

A. D. COLE, DEC'D.
 N. M. COLE, ADMINISTRATRIX.
 AUTOMATIC MACHINE FOR MAKING BOBBINS.
 APPLICATION FILED JAN. 4, 1909.

998,565.

Patented July 18, 1911.

2 SHEETS—SHEET 1.

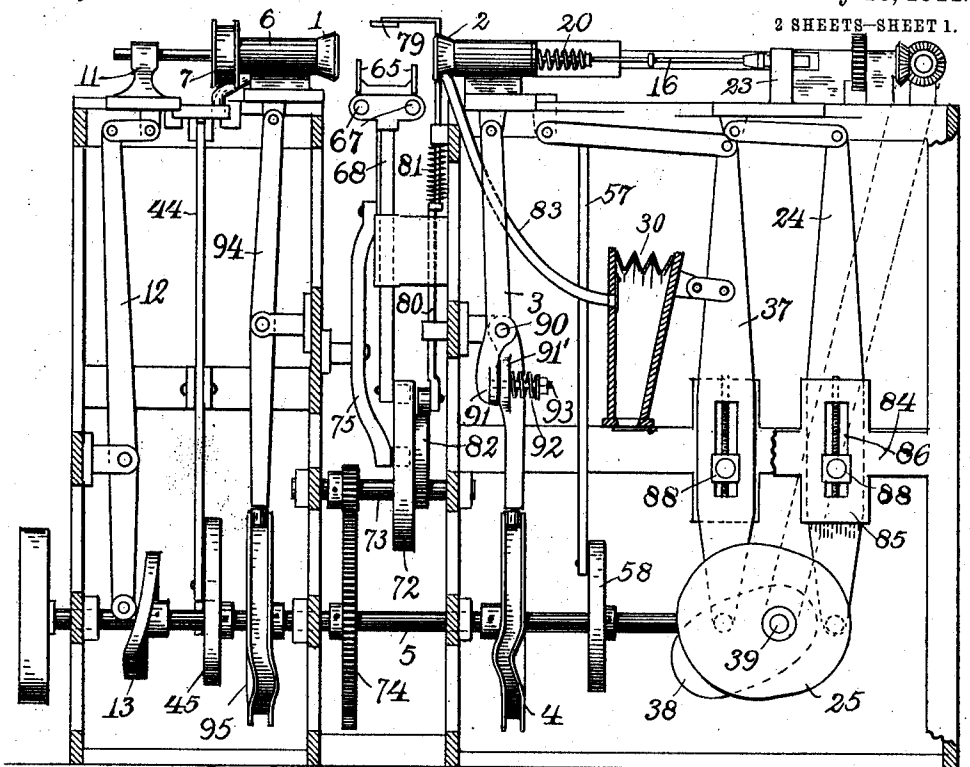


Fig. 1

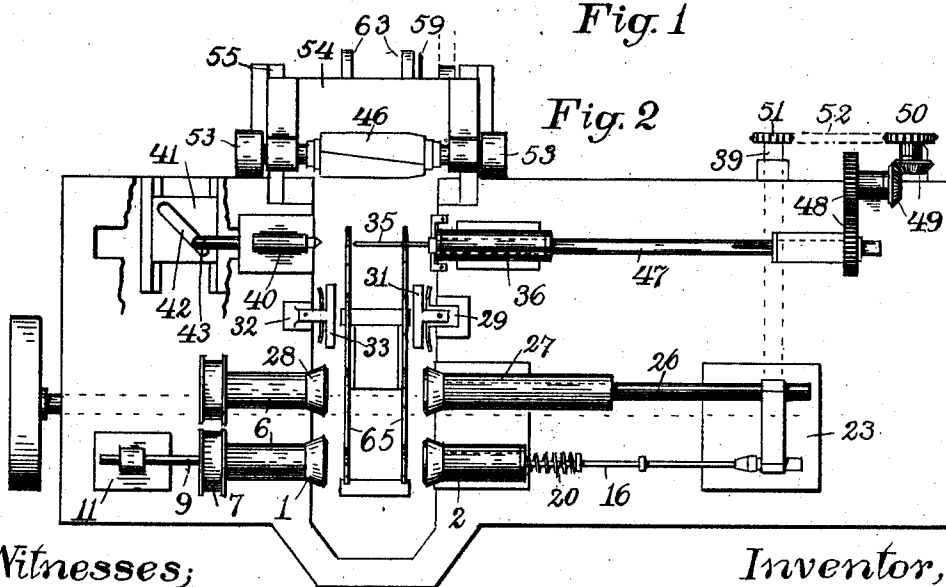


Fig. 2

Witnesses;

R. C. Waite
Warren M. Hens

Inventor,

Arthur D. Cole,
deceased.
Nancy M. Cole,
Administratrix;

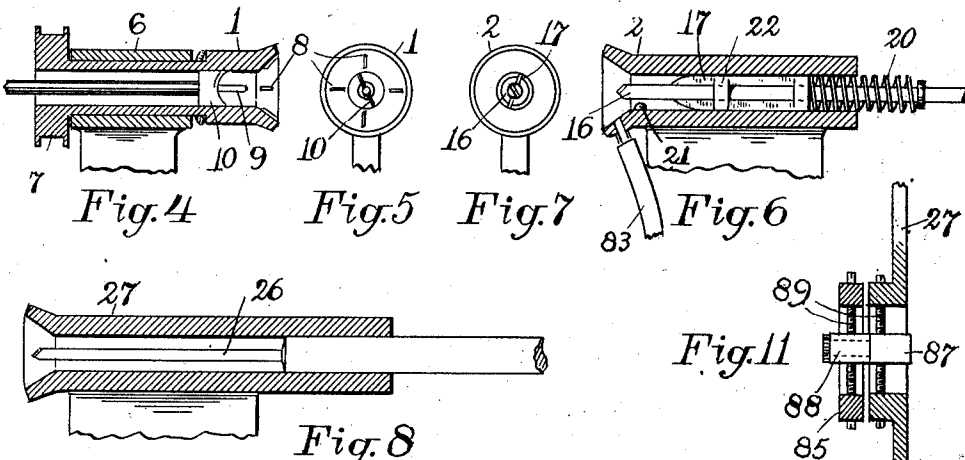
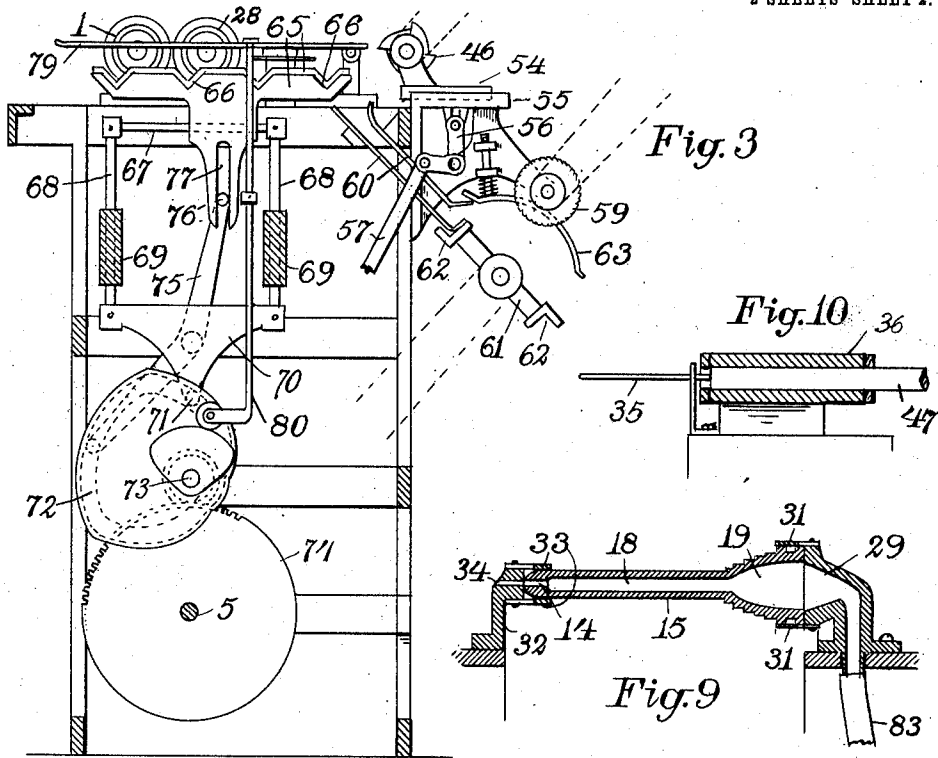
By *A. B. Ugham,*
Attorney.

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 Harrow M. Kero

Inventor,

Arthur D. Cole,
 Deceased,
 Nancy M. Cole,
 Administratrix,

By A. Bligham,
 Attorney.

UNITED STATES PATENT OFFICE.

NANCY M. COLE, OF BATH, MAINE, ADMINISTRATRIX OF ARTHUR D. COLE, DECEASED.

AUTOMATIC MACHINE FOR MAKING BOBBINS.

998,565.

Specification of Letters Patent. Patented July 18, 1911.

Application filed January 4, 1909. Serial No. 470,657.

To all whom it may concern:

Be it known that I, NANCY M. COLE, a citizen of the United States, and a resident of Bath, in the county of Sagadahoc and State of Maine, am the administratrix of the estate of ARTHUR D. COLE, deceased, late a citizen of Lynn, in the county of Essex and Commonwealth of Massachusetts, and declare that the said ARTHUR D. COLE was the inventor of certain new and useful Improvements in Automatic Machines for Making Bobbins, of which the following is a specification.

The object of this invention is the construction of a machine for the automatic formation of wooden bobbins, which shall act to receive roughly shaped blocks of wood, pass them on to devices for boring and counter-boring the central holes through them; thence transferring them to mechanism for shaping their ends; then onward to the turning cutters, and finally to a saw for truing up a remaining rough end.

Referring to the drawings forming part of this specification, Figure 1 is a front elevation, mainly in section, of a machine made in accordance with my invention. Fig. 2 is a plan view of said machine. Fig. 3 is a transverse, substantially central section of the same. Fig. 4 is a central longitudinal section of one of the combined bobbin rotating, drilling and shaping devices. Fig. 5 is an end view of the same. Fig. 6 is a central longitudinal section of one of the drilling and reaming devices. Fig. 7 is an end view of the same. Fig. 8 is a central, longitudinal section of another of the drilling devices. Fig. 9 is a central, longitudinal section of the main suction device for withdrawing shavings from the interior of the drilled bobbins. Fig. 10 is a central longitudinal section of the spindle and chuck for rotating the drilled and reamed blanks while being turned to shape. Fig. 11 is a detail sectional view of the adjusting devices for certain of the actuating levers.

The partially shaped block from which a bobbin is to be formed, is first delivered to the two bell-mouthed chucks 1, 2, which are withdrawn and then advanced to receive the block; such movable chucks being slidable in suitable ways and advanced and receded by means of the intermediately fulcrumed levers 3 and 90, and the cams 4 and 95 on the main shaft 5, as shown in Fig. 1.

As shown in Fig. 4, the chuck 1 is rotatable in suitable fixed bearings 6 by means of power applied to its pulley 7, and is provided with spurs 8 in its mouth for engaging and rotating the blank. Within this chuck is a drill 9 and a shaper blade 10 rigid therewith held from turning by the slide 11 (Fig. 1) which is advanced and receded by the intermediately fulcrumed lever 12 and face-cam 13 on the said shaft 5.

The blank being rotated by its chuck 1, the advancement of the drill and shaper blade into engagement therewith drills the small hole 14 of the bobbin-to-be 15 (Fig. 9) and rounds over the latter's extremity. Simultaneously with this, the non-rotating drill 16 and the reamer 17 (Fig. 6) are pressed into the blank and the hole 18 and hollow 19 formed thereby; the said drill being slidable relative to the reamer 17, and permitted farther advancement by the helical spring 20. A stop 21 met by the cross bar or disk 22 keeps the said reamer from cutting the blank too deeply. The means for thus moving the drill 16 comprises the slidable standard 23 moved by the intermediately fulcrumed lever 24 and the face cam 25 (Fig. 1). The next step is to ream out the hole 18; and this is performed by the reamer 26 (Figs. 2 and 8) slidable within the chuck 27 by means of the said standard 23. The blank being received from the chucks 1 and 2, and delivered to the chucks 27 and 28, of which the chuck 27 is advanced and receded by the same means as is the chuck 2, while the chuck 28 is formed and rotated exactly like the chuck 1, but without the drill and shaper 9, 10. Said reamer 26 having done its work and been withdrawn, the chuck 27 recedes and permits the blank to be conveyed to the dust-removing means. Such means, as shown in Figs. 2 and 9, consist of the mouth 29 connected with a suction-producing device, as the bellows (Fig. 1) laterally extended top and bottom guides 31, a tail-rest 32 and similar guides 33. When the blank is delivered horizontally to said parts, the air is sucked through the holes 14, 18 and 19 thereof, and the hole 34 in the tail-rest, and all dust and shavings therein drawn away and deposited elsewhere. Immediately after such dust-removing, the blank is carried on to a point in alinement with the spindle 35 which has been withdrawn from the position shown in Fig. 2 to make room therefor, the means of with-

drawal comprising the slidable standard 36 moved by the intermediately fulcrumed lever 37 and the cam 38 mounted on the cross shaft 39. When thus in alinement, the spindle is pressed forward toward the tail-stock 40, which is at the same time moved into engagement with the end of the blank by any suitable means, as the laterally slidable plate 41 having an oblique slot 42 therein engaged by a rigid projection 43 from the tail-stock. This plate is suitably shifted by the intermediately fulcrumed lever 44 and cam 45 on said shaft 5. When this spindle 35 is in tight interior engagement with the blank, and the latter is hence being rotated thereby, then the revolving cutting blades 46 are advanced toward such blank until they have shaped the same into its perfect contour. The spindle-rotating mechanism consists of the shaft 47, gears 48, 49, and sprockets and chain 50, 51, 52, the sprocket 51 being preferably mounted on said cross-shaft 39. Said cutter blades 46 are revolved by any suitable means, as power belted to their pulleys 53, and are advanced toward the blank by being carried upon the plate 54 sliding in ways 55 and moved by the angle-iron 56, connecting rod 57 (Fig. 3) and cam 58 on said shaft 5 (Fig. 1). After being thus finally shaped, there remains only the smoothing and squaring up of the base or larger end of the bobbin. This is done by the fine, rapidly revolving circular saw 59 to which the bobbin is delivered in the following way. Directly below the bobbin as it is held by the spindle 35 and tail-stock 40, are raceways 60 inclined at a sharp angle and disposed to deliver a bobbin, when dropped into their upper ends, into the path of the slowly revolving arms 61 provided with the hands 62. By one of said hands, a bobbin is carried over into resilient contact with the spring guides 63, which are curved substantially concentric with the center of rotation of said arms. These guides hold the bobbin firmly in place in the hand 62 carrying it, so that when such hand moves the bobbin past the field of the saw 59, the latter performs its share of the work. See Fig. 3.

One of the important features of this invention is the means for thus transporting the blanks from point to point in the several steps of the operation. The preferable device for this purpose consists of the two carrier blades 65 formed with notches 66 located at distances apart corresponding to the distances between the chucks 1 and 28, the dust-removing mouth 29 and tail-stock 40. This carrier, by receiving properly timed vertical and longitudinal movements, rises into engagement with the blanks in the several named devices, then such devices release them, the carrier moves rearward one space, said devices again engage the blanks, and

then the carrier sinks and returns to its original position. Each time the carrier advances to its foremost position, a fresh blank is fed by the attendant, or by other means, to the foremost notch 66, and so a constant intermittent movement of blanks is maintained, until they drop to the floor at the rear in complete usable condition. The means for thus actuating said carrier comprises the horizontal rods 67 upon which the carriers are slidably mounted; means for raising and lowering said rods consisting of the vertical bars 68 slidable in suitable guides 69 and carried by a head 70 having a roll 71 engaging a face cam 72 mounted on the shaft 73 which is connected with the shaft 5 by suitable gearing 74; and means for longitudinally moving the carrier consisting of the intermediately pivoted lever 75 having a roll 76 at its upper end engaging a vertical slot 77 formed in a depending part of the carrier, while the lower extremity of said lever is operated by said face cam.

To better retain the bobbins and blanks in place in the notches of the carrier, it is preferable to provide the long horizontal rod 79 rigidly held by the vertically movable upright 80 yieldingly pressed down by a spring 81 (Figs. 3, 1) and having its lower end resting upon a cam 82 mounted on the shaft 73.

In addition to having the dust and shavings removed by the special devices above described, it is well to have one or both the chucks 2 and 27 connected by a suitable flexible tube 83 to said bellows 30, or other suction producing means, as shown in Figs. 1 and 6.

To adjust the extent of throw given by the levers 24 and 37 to their respective standards 23 and 36, the following arrangement is used; and it being the same in each case, the description of one will suffice for both. The frame-beam 84 (Figs. 1 and 11) is formed with a vertically slotted enlargement 85, and the lever 24 is formed with a similar slot 86. In these two slots are two blocks 87, 88, one rotatably supporting the other. These blocks being held in their respective slots by suitable adjusting screws 89, all that needs to be done in order to increase the throw of the lever and at the same time retain its extremities at the same level as before, is to turn said screws and adjust both blocks to a lower level than previously; or vice versa.

The lever 3 is rendered resilient in its inward stroke given to the chuck 2, by having the former in two sections pivoted together at any point, preferably their fulcrum 90. The two sections have suitable shoulders 91 mutually engaging when the cam 4 gives to the lower section a movement to retract the chucks 2 and 27, and so positively affect

the latter, but when the movement is in the opposite direction, the short spiral spring 92 acting between the shoulder 91' and the nut on the bolt 93 which is held by the shoulder 91, serves to permit more or less yielding to the lever 3 and so give it a resilient pressure to said chucks, and hence to the blanks held between the same and their opposing chucks. This is quite necessary in order to perfectly hold the blanks notwithstanding the variations in the lengths and diameters thereof.

It is also well to have the chucks 1 and 28 advanced and retracted into and out of engagement with the blanks, although not resiliently, in order that the chucks may not interfere with the transfer of the blanks to and from them. This is done by having the standards 6 of said chucks made slidable, and moved by the lever 94 and cam 95 on the shaft 5.

What I claim as the invention is as follows, to wit:

1. A bobbin forming machine comprising a series of boring and reaming devices, and dust-removing means consisting of a bell-mouth adapted to receive the end of the bored bobbin-blank, a means supporting the opposite end of the bobbin adapted to permit the access of the atmosphere to the hole through the bobbin, and means for exhausting the air from the bell-mouth.

2. In a bobbin forming machine, the combination with a hollow chuck and means for rotating a blank therewith, of a reciprocating non-rotating drill within said chuck, and a yieldingly held reamer carried by said drill.

3. A bobbin forming machine comprising a pair of rotating bell-mouthed chucks having blank-engaging spurs therein, means for longitudinally reciprocating the same simultaneously, a non-rotatable periodically reciprocating drill in one of said chucks and a concave-shaper fixed to the said drill a

suitable distance back from its cutting end, a second pair of bell-mouthed chucks in alinement with the first but non-rotatable, means for reciprocating them simultaneously, a non-rotating but longitudinally reciprocating drill and a reamer yieldingly carried thereby located within the chuck in alinement with the one carrying the first-named drill, a non-rotating reamer located in the other of the last two named chucks and reciprocated simultaneously with said drills, and a carrier for delivering blanks to said chucks and receiving them therefrom.

4. The combination with blank drilling and reaming devices, of a member having a mouth and top and bottom guides, means for producing a suction through said mouth, a tail-rest having an opening through it and top and bottom guides, and means for horizontally transporting blanks from the first-described devices between said member and tail-rest, and also between said guides.

5. The combination with bell-mouthed chucks in alinement, one rotating and the other not, one or both containing drilling and reaming devices, of means for reciprocating one of said chucks comprising an intermediately fulcrumed lever connected at one end to the last-named chuck and at its other end to operating means, said lever being in two pivotally joined sections having shoulders to limit flexure in one direction, and a spring to yieldingly resist flexure in the opposite direction.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 19th day of December, 1908.

NANCY M. COLE,
Administratrix of the estate of Arthur D. Cole, deceased.

Witnesses:

A. B. UPHAM,
ALEXANDER MACDONALD.