C. HOPKINS.
Watchmakers' Lathe.

No. 196,228. Patented Oct. 16, 1877.

Fig. 1.

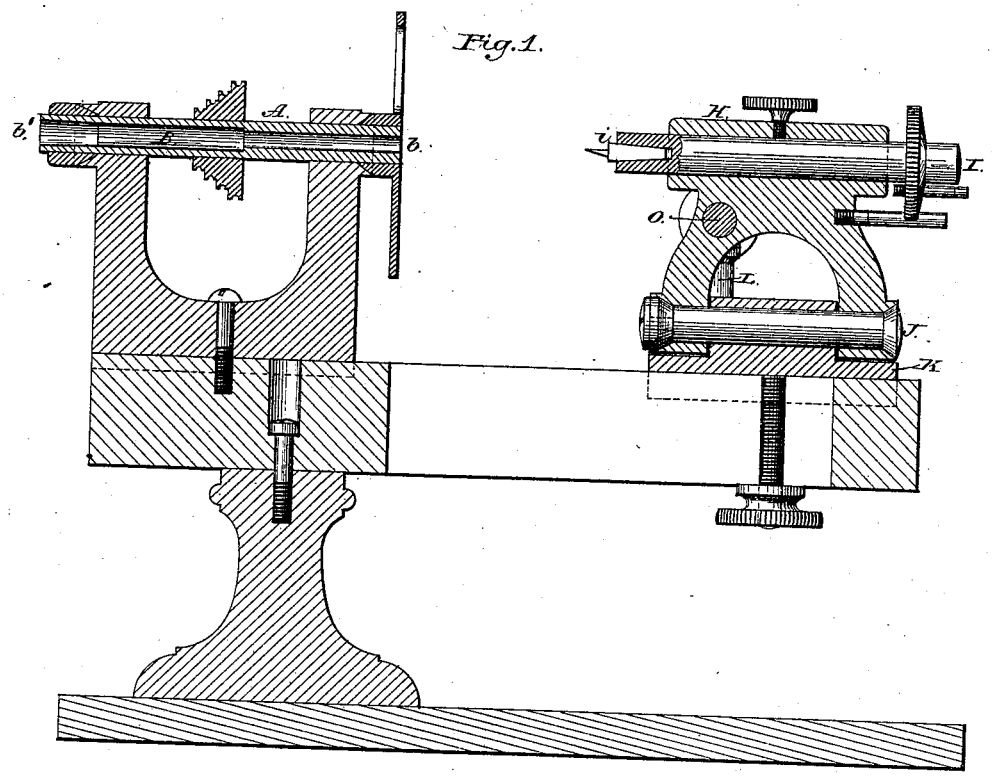


Fig. 2.

Fig. 3.

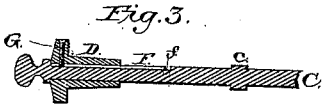
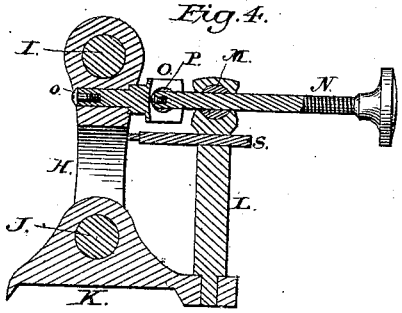


Fig. 4.



Attest:
C. E. Van Arsman
F. E. Hollon

Inventor:
Caleb Hopkins.

UNITED STATES PATENT OFFICE.

CALEB HOPKINS, OF WALTHAM, MASSACHUSETTS.

IMPROVEMENT IN WATCH-MAKERS' LATHES.

Specification forming part of Letters Patent No. **196,228**, dated October 16, 1877; application filed September 21, 1876.

To all whom it may concern:

Be it known that I, CALEB HOPKINS, of Waltham, State of Massachusetts, have invented Improvements in Turning-Lathes, of which the following is a specification:

The object of my invention is to enhance the practical value, at small additional cost, of watch-makers' and other lathes, first, by so constructing the tail-stock of the lathe as to make it serve the double purpose of a tail-stock and of a swing-rest, operated by a laterally-working screw, for facing off work run in the lathe, cutting jewel-settings, upright boring, and other light work; and, second, by combining a pump-center with the spindle of the lathe in such a way, by means of a detachable taper bush fitted to the back end of the lathe-spindle, that the said pump-center and the spring that acts upon it, together with the said taper bush, may be instantly withdrawn from the lathe-spindle, when so desired, and again as promptly replaced, without detriment to its accuracy or to its practical working.

In the accompanying drawing, Figure 1 is an elevated longitudinal section of a lathe embodying the principal parts of my invention, in which K represents the bottom piece or saddle of the tail-stock, fitted accurately to the top of the lathe-bed, and attached thereto as represented, or it may be attached by any other of the ordinary appliances for such purpose. Through the upper part of the saddle K, which is made of form suitable therefor, the axle or arbor J, on which the part H of the tail-stock is made to swing back and forth, is longitudinally placed. The spindle I, in the upper part of H, for holding the cutter *i*, or, in its stead, a male or a female center, is so adjusted that in all positions of the swing part H it will be in either parallel line or in exact center line with the head-stock spindle A. The part H, carrying the spindle I, is operated (worked backward and forward laterally) by the working screw N, as in Fig. 4, wherein the combination tail-stock is represented as cut squarely across vertically at the point of connection of the lateral-working screw N, a longitudinal section of which, together with sections of the self-adjusting nut M, in which the screw N works, the self-adjusting socket P, in which its forward end is held, and of the combining parts L and O, and of the stop-screw S, in addition to cross-sections of the pieces K, J, H, and I, is clearly shown.

The more special points in this part of my invention are those pertaining to the working-screw N, and its combination with the other parts immediately connected with it.

It will be readily understood that, inasmuch as the part H moves in an arc instead of a plane when moved backward and forward by means of the screw N, which passes through the nut M in the upper part of the stationary post L, and has its forward end held in the socket P, which is supported in the outer end of the stationary stud O attached to the swing part H, or in some other device equivalent thereto, the forward end of the screw N will necessarily rise and fall in proportion as H approaches to or recedes from an upright position, and, therefore, in order to prevent the screw N from binding in the nut M and in the socket P, and being thus rendered inoperative, both the nut M and the socket P must be made self-adjusting to the ever-changing angle of the screw N, which, in my invention, I have accomplished by making both the nut M and the socket-piece P of cylindrical form, with the screw-hole in the one and socket-hole in the other, placed transversely through its center, and then so placing these in their respective positions in the post L and the stud O, as shown in Fig. 4, that they will turn or move within the sockets in which they are respectively placed in unison with each change of angle of the working screw N; or the nut M and socket-piece O may be of any other form than cylindrical, when so desired, and be made to move on centers instead of within sockets.

The screw S, Fig. 4, is employed as a stop to the swing part H when fixing it to an upright position preparatory to using this part of my invention as a tail-stock.

Fig. 2 is a perspective view of the pump-center embraced in the second part of my invention, with the detachable taper bush D, hereinbefore referred to, and the spring E, for throwing the center forward in the lathe-spindle, placed in proper positions upon it. The pump-center, as thus represented, is made and ground to size to fit properly the smaller part

b of the bore B in the spindle A, Fig. 1, while its back end, when placed in position within the lathe-spindle, is supported by the taper bush D, which is made to fit accurately the taper part *b'* of the bore B, and which, for convenience in placing it in position, and removing it when desired, is formed with a flanged thumb-piece at its outer end. Freedom of movement for the spring E and the collar *c* is provided for by enlarging the bore B back of the part *b*, as represented in the drawing.

Fig. 3 is a longitudinal section of the back part of the pump-center C and of the flanged taper bush D, showing more clearly than in Fig. 2 the means I have adopted for preventing the center C from turning in the bush D, and for fastening it back out of the way in the lathe-spindle, when so desired, which consists of a longitudinal groove cut in one side of the pump-center C, and extending forward from its back end to a distance corresponding to the extent to which it is desired to provide for drawing the center C backward in the lathe-spindle; and of a short, acute angular lateral cut outward from the groove F at this point, the said lateral cut F being inclined backward sufficiently to form a kind of hooked recess to one side from the forward end of the groove F; and, in addition to this, of a screw or pin, G, which passes uprightly through the flanged end of the bush D, with its inner end projecting into the groove F sufficiently to prevent the center C from turning in the lathe-spindle, but not so as to prevent it from moving freely backward and forward. Then, in order to fasten the pump-center C back out of the way, when so desired, it is simply drawn back the extent of the cut F, and then, by a slight turn of the center C, the pin G is thrown into the recess *f*, where it is retained until voluntarily released or unlocked by the operator, the hook formed by the recess *f*, as described, effectually preventing untimely release of the center C by any ordinary action or handling of the lathe.

I claim as my invention—

1. The combination, in the tail-stock of a lathe, of the self-adjusting nut M and socket P with the working screw N, the post L, the swing part H, the saddle K, and pivot J, substantially as described.

2. The combination of the plain detachable taper bush D at the back end of the lathe-spindle with the pump-center C and the lathe-spindle A, substantially as described.

CALEB HOPKINS.

Witnesses:
C. E. VAN NORMAN,
F. E. HOLLOW.