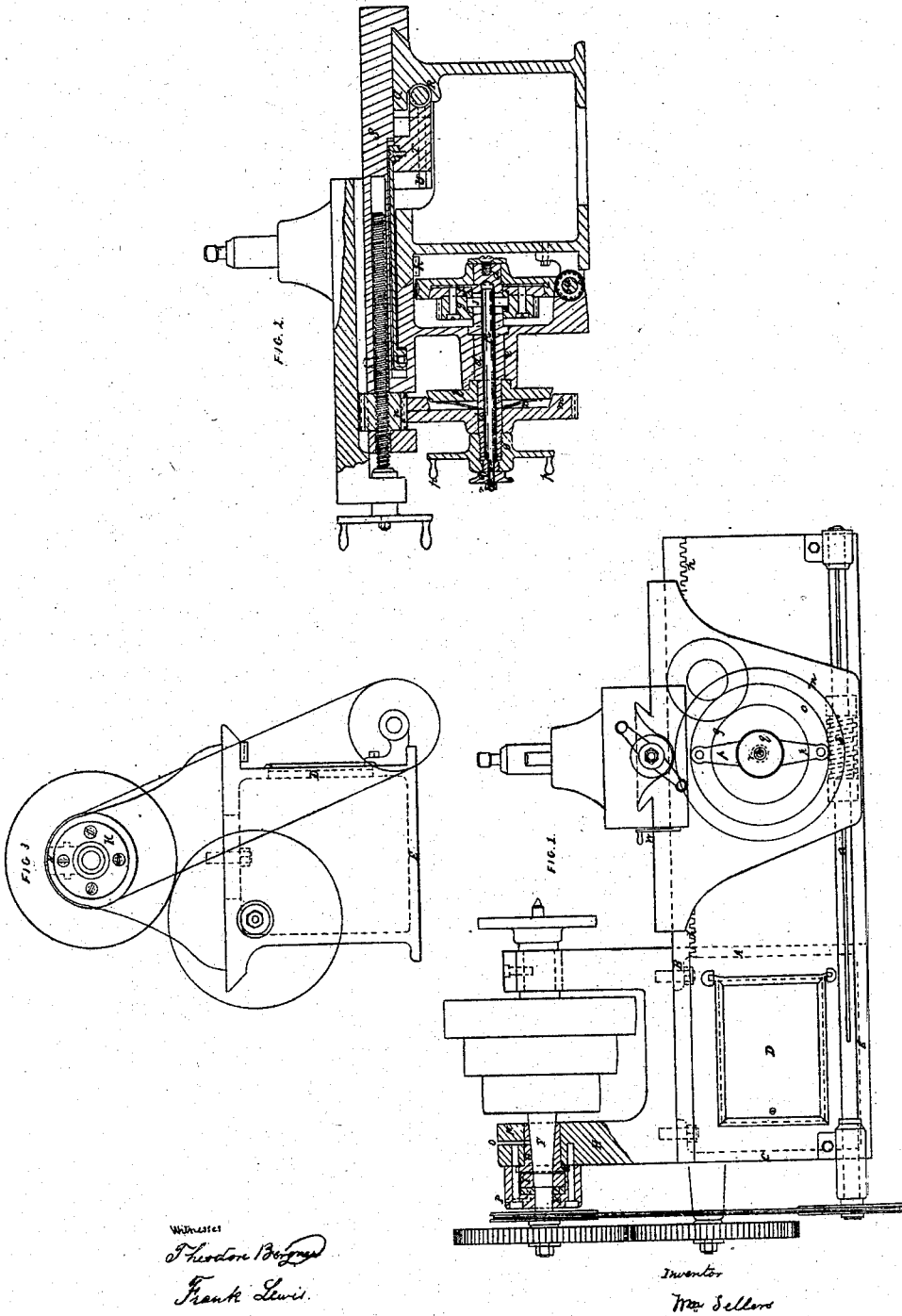


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LATHE FOR TURNING IRON.

No. 74,609.

Patented Feb. 18, 1868.



Witnesses  
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# UNITED STATES PATENT OFFICE.

WILLIAM SELLERS, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN LATHES FOR TURNING IRON.

Specification forming part of Letters Patent No. 74,609, dated February 18, 1863.

*To all whom it may concern:*

Be it known that I, WILLIAM SELLERS, of the city of Philadelphia, in the State of Pennsylvania, have invented certain Improvements in Turning-Lathes for Metal or Wood; and I hereby declare the following to be a full and exact description thereof.

The objects of my invention are, first, to secure the fixed or live head to the shear or bed of the machine in a neater, more secure, and convenient manner than has heretofore been done, while at the same time a tool receptacle or closet is formed in the bed; second, to so arrange the back journal of the spindle that it shall be supported in a solid conical bearing, that its end-thrust shall be received upon surfaces contained within an oil-tight box, that it shall admit of accurate adjustment to compensate for wear, and that the spindle, with its cone-pulley upon it, can be lowered vertically into place, thus shortening and rendering compact all the parts of the head; third, to so place the lead-screw of the lathe that it shall be entirely protected from dirt, and to effect the engagement and disengagement of the slide-rest with the screw horizontally, so as to allow the cross-girths, upon which depend the stiffness of the bed, to be carried higher up or nearer to the top of the shear than has heretofore been done; fourth, to operate the longitudinal and cross feed from the same worm-wheel and worm, in such a manner that either one may be set in motion by the same handle, moved in the same direction, the feed used being determined by a separate adjustment.

To render clear the nature of my invention, and to enable any intelligent mechanic to construct a machine on the same principle, I will explain the theory and operation of each part in the order of the objects as specified, referring to the annexed drawings, making part of this specification, in which—

Figure 1 is a side elevation of the lathe, showing part of the head in section. Fig. 2 is a sectional elevation of its shear or bed and of the slide-rest. Fig. 3 is an end elevation of the back bearing, to show the opening in the upright for the admission of the spindles; similar letters on each referring to similar parts.

In attaching the fixed or live head to the

shear or bed, I place the first girth, A, of the bed flush with the face-plate end of live-head and turn a flange, B, in under the live-head. The end girth C is also flanged in the same manner. Through these flanges I pass short bolts, screwed into the under side of the head, and having nuts below the flanges; or, when the case will permit, I core out the live-head, leaving flanges to correspond with those in the bed, and then make use of through-bolts, with their heads above and their nuts below. To afford access to these bolts, I arrange an opening, D, in the side of the bed, which enables me to use shorter and less elastic bolts than if they passed entirely through the bed and were screwed up from below. (This, in large lathes placed on foundations, would not be admissible.) As thus arranged, the head likewise presents a neater appearance than if it were held down by bolts outside. To increase the strength and stiffness of the bed below the live-head, I close the bottom of the shear by a solid web of metal, E. The opening D, I also close by a door, and thus provide a convenient tool receptacle or closet in the bed.

In arranging the back bearing of the live-head to attain the objects specified, I form the back journal F of the spindle conical, with the base of the cone toward the front-end of the spindle. To this conical part I fit a brass bearing, G, cylindrical on its outside, and fitting into a hole in the back upright H of the live-head. On the spindle, and back of the conical bearing, I key a hardened-steel collar, I. To hold the brass bearing G in place, and to furnish the means of receiving the end-thrust of the spindle, I bolt to the back of the head the tail-block K, which surrounds the spindle, and contains within it a hardened-steel ring, L, to match the steel collar I on the spindle. This block K is recessed to receive the flange M of the brass bearing G, and the bolts which fasten the tail-block to the head pass through the flange M, thus preventing the bearing G from turning.

To permit the spindle, with its cone-pulley upon it, to be readily placed in position, and to avoid the necessity of allowing space enough between the two uprights of the live-head to slide the spindle and cone diagonally into the hole in the back upright, as is customary in

lathes provided with a solid back bearing, I, cut an opening through the upper part of the back upright, (see M, Fig. 3,) which opening I fill with a block, N, tongued into the head, and sliding into it from the back end. This opening is a little wider than the diameter of the spindle within it, and will permit the spindle to be lowered vertically into place before the brass bearing G is put in. The block N is held in position by one bolt in the tail-block K. The spindle is continued through the tail-block K, and to its overhanging end are fitted the necessary change wheels and pulleys for the feeds. The tail-block K is so fitted to the head as to form an oil-tight joint and to constitute an oil-box, to retain the oil within the bearings, and thus insure thorough lubrication of the sliding parts.

Oil is fed to the conical journal F through the oil-hole O, which passes through the block N and the bearing G, and to the steel plates through the oil-hole P, which passes through the steel plate L, and delivers the oil to the collar I, the collar I being furnished with radial grooves to distribute the oil.

The adjustment of this species of bearing and tail-block is effected by turning off some of the flange M next to the head, and by packing between the tail-block and the flange, so as to advance it farther upon the conical journal F, and thus take up the lost motion, and by packing out the steel plate L to adjust the spindle endwise.

The sliding surfaces are large, and being well oiled are not liable to wear; hence adjustment is seldom needed; but when once made cannot be tampered with by inexperienced workmen, who sometimes cause much undue friction and injury to the lathe by injudicious handling of the tail-screw.

To protect the lead-screw from dirt, and to stiffen the shear by cross-girths as near to the top of it as possible, I arrange in the bed, immediately under the overhanging edge of the shear-top Q, a bearing, R, running the whole length of the screw, which serves as a trough, in which the lead-screw rests, and incloses about one-half of its circumference.

To effect the engagement and disengagement of the saddle or slide-rest S with the screw, I arrange a segment of a nut, T, sliding horizontally in grooves U in a projection downward of the slide-rest S. This nut T is forced into gear, or drawn out of gear, by means of a rod, V, passing through the slide-rest over the top of the shear, and is operated by a handle and crank, W, one-half revolution of which effects the desired motion.

I am well aware there is no novelty in supporting the lead-screw in a trough its entire length, such a device having been patented by Edward Bancroft and myself, February 7, 1854; but in all previous cases the screw has been only partially protected from dirt, and the nut has been moved vertically, hence requiring more room below the slide-rest than in my arrangement, and has prevented the

cross-girths, which unite the sides of the shear, being carried so near to the top of the bed.

In a turning-lathe arranged with a longitudinal feed for turning cylindrical work and a cross-feed for facing, the two feeds are never wanted at one and the same time, and serious injury would accrue to the work if the workmen should inadvertently throw the wrong feed into gear. To avoid this difficulty I arrange the two feeds in the following manner: Upon the feed-shaft *a* is feathered a worm, *b*. This worm gives motion to the worm-wheel *c*. The worm-wheel *c* is fastened to the end of the shaft *d*, which shaft is supported in a bearing, *e*, attached to the slide-rest or saddle. The worm-wheel is recessed so as to form a female friction-clutch. Sliding on the shaft *d* is a male friction-clutch, *f*, to match the clutch in *c*. Attached to this clutch *f* is a spur-wheel, *g*. This wheel conveys motion to the pinion gearing into the rack *h*. On the under side of the shear-top, between *g* and *f*, is a loose collar, *i*. Through this collar *i* passes a key, *j*. The key *j* fits sidewise in a slot through the shaft *d*, but has room to move back and forth. Through the center of the shaft *d* passes a rod, *k*, and through the end of this rod the key *j* also passes. The rod *k* is free to move endwise, and is designed to operate the clutches *g f*. Outside of the bearing *e* is keyed upon the shaft *d* a male friction-clutch, *l*, and loose upon the same shaft is the female half of the friction-clutch *m*. Between the two, *l* and *m*, is a steel spring, *x*, which tends to force them apart. The periphery of the clutch *m* is provided with teeth gearing into a spur-pinion, *n*, which pinion is the nut of the cross-feed screw in the saddle. The outside end of the shaft *d* has a screw cut upon it, and the nut of this screw is the hub O of the cross-handle *p p*. Tapped into the same hub O is a screw, *q*, with a milled head. Through this screw *q* passes the rod *k*, which is reduced in diameter where it passes through the screw, and is swiveled to the screw by a collar, *r*, outside of it, so as to rotate freely but have no lost motion endwise. The screw *q* has a limited motion, but is so adjusted that if it be screwed into the hub O as far as possible, as is shown in Fig. 2, and then the nut O be screwed up as far as possible, the male clutch *f* will be forced into gear with the female clutch *c* before the female clutch *m* will have reached the male clutch *l*. Upon the unscrewing of the nut O both clutches will be separated. If, however, the screw *q* be unscrewed as far as possible, and then the nut O be screwed up, as before, the female clutch *m* will gear with the male clutch *l* before *f* will reach *c*. Thus, in the first place, the longitudinal feed will be engaged by screwing up the nut O and, in the second case the cross-feed will be engaged by the same motion in the same direction of the nut O. Hence it is evident that the feed to be used is determined by the adjustment of the screw *q*; but, after such adjustment has been made, the engagement and disengage-

ment of the feed are effected with certainty and without the exercise of caution on the part of workmen.

Having thus described my invention as to its object and mode of operation, it will be readily seen that its essential features are novel in the theory of their operation, and are not to be limited to the exact form and arrangement of parts as described, but may be modified to suit the nature of the case; therefore,

What I claim as new, and desire to secure by Letters Patent, is—

1. Attaching the fixed or live head to the shear or bed by bolts passing through and straining upon the flanges on the cross-girths in the bed, as described.

2. Forming a hole in the side of the lathe-beds, for the purpose of operating the bolts or other holding-down apparatus for the live-heads, substantially as described.

3. Casting a web across the bottom of lathe-beds between the two girths under the head, for the purpose of stiffening the bed when a hole is made in the side, and to form a secure tool-receptacle in the same, substantially as described.

4. Supporting the back journal of the spindle in a solid conical bearing, when this bear-

ing is held in position by an oil-box, substantially as described.

5. Receiving the end-thrust of the spindle upon collars placed inside of an oil-box at the rear of the back bearing, when this box is so arranged as to permit the spindle to pass through it, for the purpose specified.

6. The block N, substantially as described, and for the purpose specified.

7. Placing the lead-screw under cover and in a bearing its whole length, substantially as described.

8. Engaging or disengaging the saddle or slide-rest with a feed-screw, supported as described, by means of a segment of a nut moving horizontally, for the purpose specified.

9. Operating the longitudinal and cross-feed of the lathe by two clutches on the same shaft, in the manner substantially as and for the purpose specified.

10. Engaging and disengaging both clutches by movements of the same handle in the same direction, substantially as described.

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Witnesses:

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