3 Sheets—Sheet 1.

G. W. GLAZIER & O. E. WAIT.

MACHINE FOR MAKING BOBBINS.

No. 172,622. Patented Jan. 25, 1876.

Fig. 1.

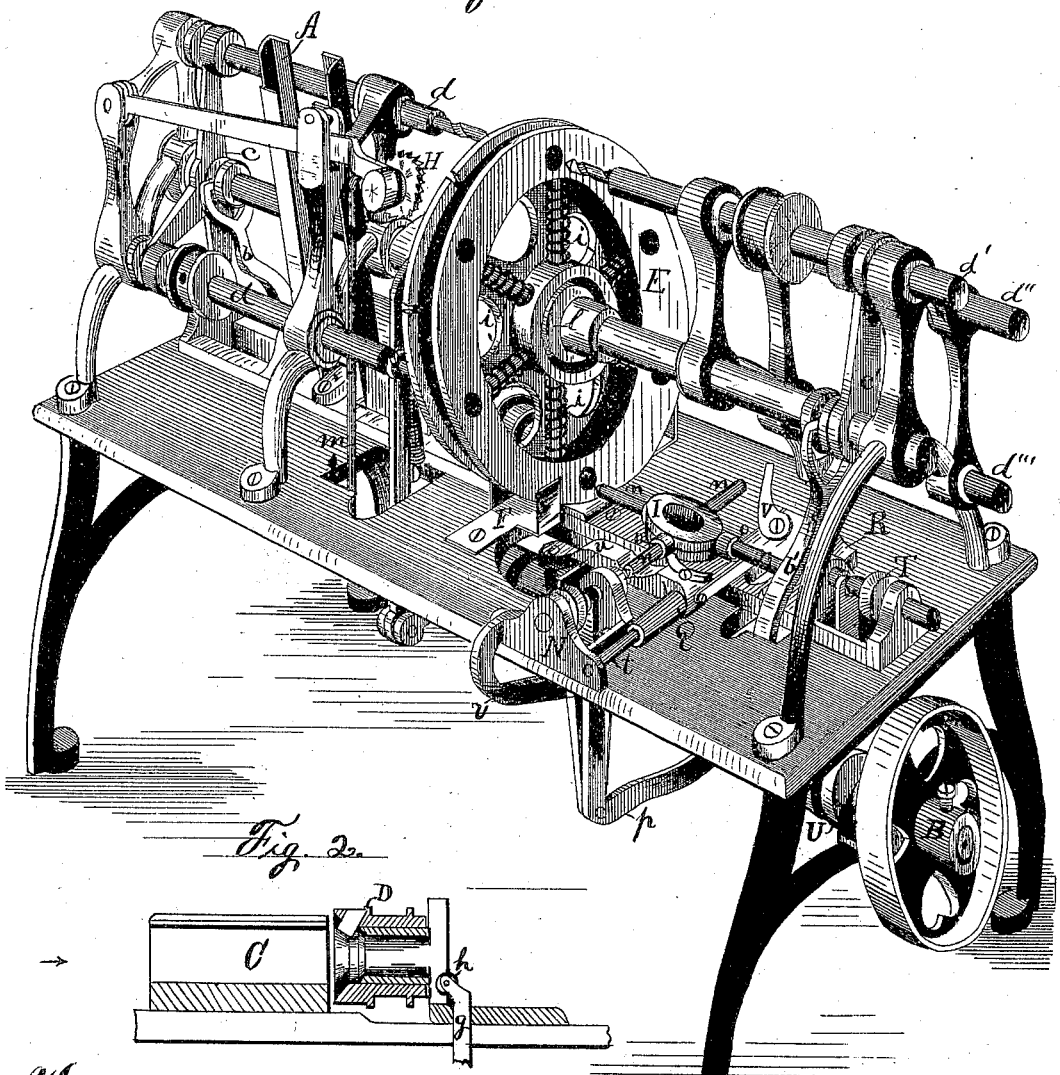

Fig. 2.

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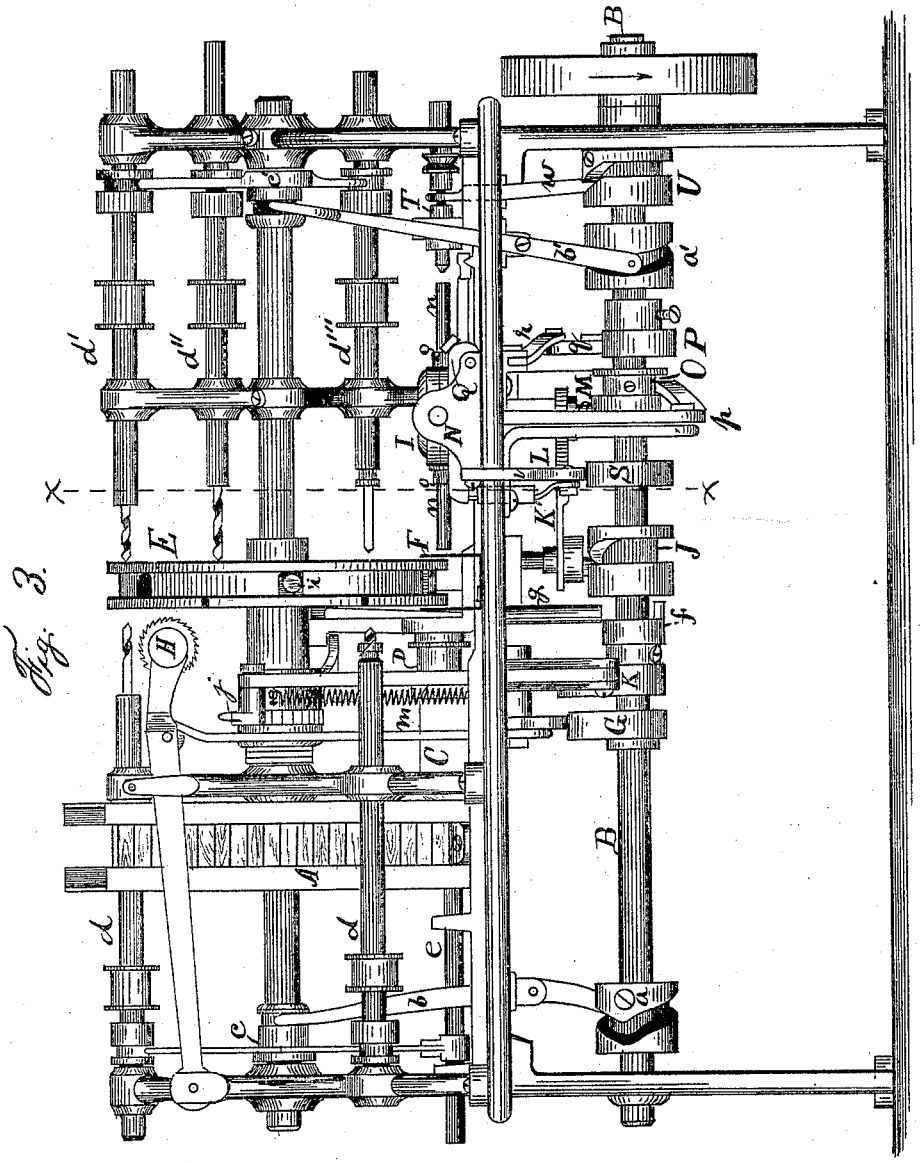

Fig. 3.

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Fig. 4.

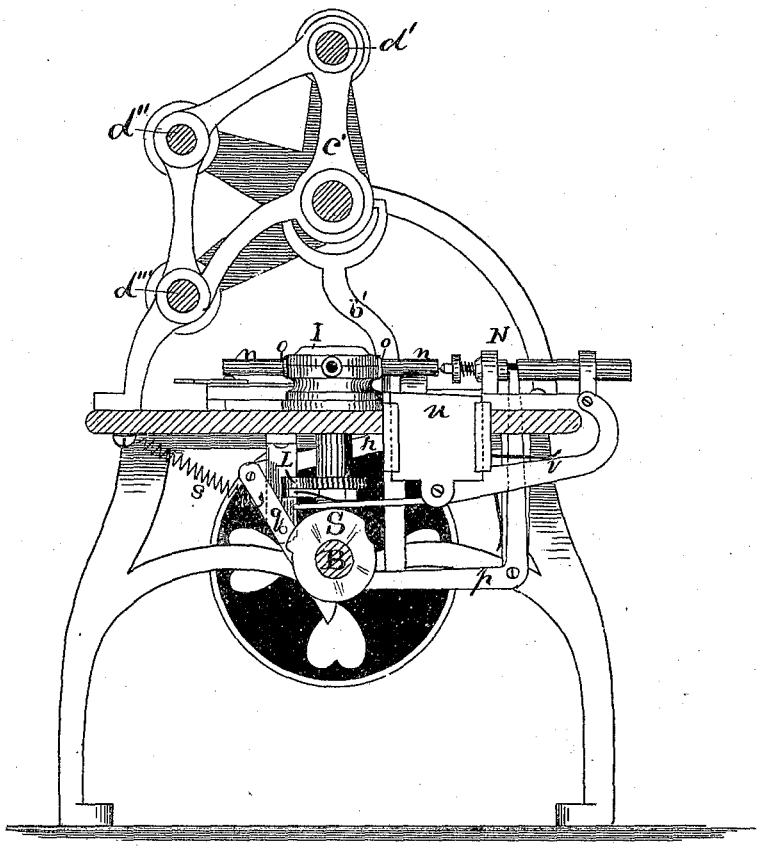
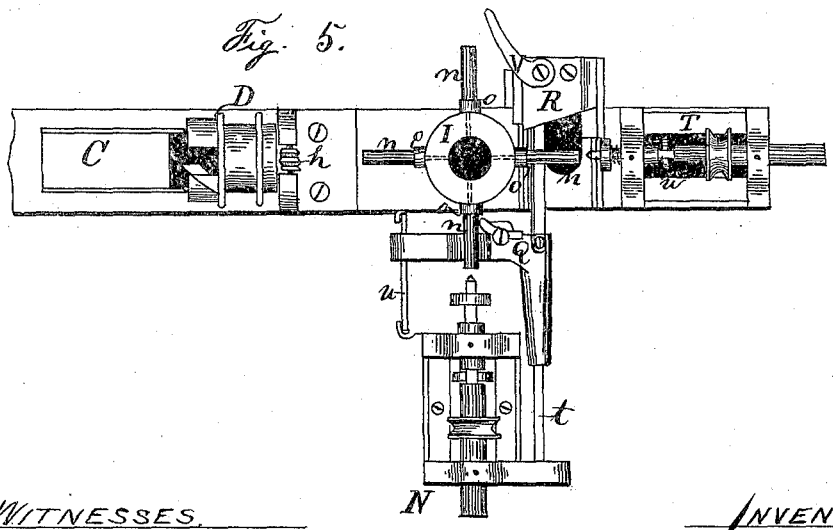


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE W. GLAZIER, OF SALEM, AND OSCAR E. WAIT, OF LYNN, MASSACHUSETTS, ASSIGNORS TO THE LAWRENCE SPOOL COMPANY.

IMPROVEMENT IN MACHINES FOR MAKING BOBBINS.

Specification forming part of Letters Patent No. **172,622**, dated January 25, 1876; application filed June 17, 1875.

To all whom it may concern:

Be it known that we, GEORGE W. GLAZIER, of Salem, and OSCAR E. WAIT, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in a Machine for Making Bobbins, of which the following is a specification:

Our invention consists of the peculiar construction and combination of devices, all as hereinafter described.

In the accompanying drawings, Figure 1 is a perspective view of a machine for making bobbins which embodies our invention. Fig. 2 is a vertical section of a detached portion. Fig. 3 is a front elevation of said machine. Fig. 4 is a vertical section of the same on line *x x* of Fig. 3, and Fig. 5 is a top view of a detached portion of the same.

The machine is designed for taking square blocks of the proper length for a bobbin, and automatically boring, reaming, turning, and slotting, thereby producing finished bobbins more uniform in size, and at much less expense, than by the methods heretofore employed.

Motion is imparted to the driving-pulleys of the various shafts, spindles, &c., by means of suitable belts. (Not shown.) Blocks, the cross-section of which is a square fully equal in its dimension to the proposed diameter of the largest portion of the bobbin designed to be produced, are placed or stacked in the hopper A lengthwise with the machine, as shown in Fig. 3.

The main shaft B is driven in the direction indicated by the arrow in Fig. 3, and the cam *a* on the left-hand end of said shaft engages with a forked lever, *b*, the upper end of which lever rests in the hub of a spider, *c*, to throw said spider toward the center of the machine. Two arms of said spider *c* are connected with drill-spindles *d d* and one arm with the plunger-rod *e*. Therefore the movement of the spider necessarily carries with it the spindles *d d* and plunger-rod *e*, the latter of which will strike against the lower one of the blocks in the hopper and push it forward into the box C. The cam *a* then draws the lever *b* and the parts connected therewith back to their former position, when all the blocks in the hopper A fall just the thickness of the block last removed.

Another revolution of the shaft B, and the plunger-rod *e* throws another block into the box C, which block strikes its predecessor and throws it out.

Directly in front of the box C is a hollow auger, D, Fig. 2, driven by a belt, (not shown,) and as the block protrudes from the box it enters the auger, and is turned off to a size designed for the head of the bobbin, the interior of the box C being of such size as to prevent the block from rotating therein; but as the chisel in the end of the hollow auger is set beveling to make a better cut, there is a portion of the block at the rear end not turned when it leaves the box C. Therefore some device must be employed to prevent the block from rotating with the hollow auger.

Upon the shaft B there is a cam, *f*, Fig. 3, above which there is a slide, *g*, working through the frame of the machine, and in the upper end of the slide *g* there is a roller, *h*. Just as the block is about to leave the box C the cam *f* engages with the slide *g*, and throws its roller upward, and embeds the edge of said roller in the turned end of the bobbin-blank now protruding through the hollow auger, and prevents said bobbin-blank from rotating therein while being grooved by the chisel of the hollow auger, after which the cam allows the slide and roller to withdraw. The indentation in the wood made by this roller is upon that portion which will in the finished bobbin be the smallest, so that the necessary subsequent turning wholly removes the mark made by the holding-roller.

Another revolution of the shaft B, and another block is pushed from the hopper, carrying before it the two preceding blocks, when the first one enters a socket in the lower part of the revolving head E, while the second block is turned off in the hollow auger, as before described.

The head E has six sockets, and revolves around a stationary cam, *l*. Clamping-rods *i* extend from the cam *l* to the sockets, which rods are provided with springs to withdraw the

rods from the sockets, the cam being smallest upon its under side, so that when each socket comes directly underneath the short arm at the under side of the cam the spring wholly withdraws the end of the rod from the socket. A ratchet and pawl, *j'*, Fig. 3, operated through means of a lever and cam, K, causes the head E to revolve with an intermittent motion, stopping at each sixth part of a revolution. A spring (not shown) engages with slots in the periphery of the head E, to prevent it from rotating when the blanks in the sockets are being operated upon, which spring is disengaged from the head by an arm extending to the rear of the ratchet and pawl *j;* but this mechanism for holding the head we do not claim as new, and any other known mechanism may be substituted therefor without changing the nature of our invention.

At the first movement of the head E after receiving the bobbin-blank, as before described, the end of clamping-rod is thrown into the socket by means of the cam *l*, so as to firmly bear against the blank and prevent it from turning within the socket.

Just in front of and under the head E there is an evener, F, which consists of two spring-arms, standing obliquely to the head, and being the farthest apart at the rear, also so far under the head that the socket will pass it before the clamping-rod gripes the blank within the socket. In case a block is thrown too far through the socket, or that they vary in length, the spring-arms of the evener F will bear against the ends of the blanks and move them lengthwise therein, so as to bring them central with the evener, and if the evener is set centrally with the head it will bring the blocks with each end protruding the same distance upon both sides.

Another revolution of the shaft B, and another round bobbin-blank is forced into the lower socket by pushing a block from the hopper, as before described, and simultaneously therewith the spider *c* is brought forward, and with it the spindles *d d*, the front one of which carries a drill and chisel, which drills a hole partially through the center of the blank and squares the end designed for the head.

Another revolution of the shaft B and the head makes another one-sixth of a revolution, and the cam G, through means of rod *m*, causes the saw H, driven by a belt, (not shown,) to pass by the end of the blank and cut a slot across its head. At the next revolution of the shaft B and movement of the head E the drill in the rear spindle *d*, and one in spindle *d'* at the right of the head, both move toward the head and drill a central hole in each end of the blank, which holes nearly meet each other.

The next movement of the head, and the same blank is brought in front of the spindle *d''*, when the hole is drilled completely through, and then in front of spindle *d'''*, when the central hole is reamed out, these spindles *d' d'' d'''* being moved forward by means of a spider, *c'*, lever *b'*, and cam *a'*, as before described for the spindles upon the opposite end of the machine.

If the machine has been properly supplied with blocks all parts of the machine work simultaneously—that is, so soon as the block moves from one device to another, it is followed up by another block, so that with a head having six sockets there are always six blocks in the head E, being simultaneously operated upon by the different tools herein described.

When the head has completed one revolution the clamping-rod *i* releases its gripe upon the blank. When another block is fed along, and another comes from the hollow auger into the lower socket, the drilled blank is pushed out by it and thrown upon one of the spindles *n* of the horizontal revolving head I. In the center of this head there is a recess or cup, from which cup holes lead through the spindles *n n n n*, as indicated by broken lines in Fig. 5, and at the shoulder *o* of said spindles there is a branch orifice opening into the main passages, in all of which wicking is supplied.

The cup in center of head I is supplied with oil, which is carried by the wicking to the shoulders *o* and ends of spindles *n*, so as to keep them well lubricated. A cam, J, on shaft B imparts a reciprocating motion to a segmental gear, K', Fig. 3, which meshes into a gear, L, loosely fitted upon the lower end of the vertical shaft of the head I, which gear L carries a pawl, (not shown,) that engages with a ratchet having four teeth on the lower end of the shaft of the head I, whereby at each revolution of the shaft B the head I is rotated one-fourth of a revolution.

Immediately underneath the head I, at the lower end of its shaft, there is a cam, M, Fig. 3, which engages therewith, and raises the head I a short distance just previous to every partial revolution of it, whereby the spindles and the work on them are lifted out of the way of the turning and other tools to pass by them without contact therewith.

The shoulders *o* of the spindles *n* on head I serve the purpose of a tail-block for the lathes hereafter described. If desired, a collar may be placed upon the spindle at this shoulder.

The round and bored bobbin-blank, after being forced from the head E onto the spindle *n*, is brought to the front and stopped directly in front of the lathe-head N, when the cam O, Fig. 3, operates the angle-lever *p* to throw the spindle of the lathe-head N forward, and force its dog into the slot at the end of the bobbin-blank, so as to cause it to revolve with the lathe-spindle.

A cam, P, through means of levers *q r* and spring *s*, moves the tool-carriages Q R back and forth. The tool-carriage Q of the lathe N is supported at the front by a round way, *t*, upon which it can turn, so as to allow of its rear end being raised and lowered. At the

rear of the lathe N the tool-carriage is supported upon an adjustable way, *u*, which way is secured to a hinged lever, *v*, which rests upon the cam S, having two concentric faces, as shown in Fig. 4.

Just at the time that the lathe-spindle engages with the bobbin-blank to revolve it, the lever *v* rests upon the largest one of the concentric faces of the cam S, and the cutting-tool is at the tail-block of the lathe, when the cam P throws the tool toward the lathe-head the length of the barrel of the bobbin to be produced, when the lever *v* drops and rests upon the smaller concentric face of the cam S, and the way *u* falls a little, thereby dropping the cutting-tool, and causes it to cut in deeper. The spring *s* then draws the carriage back, when the spindle of the lathe-head N withdraws, and the mechanism before described raises and moves the head I another quarter-revolution, bringing the now nearly-completed bobbin in front of the lathe-head T, when the cam U and lever *w* throw the spindle of the lathe T forward to engage with the bobbin and revolve it. The carriage R and its cutting-tool then pass under the bobbin to smooth it, and then return. The head I then makes another quarter-revolution, and stops with the bobbin at the rear of the machine, and at the next movement of the carriage R the catch V engages with the bobbin and crowds it off from the spindle, so that when it again comes in front of the socket in the head E it is ready to receive another blank, and so on with each successive spindle of the head I, and carrying them on to the various parts and through the various operations before described.

Although our machine is designed for making bobbins, it is evident that by changing some of the drills, chisels, cams, and other minor details, it may be used for making various hollow articles, such as spools, pill-boxes, &c. By changing the shape of the cam S, or substituting therefor cams of other shape for raising and lowering the adjustable way *u*, the shape of the work turned upon the lathe N can be varied, as may be desired.

We claim as our invention—

1. The intermittently-revolving head E, provided with sockets, as shown, in combination with an automatic clamping mechanism, *i l*, substantially as described, and for the purpose set forth.

2. The combination of the head E, clamping devices *i l*, and the evener F, substantially as described, and for the purpose set forth.

3. The combination of the hollow auger D, slide *g*, and its operating mechanism with the roller *h*, all substantially as described, and for the purpose set forth.

4. The combination of the head E, automatic clamping mechanism *i l*, and the hollow auger D, substantially as described, and for the purpose set forth.

5. The combination of the head E, clamping mechanism *i l*, hollow auger D, and the two series of revolving spindles, substantially as described, and for the purpose set forth.

6. The combination of the head E, clamping device *i l*, hollow auger D, series of tool-carrying spindles, the saw H, and their operating mechanisms, all substantially as described, and for the purpose set forth.

7. The combination, with the head E, carrying sockets, and clamping devices, of the head I, carrying spindles *n*, and their operating mechanisms, substantially as described, and for the purpose set forth.

8. The combination of the head I, provided with spindles *n*, with the lathe-heads N T, substantially as described, and for the purpose set forth.

9. The head I and its hollow spindles *n*, provided with wicking, leading to a central cup or reservoir within the head, all substantially as described, and for the purpose set forth.

10. The combination of the lathe-head N, carriage Q, and adjustable way *u*, substantially as described, and for the purpose set forth.

11. The combination of the lathe-head N, tool-carriage Q, movable way *u*, lever *v*, and cam S, substantially as described, and for the purpose set forth.

12. The combination of the head I, provided with spindles *n*, carriage R, and catch V, substantially as described, and for the purpose set forth.

13. The combination of the rotating head I, carrying spindles *n*, tool-carriages Q R, and lifting-cam M, substantially as described, and for the purpose set forth.

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