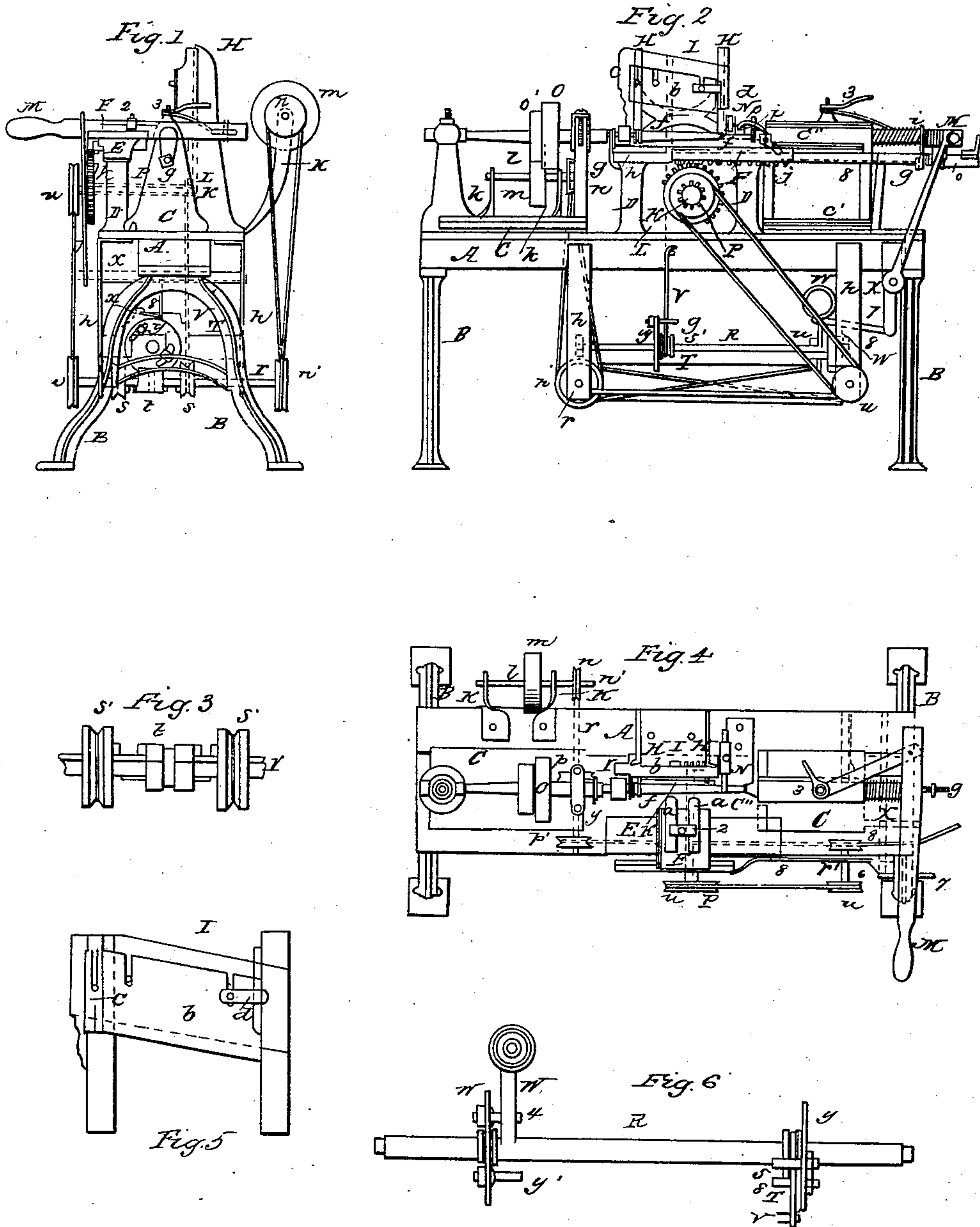


S. R. LEWIS.  
Turning Lathe.

No. 83,181.

Patented Oct. 20, 1868.



WITNESSES  
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# United States Patent Office.

STEPHEN R. LEWIS, OF ROCKFORD, ILLINOIS.

Letters Patent No. 83,181, dated October 20, 1868.

## IMPROVEMENT IN TURNING-LATHES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, STEPHEN R. LEWIS, of Rockford, in the county of Winnebago, and State of Illinois, have invented a new and useful Turning-Lathe; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, forming part of this specification, in which—

Figure 1 is an end view of the lathe.

Figure 2 is a side perspective view of the same.

Figure 3 shows a section of shaft *r*, with the loose pulleys *S* *S* and sliding clutch *t*.

Figure 4 is a top view of the machine.

Figure 5 shows tool-rest *I* and finishing-knives *b*, *c*, and *d*.

Figure 6 shows shaft *R* and its attachments.

My invention has reference to an improvement in that class of lathes designed for producing work of uniform shape, and is especially adapted for the manufacture of "bobbins," spools, chair-work, &c.; and consists in certain combinations of devices hereinafter to be set forth.

In the drawing, the legs *B B B B* support the bed-piece *A*, upon which are the head-block *C* and tail-block *C'*, which do not differ materially in these parts from those in common use.

The columns *D D*, resting on the bed-piece *A*, support the elevated way *E*, upon which the tool-rest *F* moves.

The tools *a a'* are fastened to the tool-rest *F* by a plate and set-screw, 2.

The way *H* is fastened perpendicularly to the bed-piece *A*, on which moves the tool-rest *I*, having secured to it the finishing tools *b c d*.

The cutting-tools *a a'* receive a movement longitudinally with the worked piece *f* by means of the rack *J*, fastened to it, and operated on by the segment-wheel *K*.

The tool-rest *H* receives its up-and-down movement by means of the rack *L*, secured to it, which is operated upon by the pinion *K'*, upon the same shaft with segment-wheel *K*.

The tail-centre *C'* is thrown back, when the tightening-screw 3 is released, by the action of the coiled spring *i*, placed upon it, and is brought forward by the lever *M*.

The steady-rest *N* serves the double purpose of supporting the tail-centre, and of stripping from it the end of the block cut from the finished work by the chisel *d*.

The stripping-rod *g* is bent, with one eye clasping the head-centre, and running thence under the work, is fastened to the tail-centre, which, being thrown back, removes any block which may remain upon the head-centre, cut from the finished piece by the chisel *c*.

When it is desired to move the cutting-tools by hand-power, the machine, as above described, is complete, and is thus operated:

The head-centre receives motion by means of a belt running over pulley *O*, in the usual manner, and the piece to be turned being placed in proper position on the centres, (tool-rest *F* being at rest on the right-hand end of way *E*, and tool-rest *I* at the upper end of way *H*), the shaft *P* would be turned to the left hand by a crank fastened to it, which would move the tools *a a'*, by means of the rack *J* and segment-wheel *K*.

When the segment has moved the tools *a a'* the length required to perform the work, the cogs end, and of course the tools *a a'*, are at rest, while the continued revolution of the shaft brings the finishing-tools *b, c*, and *d* to bear upon the piece *f*, by means of pinion *K'* operating the rack *L*, which are thereby moved past the piece, giving it the desired form.

Reversing the crank brings the tools to the place of rest, when the tightening-screw 3 is loosened, and the coiled spring *i*, having thrown back the tail-centre *C'*, the piece *f* is removed, and the operation may be repeated at pleasure.

It will be seen that the tools *a a'* are in motion only a part of the time while the crank is being turned, while the tools *b, c*, and *d* move continually, but, from the distance to be traversed, only act a part of the time upon the work, that is, after the tools *a a'* have traversed the piece and stopped.

This description of the machine is applicable to it when the "feeding," that is, the moving of the tools, is performed by hand-power.

In order to facilitate the operation of the machine, the cutting-tools are caused to move automatically, by the following-described devices:

To the bed-piece *A* are fastened the supports *k k* of shaft *l*, upon which are the pulleys *m* and *n*. From the bed-piece *A* is suspended the shaft *r*, on its hangers *h h*, on which are the pulleys *n', p p'*. In like manner the shaft *r'* is suspended, having on it the clutch *t*, the loose clutch-pulleys *S' S*, and the fast pulley *u*. The clutch *t* is slotted, and slides upon the shaft *r'*, on a stationary key, and may connect either with the pulley *S* or *S'*, either of which is made rigid with the shaft thereby, or it may rest between them, in which position both the pulleys move freely upon the shaft.

Upon shaft *P* is also the pulley *u*.

The shaft *R* is supported on cross-ties from the hangers *h h*. Upon this shaft is the wheel *w*, slotted for the studs 4 4'; also the wheel *y*, slotted for the studs 5 5'. In connection with the wheel *y* is the loose arm *T*, held between the adjustable studs 5 5', which is connected with rack *L* by the pitman *V*. The weighted arm *W* is also fastened to shaft *R*, holding the wheel *w* within certain limits, by the adjustable studs 4 4'. This wheel *w* is loose upon shaft *R*, and has an extension, from its periphery downward, in which is a stud, moving in the groove of the sliding clutch *t*.

Shaft *x* is also suspended, on suitable bearings, from



the bed-piece A. On this shaft are the lever 7 and arm 7'. Attached to the arm 7' is the thrust-rod 8, the end of which passes through a bearing in the cross-tie, which extends from hanger *h* to *h*.

Attached to the rack J is the thrust-bar 8', having secured to it the trip-block 6.

The pulley *m* should receive motion by a belt running from pulley O'.

A belt runs from pulley *n* on shaft *l*, with a half turn to pulley *n'* on shaft *r*. An open belt runs from pulley *p* to loose pulley S' on shaft *r'*. A crossed belt runs from pulley *p'*, on shaft *r*, to loose pulley S' on shaft *r'*. An open belt runs from pulley *u*, on shaft *r*, to pulley *u'*, on shaft P.

In operation, the feeding-device receives motion from the main head-centre pulley, O', by a belt passing over pulley *m*, which, in turn, communicates motion, by a half-turn belt, to shaft *r*, on pulley *n'*. An open belt, running from pulley *p* to loose pulley S, imparts motion to shaft *r'*, when the sliding clutch *t* is in mesh with said pulley, which, in turn, gives motion to shaft P, through the medium of the open belt running from pulley *u* to pulley *u'*, on shaft P.

The rotation of shaft P meshes segment-wheel K into rack J, driving forward the tool-rest F; and the forward rotation of shaft P also brings down the finishing-knives *b*, *c*, and *d*, by means of the pinion K' meshing into rack L.

Rack L communicates motion to shaft R, by the pitman V, attached to arm T, which, when the finishing-knives are fully down, has so far turned the shaft R as to bring the weighted arm W past its centre, when the weight, falling to the rear side, throws the clutch *t* into mesh with pulley S', which, through its crossed-belt connection, reverses the motions just described.

The back movement of tool-rest F brings the trip-block 6, of thrust-bar 8', against lever 7, thereby pushing it back, and hence throwing forward the thrust-rod 8, against which the weight W rests when it passes the centre, in which position the clutch *t* is free from both the loose pulleys, S and S', and hence the tools rest, permitting the removal of the finished piece *f*, and another block put on the centres.

In removing the finished piece, the nut 3 is loosened, when the tail-centre is thrown back by the coiled spring *i*, the rest N stripping from the centre any block which may have been left on it by the finishing-tool *d*, while, by the same movement, the stripping-rod *g* removes any block which may have remained on the head-centre by the action of the cutting-tool *c*.

Bringing forward lever M, to fasten the tail-centre in the block *f*, draws with it lever 7, and thereby thrust-rod 8, which permits the weight W to pass over, which throws clutch *t* into mesh with pulley S, hence starting the feeding-devices, as just explained.

In this invention, special attention is asked to the following, among other points:

First. The tool-rest F may support any desired number of cutting-chisels, and when more than one is used, the front one should be placed higher than the next behind it, so as not to cut so deep. In this arrangement the passage of the chisels along the way E will bring the piece *f* to a uniform size, and the segment having passed the rack J, the continued rotation of shaft P does not move the tools *a a'*, but brings the finishing-knives *b c d* to the piece *f*, giving it the desired form. The finishing-knives may be of any desired form, and may be made of as many pieces as is thought most convenient, and, being fastened securely to the perpendicular tool-rest I, will insure a uniformity of the finished work.

Second. It will be seen that the rotation of shaft P

gives an intermittent motion to the tool-rest F, by means of the segment-wheel K and rack J, whereby these tools, having passed the length of the piece *f*, stop, while the finishing-tools give it the desired form. These finishing-tools receive motion by the pinion K' on shaft P, and receive a reciprocating motion by reversing the motion of the shaft. These tools are at rest on the way H, at the upper end, in which position they do not interfere with the removal of the piece *f* and replacing a new piece. The shaft P may be turned by a crank when the increased speed of the automatic feeding-device is not deemed a sufficient compensation for its cost.

Third. The stripping-rod *g*, claspings the head-centre, is connected to the tail-centre, so that the rod shall clear the head-centre of any block which may have been left upon it by the finishing-knives, and, at the same time, the steady-rest N, which supports the tail-centre when thrown forward, strips from it any block which may have been left on it by the finishing-knives, when it is thrown back.

Fourth. It will be observed that the shafts *l* and *r* have a constant motion in one direction, by means of the belts already described; but, since the shaft P must reverse its motion, and also be a portion of the time at rest, the two pulleys, *p p'*, fast upon shaft *r*, and the two loose pulleys, S S', upon shaft *r'*, with the sliding clutch *t*, will give all these conditions; for, when the sliding clutch *t* connects with pulley S, the cutting-tools, through the system of belts already described, will receive a forward movement, and when the clutch is connected with pulley S', a backward movement, and will rest when the clutch is free from both pulleys.

Fifth. The clutch *t* receives its motion from the stud in the arm of wheel *w*, which wheel is loose upon shaft R, but limited in its movements by the studs 4 4', on either side of the weighted arm W. This shaft R receives its motion from the pitman V, connecting the rack L, attached to the tool-rest I, through the loose arm T, which is limited in its movement by the studs 5 5', fastened in the wheel *y*. It will be seen that the action of pitman V upon this shaft will raise the weighted arm W, and when it has passed the centre, will fall to the other side, carrying with it wheel *w*, by means of the studs 4 4', and hence clutch *t*, which, connecting with the opposite pulley, will reverse the motion of the tools, as already described.

Sixth. As has been already stated, it is necessary to bring the cutting-tools to rest while the piece *f* is being replaced, and, since the weighted arm W would always incline to throw the clutch *t* into mesh with one or the other of the pulleys S S', I obviate this difficulty by the thrust-rod 8, against which the lever W may rest until the rod is drawn back by the action of lever M upon lever 7. This thrust-rod is thrown forward, by means of the trip-block 6, upon thrust-bar 8', which is secured to the tool-rest F; the backward movement of which brings trip-block 6 against lever 7, which rotates shaft *r*, and thus throws forward the thrust-bar 8, which is connected to lever 7'.

Having thus described my invention,

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

The combination and arrangement of the tool-rests F and I, with the cutting-tools secured thereto, with segment-wheel K, and pinion K', and racks J and L, the whole constructed substantially as described, and operating as and for the purpose set forth.

STEPHEN R. LEWIS.

Witnesses:

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