this case journaled by a screw-pintle 46, which passes through the eye of the lug 34.

Figs. 20 to 23, inclusive, show the hinged plate and frame 38 39 utilized as a part of a gear cutting or "rounding-up" attachment. The ebb between the ears 35 36 is made circular at its inner end to fit the spindle 5, over which the plate 36 may be slipped and clamped by tightening the screws 37. The gear which is to be "rounded up" or to have its teeth cut is held between two centers 47 48, which are mounted in alignment in the arbor of the frame 38 and adequately held by set-screws 48 49 and is supported by an adjustable rest 49. The gear thus held may be moved toward or from the cutter on the live spindle by swinging the frame 38 with respect to the plate 36.

I claim—

1. In a lathe, a horizontal tail-stock spindle, mounted to turn about a vertical axis and guided to move with its longitudinal axis in parallelism to itself in a path perpendicular to itself.

2. In a lathe, a horizontal tail-stock spindle, mounted to turn about a vertical axis and to swing about an axis parallel to its longitudinal axis.

3. In a lathe, a base, a frame pivoted thereto on a vertical axis, a horizontal spindle, and a bearing for the spindle guided to move on the frame in a path perpendicular to the axis of the spindle.

4. In a lathe, a base, a frame pivoted thereto on a vertical axis, a horizontal spindle, and a bearing for the spindle hinged to the base on an axis parallel to the spindle.

5. In a lathe, a base, a frame pivoted thereto on a vertical axis, a horizontal spindle, a bearing for the spindle guided to move on the frame in a path perpendicular to the axis of the spindle, and provisions for adjusting the spindle axially in its bearing.

6. In a lathe, a tail-stock comprising a base, a frame pivoted thereto on a vertical axis and having a jewel-holding jaw, a rock-frame hinged to said frame on a horizontal axis and
having a complemental jewel-holding jaw, and
spindle mounted on said rock-frame parallel to the hinge-axis half-way between said axis and said complemental jaw.

7. An attachment for lathes comprising a head having a coupling-stem, and a holder having provisions for holding a plurality of tools and pivoted on an axis at right angles to the longitudinal axis of the stem, whereby to align with the said axis any tool thus held.

8. In a lathe, a tail-spindle, and a tool-holding device mounted thereon and comprising a tool-holder having provisions for holding two cutting-tools and movable pivotally on an axis perpendicular to the axis of the spindle into position to center the cutting edge of either tool on the axis of the spindle.

9. In a lathe, a tool-holding device having a support or head, a holder pivoted thereon and having provisions for holding two tools, and adjustable stop-screws mounted in the holder and adapted to abut against the head, said screws determining two positions of the holder at right angles to each other.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM D. CLEMENT.

Witnesses:
A. D. HARRISON,
C. F. BROWN.