J. T. Hawkins.

Gage Lathe.

No. 87,929. Patented Mar. 16, 1869.

Fig: 2

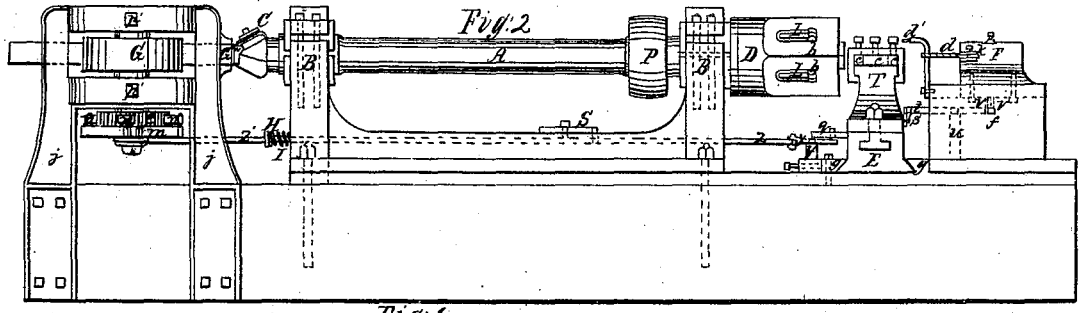


Fig: 6

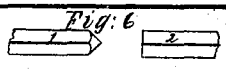


Fig: 4

Fig: 5

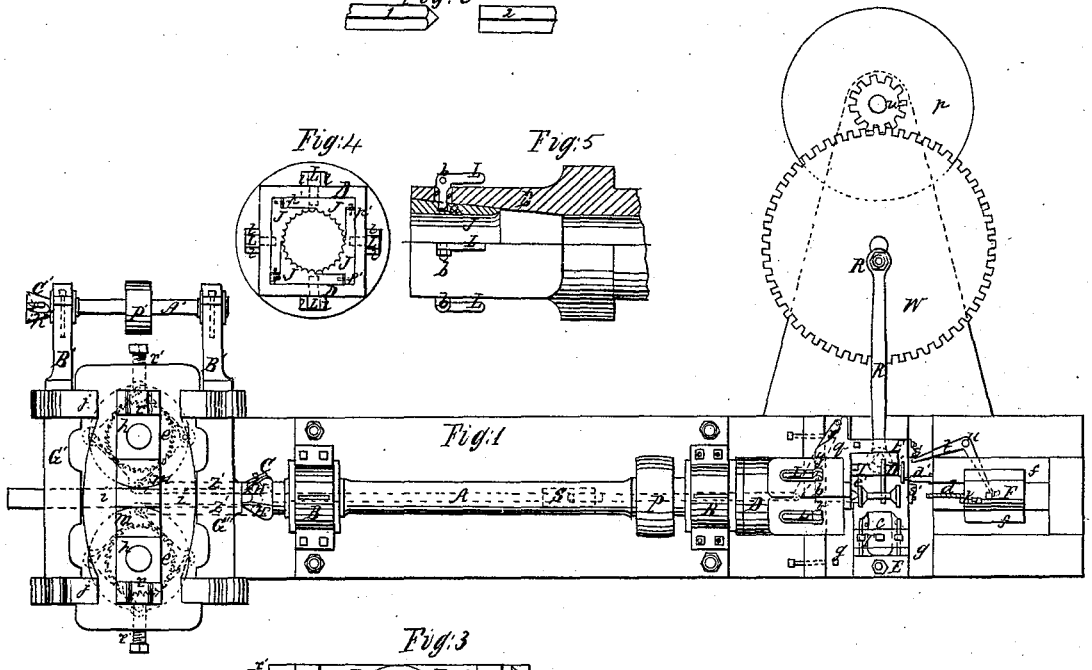
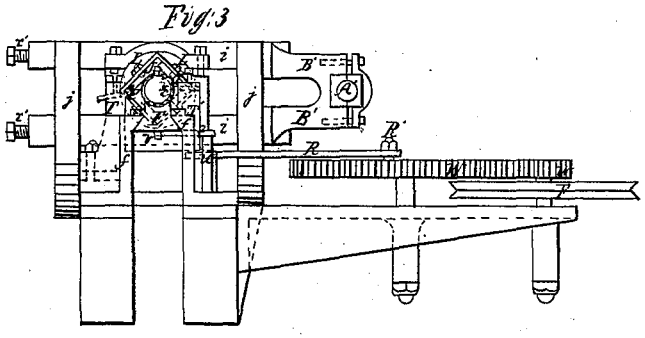


Fig: 1

Fig: 3



Witnesses
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JOHN T. HAWKINS, OF ANNAPOLIS, MARYLAND, ASSIGNOR TO HOLT, HAWKINS & CO., OF SAME PLACE.

Letters Patent No. 87,929, *dated March* 16, 1869.

IMPROVEMENT IN LATHE FOR TURNING SPOOLS.

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, JOHN T. HAWKINS, of the city of Annapolis, in the county of Anne Arundel, and State of Maryland, have invented a new and useful Machine for the Manufacture of Thread or Silk-Spools, and other solids of revolution, of wood or other material; 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 drawings, making a part of this specification.

Construction.

Figure 1 is a plan view,

Figure 2, a front elevation, and

Figure 3, an end elevation of the machine.

Figure 4 is an end view of the centrifugal chuck, on a larger scale, and

Figure 5 is a longitudinal view of the same, one-half being shown in section.

Figure 6 is a view of the sticks, or blanks, as prepared for the machine.

Like letters refer to like parts.

A is a hollow mandrel, running in suitable bearings, B B, driven by means of the pulley P.

C is a cutter-head, secured to the end of the mandrel A, rotating with it, and carrying one or more knives, or cutters, for the purpose of roughing out the stick, or blank, into a cylindrical form, before entering the hollow mandrel A.

D is a chuck, or holder, secured to or forming a part of the hollow mandrel A.

Within this chuck, and sliding upon inclined surfaces upon its interior, are two or more jaws, J J J J, symmetrically arranged with reference to the axis of A, and so constructed that their inner outlines shall form an opening, parallel in the direction of the axis of A, and of such form of transverse section as to be suited to gripe, or hold the particular form of stick, or blank, to be fed into or through them, and hold it securely and central, while being cut or turned into the required form.

L L L L are four right-angled levers, working upon the pins or bolts, *b b*, which pass through lugs *l l*, formed upon the chuck D.

One arm of the lever L passes through the slot *o*, in the chuck D, and engages a suitable slot, or opening, *a*, in the jaw J.

The other arm of the lever L lies outside of the chuck D, and generally parallel to the axis of the mandrel A, and by the centrifugal force generated by the rotation of the chuck D, causes the jaws J J J J to be forced up the inclined surfaces upon the interior of the chuck D, and thus closes the opening formed by the two or more symmetrical jaws J, accommodating the size of the opening to moderate variations in the size of the stick, or blank fed into or through it, as well as securing the stick, or blank rigidly and central with reference to the axis of the mandrel A, while being cut or turned.

p' p' p' p' are four dowel-pins, each being secured at one end in one of the jaws J, and sliding in the other, insuring the simultaneous motion of the four jaws, J J J J, and a central position, always, for the opening formed by them, or for the stick held by them.

E is a slide, moving in suitable guides *g g*, and carrying the tool, or cutter-stocks T and T'.

The slide E is actuated by the gear-wheel W, pinion *w*, and pulley *p*, through the connecting-rod R, and the crank-pin R'.

The cutter-stock T carries the cutters *c c c c c*, or any number or form of cutters required to form the particular article to be formed or turned.

The cutter-stock T' carries a single inverted cutter, *c'*, for the purpose, principally, of cutting off the spool or other piece when finished, but may be so formed as to give part of the ultimate form to the piece to be turned.

The pulleys *p* and P, as well as the pulley P', are driven by belts from suitable pulleys upon the same counter-shaft, or by any other means that shall insure the rotation of the mandrel A at the proper proportionate speed, whenever the slide E is in motion.

F is a sliding drill-stock, or holder, moving upon the guides *f f*, carrying a suitable drill, or bit, *d*, for the purpose of boring the hole in the spool or other piece being formed by the machine.

The sliding drill-stock, F, also carries one or more cutters, K, for the purpose of squaring the outer end of the spools to a uniform length, or for cutting any device upon the outer end that may be required in the form of the piece to be made.

The slide F is actuated by the adjustable dogs, or stops *s s'*, engaging the bent lever *t*, which vibrates upon the stud *u*, and engages the two pins *v v*, on the lower side of the sliding-stock F, or by any equivalent device.

The motion of the sliding drill-stock F is varied at pleasure, by changing the position of the dogs, or stops *s s'*, which are secured to the slide E, and move with it.

G G are a pair of feed-rolls, serrated upon their cylindrical surface, in the direction of their axes, and turning in suitable boxes *h h*, which slide in the guides *i i*, the whole being supported in the frames *j j*.

r r are cylindrical rubber springs, adjusted in tension by the set-screws *r' r'* bearing upon the boxes *h h*, for the purpose of permitting the rolls G G to accommodate themselves to variations in the thickness of the rough square stick, or blank, which is fed by them to the cutters in the cutter-head C, and thence through the centrifugal chuck D.

e e are two ratchet-wheels, each secured to the spindle of one of the rolls G.

m m are two pawl-wheels, each carrying four, or any number of pawls, *n n n n*, which engage the teeth of

the ratchet-wheels *e e*, and are so divided in the circle that but one of them can engage a tooth of the ratchet-wheel *e* at one time, thus enabling a division of the motion of the rolls into fractions which shall not exceed in length one-fourth of one tooth in the ratchet-wheel, for the purpose of varying the length of the spools, or other pieces to be made.

If it be necessary to vary the length of spool or other piece in a lesser quantity than corresponds to one-quarter of one tooth of the ratchet-wheels, it is done by varying also the width of the cutting-off tool *c'*.

The pawl-wheel *m* turns loosely upon the lower end of the roller-spindle, and is actuated by the adjustable cam *q*, which is secured to the slide E, through the lever *x*, vibrating upon the stud *y*, one end of which engages the slotted end of the sliding rod Z.

The rod Z is jointed to the two connecting-rods, Z' Z', at H, their other ends engaging pins upon the under side of the pawl-wheels *m m*.

The rod Z, with the connecting-rods Z' Z', and the pawl-wheels *m m*, are given the return motion by the spiral spring I, and the amount of motion given the pawl-wheels, and thus the rolls, is determined by the adjustable stop S.

B' B' are suitable frames, carrying the spindle A', which is driven by means of the pulley P', and carries upon its outer end a small conical cutter-head, C', containing one or more knives, or cutters, K', for the purpose of forming one end of the square stick, or blank I, fig. 6, into an obtuse cone, before being fed into the rolls G G.

G' G'' are guides secured to the frames *j j*, having in each of them a square hole, slightly larger than the stick, or blank to be fed through the rolls. These guides are for the purpose of guiding the stick, or blank in line with the axis of the mandrel A.

The guide G'' also serves to prevent the stick, or blank from turning, after having left the rolls, and while the cutters in the head C are rounding the last end of it.

The cutters of cutter-head C work close to the guide G'', to insure that the stick, or blank shall not turn before it has been rounded throughout its entire length.

D' is a spring, secured to the cutter-stock T', and moving with it, for the purpose of throwing out the spool or other piece as soon as it is cut off by the cutter *c'*, the spring passing under a stationary pin, *d'*, and being released from it, at the proper moment, by its own motion.

Operation.

The sticks, or blanks are to be cut to length not to exceed the distance between the cutter-head C and the entrance to the jaws J of the centrifugal chuck D, in order that it may rotate with the mandrel A, as soon as it enters the chuck D.

The sticks, or blanks, if of wood or other material which may require the precaution, are to be placed on end in a shallow dish, or pan, containing water or other liquid, in order that the evaporation of the water thus soaked into them, may carry off the heat developed by the friction of the advancing knife upon the following blank, or stick, the blank, as soon as it is rounded by the cutter-head C, being pushed ahead through the mandrel A, and centrifugal chuck D, by the succeeding blank, as it passes through the rolls, the one being rotated by the chuck D, and the other being held from rotating by the rolls G G and the guide G''.

Before being fed into the machine, the dry end of the blank, or stick, is made to enter the cutter-head C, which forms it into an obtuse cone, as shown at 1, fig. 6, in order to reduce the friction between the adjoining ends of the blanks to a minimum.

The mandrel A, being in motion, the rotation of the wheel W withdraws the cutter *c'*, after having cut off the piece or spool last formed.

As soon as the cutter *c'* is withdrawn sufficiently to clear the stick, or blank to be fed through the chuck D, for the next operation, the cam *q* engages the pin on the end of the lever *x*, and through it and the rod Z, and connecting-rods Z' Z', causes the rolls G G to rotate an amount determined by the stop S, thus feeding the rounded blank through the chuck D the required distance.

Continuing the rotation of the wheel W, the dog, or stop, *s'*, engages the lever *t*, thus causing the drill, or bit, *d*, to enter the spool or other piece.

Simultaneously with the last operation, the cutter-stock T, with the cutters *c c c c c*, advance and cut the spool or other piece to the required form, the time of motion of the drill-stock F and the cutter-stock T being so arranged that the drill, or bit, *d*, shall have passed a considerable distance into the spool or other piece before the cutters *c c c c c* begin to cut, thus forming a support for the outer end of the piece being turned or cut.

In cases where no hole is required in the piece to be turned, the dogs, or stops *s s'*, may be removed, the drill-stock F secured in position, and the drill, or bit replaced by a suitable conical or other centre to serve for such support to the outer end of the piece to be turned.

Continuing further the rotation of the wheel W, the cutters *c c c c c*, and the drill, or bit *d*, are withdrawn, and on the return stroke of the slide E, the cutter *c'* is advanced, cutting off the spool or other piece, now otherwise complete.

When the drill, or bit *d*, has been made to pass into the spool or other piece the maximum distance, the cutter K turns or finishes off the outer end to the required length and form.

These operations being repeated, for every revolution of the wheel W, a spool or other piece is completed.

When the cutter *c'* has just cut off the finished spool or other piece, the spring D' is released from under the pin *d'*, and throws the spool or other piece out, clear of the machine and the shavings, or cuttings, into a suitable receptacle provided for that purpose.

Claims.

I claim—

1. The centrifugal chuck, or holder D, with its centrifugal arms, or levers L L, and jaws J J J J, sliding upon its inclined interior, or its equivalent, for the purpose set forth.

2. The combination of the cutter-head C, and its cutters, with the guide G'', as specified.

3. A blank, from which to manufacture spools or other articles, when pointed at one end and operated in the manner described, and used in connection with the herein-described machine, for the purpose of reducing friction, as specified.

4. Feeding the rounded revolving stick, or blank by the pressure of the non-rotating stick, or blank upon it, in the manner described.

5. Soaking one end of each stick, or blank, in water or other liquid, in the manner and for the purpose set forth.

6. The arrangement of the rod Z, connecting-rods Z' Z', the pawl-wheels *m m*, and the ratchet-wheels *e e*, for the purpose specified.

7. The use of the cutter or cutters K, in combination with the sliding drill-stock F, operating as described for the purpose set forth.

8. The combination of the slide, or cutter-holder E, movable cutter K, centrifugal chuck D, hollow mandrel A, with the cutter-head C, and its cutters, and the guides G' G'', for the purpose described.

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Witnesses:

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