C. HOPKINS.

Improvement in Watch-Makers' Lathes and Chucks.

No. 132,763. Patented Nov. 5, 1872.

*Fig. 1.*

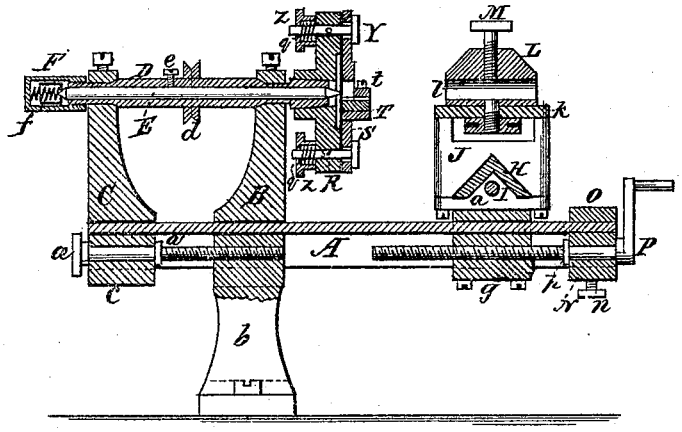

*Fig. 2.*

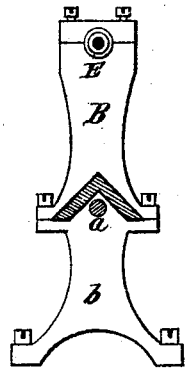

*Fig. 3.*

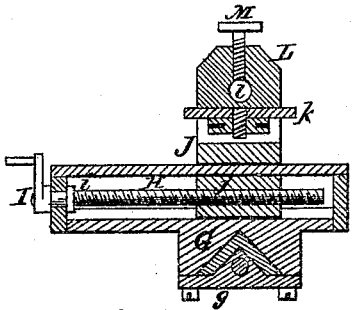

*Fig. 5.*

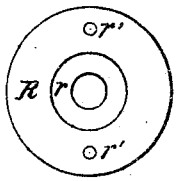

*Fig. 4.*

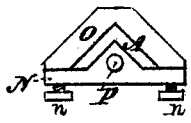

*Fig. 6.*

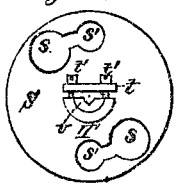

*Fig. 8.*

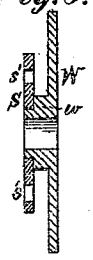

*Fig. 9.*

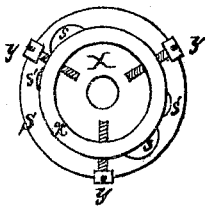

*Fig. 10.*

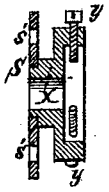

*Fig. 7.*

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# UNITED STATES PATENT OFFICE.

CALEB HOPKINS, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN WATCHMAKERS' LATHES AND CHUCKS.

Specification forming part of Letters Patent No. **132,763**, dated November 5, 1872; antedated November 2, 1872.

*To all whom it may concern:*

Be it known that I, CALEB HOPKINS, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Watchmakers' Lathe and Lathe-Chuck, of which the following is a specification:

*Nature and Objects of the Invention.*

The first part of my invention relates to the head and spindle of a watchmaker's turning-lathe, the said head being made in two parts, and so attached to the lathe-shears as to allow of their being set closer to or further from each other at pleasure, and being provided with an adjusting-screw that passes loosely through one part of the head, or a piece attached thereto, and screws into the other part; and the spindle being formed with a longitudinal bore through its center, and with a hollow cap attached to its rear end, in which is placed a spiral spring designed and so arranged as to act upon a movable center within the bore of the spindle; the object of this part of my invention being, first, to provide for adjusting the slack between the spindle-bearings by setting the two parts of the head closer to or further from each other, as desired; and, second, to provide a ready way by which the spindle center may be used either as a stationary or a spring center, or be wholly withdrawn at pleasure without detriment to the practical working of the lathe. The second part of my invention relates to the combination of a slide-rest with the shears of the lathe in such way that the said shears become a part of the slide-rest and the lower slide on which the rest moves; the object of this part of my invention being, first, to simplify the general structure of the machine, and by entirely dispensing with the part that usually constitutes the lower slide of the slide-rest to materially lessen the cost of its manufacture; and, second, to make the slide-rest in addition to its ordinary uses to serve the purpose also of a back-head to the lathe for uprighting, upright drilling, and other like uses. The third part of my invention relates to an improved universal lathe-chuck, made to fit on a tapered arbor formed on or attached to the forward end of the lathe-spindle, for holding upright and to accurate center any of the various parts of watch movements and other work that may require to be operated upon in a turning-lathe.

*Description of the Accompanying Drawing.*

Figure 1 is a vertical longitudinal section of a lathe and attachments embodying the principal parts of my invention. Fig. 2 is a vertical transverse section through the forward part of the lathe-head. Fig. 3 is a vertical transverse section through the center of the slide-rest. Fig. 4 is a vertical transverse section through that part where the lower working screw of the slide-rest is attached to the lathe-shears. Fig. 5 is a front view of the face-plate of the chuck. Fig. 6 is a front view of a perforated metallic disk with clamping-jaws attached thereto, and thus constituting the jaw-plate of the chuck. Fig. 7 is a straight half-round piece of metal with a longitudinal groove through the center of its flatted side, and is designed for varying the inner capacity of the clamping-jaws and for sustaining straight pieces of work in longitudinal position in the chuck. Fig. 8 is a section of an additional attachment to the chuck, to be used in place of the jaw-plate, Fig. 6, as occasion requires, for holding watch-plates, bridges, &c. Fig. 9 is a still further attachment to the chuck for holding mainspring-barrels and other like work. Fig. 10 is a section of the same.

*General Description.*

A is the shears of the lathe, which should be made of steel or other hard stiff metal, and may be of ridge-shape, hollowed out on the under side, or of any other suitable form that will support in steady upright and centered positions the parts that are to rest upon it, and at the same time afford place for the lower working screw of the slide-rest and the combining parts immediately connected therewith. B and C are the two parts of the lathe-head, the bearings for the spindle being of similar form in both, and the two parts being attached to the shears of the lathe in such a way that the slack between the spindle-bearings may be readily adjusted by means of the adjusting-screw *a*, which is made to pass loosely through the back part C of the head, or a piece, *c*, attached thereto, and screws into the other part B, or

into the standard *b* on the under side of the shears, the collar *a'* serving to retain the shank of the screw *a* in its place in the back part of the head. D is the lathe-spindle, which, as represented in Fig. 1, is bored longitudinally through its center, and is made of sufficient length to project somewhat beyond both the forward and back bearings, the forward part being formed into a tapered arbor to receive the chuck and hold it in place, and a screw being cut on the back end to hold a screw-cap, hereinafter described. E is a straight, round center piece, somewhat longer than the spindle, and of size to fit the longitudinal bore therein, and may be used as a spring-center or held stationary at any desired point by means of the set-screw *e;* or it may be wholly withdrawn, at pleasure, leaving an open bore through the entire length of the spindle. F is a hollow cap made to screw on the back end of the spindle D, and contains within it, in inverted position, a cup-shaped piece, *f*, in which is placed a spiral spring in such way that when the cap F is screwed home on the end of the spindle the bottom of the cup *f* is pressed by the spring within it against the back end of the center E, throwing it forward when not set by the set-screw *e*. G, H, I, J, *j*, K, L, and M are the main parts of the slide-rest above the shears of the lathe, and may be made of the respective forms and united together as represented in the accompanying drawing; or any other style of slide-rest may be employed that will admit of the shears of the lathe being made to constitute the lower slide of the rest. P is the lower working-screw of the slide-rest, and is held in place at the end of the lathe-shears by means of the attaching-pieces N and O, which are so fitted to the end of the shears that they may be firmly attached thereto by simply tightening the thumb-screws *n n*, the shank of the working-screw P being retained in the piece N, through which it passes, by the fixed collar *p*, while the screw is worked in the piece *g* of the slide-rest, moving the rest forward or backward, as occasion requires; or, by loosening the screws *n n*, the attaching-pieces N O, together with the screw P and the other parts of the slide-rest, may all be drawn off together over the end of the shears and wholly removed therefrom. R is a face-plate made to fit on the tapered arbor at the forward end of the spindle D, the face of the said plate being turned off level and exactly upright or at right angles with the spindle D, and being provided with the spring-bolts Y Y, which pass through the said plate R at equal distance from its center and at right angles with its face, with flat level heads in front and knurled screw caps or nuts Z Z at the back, the said caps Z Z being formed hollow or with a cavity in each immediately around the bolt next to the back of the plate, in which are placed spiral springs *q q*, that act, respectively, on the inner sides of the caps and the back of the plate R in such way as to produce a continuous backward draw upon the bolts. The dots *z z* on the bolts Y Y represent pins that pass through the bolts transversely and fall into slots either in the face or back of the face-plate R to prevent the bolts from turning as the screw-caps Z Z are being tightened or loosened; or the said bolts may be made square instead of round, and the pins *z z* in such case dispensed with. S is a flat disk, of steel or other hard metal, of uniform thickness, and with holes *s s* bored or punched through it at same distances from its center, and coinciding in positions with the bolt-holes *r' r'* in the face-plate R, and of sizes to allow the heads of the bolts Y Y to pass freely through them, and having, also, in the same circle and coinciding positions, the additional holes *s' s'*, of smaller diameter than the holes *s s*, the said holes *s s* and *s' s'* being connected with each other by open slots of still smaller diameter than the holes *s' s'*, but wide enough to allow free passage of the shanks of the bolts Y Y from one hole to the other. To the aforesaid disk S, for all ordinary purposes of turning, the clamping-jaws T *t* are attached as follows, namely: To the center of the disk, and projecting squarely outward from its face, a piece of steel or other hard metal of suitable length and diameter is firmly and permanently attached; a longitudinal hole is then bored through this projecting piece at right angles with the back of the disk, and then one-half of it cut away longitudinally, and to the remaining part T the movable jaw-piece *t* is attached by means of the screws *t' t'*. W is a flat metallic disk or plate of any desired diameter, attached to the perforated disk S by the shank *w*, the two pieces being so set that the face of the plate W and the back of the disk S will be exactly level with each other, the shank *w* being of sufficient length to barely allow for freedom of movement of the heads of the bolts Y Y between the two plates. This combination, just described, constitutes an additional attachment to the chuck, and is designed for holding watch-plates, bridges, and other flat or irregular pieces of work, the said work being attached to the face of the plate W by use of wax, screws, or clamps, as preferred. The piece X with flat level bed, and with projecting rim *x*, through which the screws *y y y* are passed at equal distances from each other, and with their points converging inward toward the center, is a still further clamping arrangement in combination with the disk S, to which it is attached in same way as the plate W, and is designed for holding mainspring, barrels, &c. The piece V, of which any desired number, assorted, may accompany the chuck, consists of a piece of straight half-round steel or other metal of same length as the jaw T, and of diameter to fit snugly the original bore therein, with a longitudinal groove cut in the center of its flatted side, and with a small steady-pin, *v*, near one end in the center of its rounded side, which, in use, drops into a hole made for it in the bottom of the jaw T to prevent it from turning or

falling out of place, the said piece V being designed for varying the inner capacity of the clamping-jaws T *t*, the longitudinal groove therein being graduated in size to the work to be operated upon. The chuck just hereinbefore described, with its several attachments, and which constitutes the third part of my invention, may be made of sizes for general machinists' use as well as for watch work; and it may be fitted to any of the different other makes of turning-lathes in use as readily as to that herein described, and for which it is more especially designed.

The work to be operated upon, if a staff, pinion, or other like piece, should be first placed in the clamping-jaws T *t*, with an appropriate piece, V, under it, and fastened there by tightening the screws *t' t'*. The holes *s s* should then be placed over the heads of the bolts Y Y, the screw-caps Z Z be loosened, and the bolts pressed forward sufficiently to allow the disk S to slip under their heads and be turned round so as to pass the shanks of the bolts through the open slots from the holes *s s* to *s' s'*. The last-named holes, while large enough to allow considerable oscillation of the disk, will not permit the heads of the bolts to draw through them, while, at the same time, the backward draw of the springs *q q* upon the bolts is made sufficient to sustain the jaw plate or disk S as thus placed, in whatever position it may be moved to on the face-plate R. The lathe should then be put in motion and the work to be operated upon run to center by bringing some blunt instrument to bear steadily against it; and when properly centered thus it should be fastened there by again tightening the screw-caps Z Z.

In using the attachment, Fig. 8, for watch-plates, bridges, and other flat or irregular shaped pieces, the work, as hereinbefore stated, may be attached to the face of the plate W by use of either wax, screws, or clamps; after which the attachment is placed on the face-plate R, the work run to center, and fastened there in same way as in the preceding case, hereinbefore described; and the attachment, Fig. 9, is used in precisely same way as Fig. 8, except that the work to be operated upon is placed within the rim *x* and the points of the screws *y y y* forced inward upon its edges with sufficient firmness to hold it in its place.

*Claims.*

I claim as my invention—

1. The combination of the adjusting-screw *a* with the head-pieces B and C and the shears A, substantially as and for the purposes hereinbefore set forth.

2. The screw-cap F with the inner spring-cup *f*, in combination with the spindle D and the movable center E, substantially as and for the purposes hereinbefore set forth.

3. The attaching-pieces N and O, in combination with the shears A and the working-screw P of the slide-rest, substantially as and for the purposes hereinbefore set forth.

4. The perforated disk S, substantially as described, and for the purposes hereinbefore set forth.

5. The combination of the clamping-jaws T *t* with the disk S, substantially as described, and for the purposes hereinbefore set forth.

6. The combination of the face-plate W with the disk S, substantially as and for the purposes hereinbefore set forth.

7. The combination of the piece X, having the projecting rim *x* and the screws *y y y*, with the disk S, substantially as and for the purposes hereinbefore set forth.

8. The combination of the perforated disk S with the face-plate R and the spring-bolts Y Y, substantially as and for the purposes hereinbefore set forth.

9. The half-round and grooved piece V, in combination with the clamping-jaws T *t*, substantially as described, and for the purposes hereinbefore set forth.

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Witnesses:

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