No. 854,693. PATENTED MAY 21, 1907.

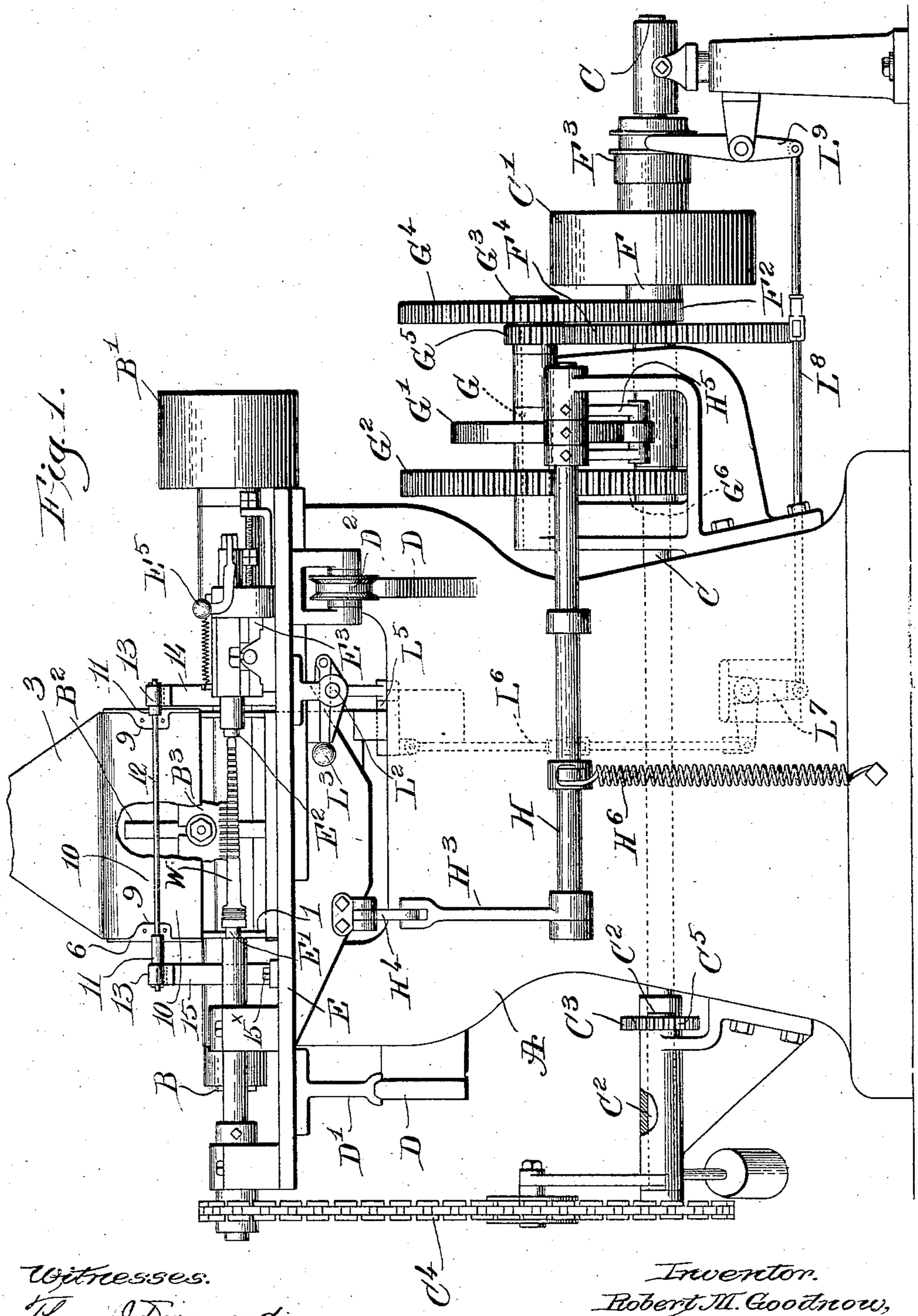
R. M. GOODNOW.

BOBBIN TURNING APPARATUS.

APPLICATION FILED MAR. 13, 1907.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

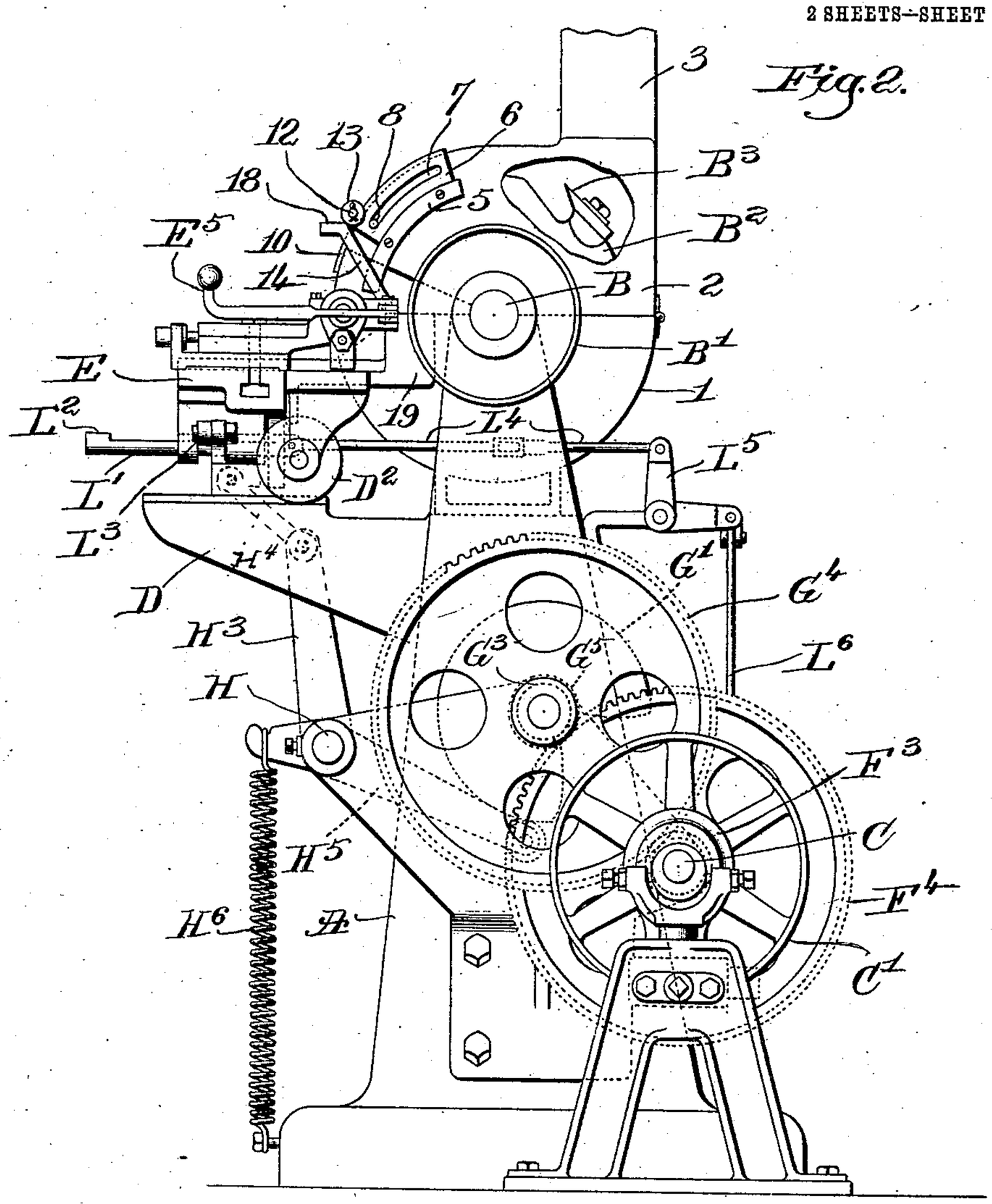
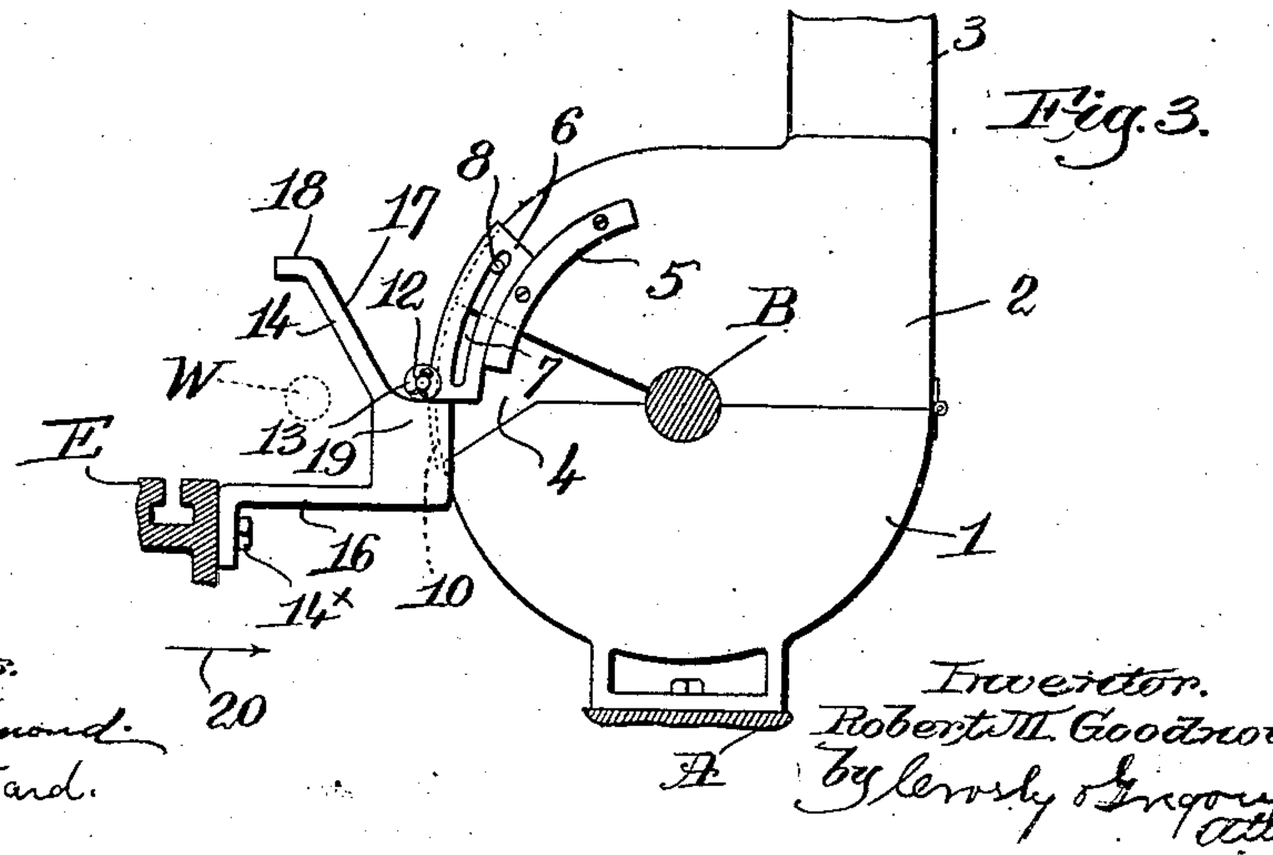


Fig. 3.



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UNITED STATES PATENT OFFICE.

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BOBBIN-TURNING APPARATUS.

No. 854,693. Specification of Letters Patent. Patented May 21, 1907.

Application filed March 13, 1907. Serial No. 362,109.

To all whom it may concern:

Be it known that I, ROBERT M. GOODNOW, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Bobbin-Turning Apparatus, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to apparatus for turning wooden articles, such for instance as bobbins for use in loom-shuttles, the apparatus in general comprehending a revolving cutting tool, a table movable toward and from the tool, and means on the table for holding and rotating the work as it is presented to the cutting tool.

Broadly speaking such apparatus is not new, and some of the structural features of the apparatus in which I have embodied my present invention are substantially such as are found in United States Patent No. 690,253, granted December 31, 1901 to G. A. Ensign. In such apparatus the operator places the work, such as a wooden blank, into position between the head and tail stocks mounted on the table, and at such time there is danger to the hands of the operator owing to the close proximity of the cutting tool, which revolves at a high rate of speed.

My present invention has for its object the production of means for effectually shielding or guarding the cutting tool when not actually engaging the work, means being provided to retract the shield automatically and expose the cutting tool by or through movement of the table to present the work to the tool, the withdrawal of the work from the tool effecting return of the shield to operative position with relation to the cutting tool.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a front elevation of a bobbin-turning apparatus embodying one form of my invention, the shield being shown in retracted position to expose the cutting tool; Fig. 2 is a right hand side elevation of the apparatus shown in Fig. 1, the hood for the tool being broken out to show a portion of the cutting tool; Fig. 3 is a similar view of the hood and shield but showing the latter in position to guard or cover the cutting tool:

The main frame A has two rotatable shafts B and C, separately driven by pulleys B′, C′ from suitable belts, not shown, a cutting tool or head as B², being mounted on the shaft B and having suitable cutters B³ of the desired form to shape the article to be turned.

Tracks or guideways D extending forward from frame A at right angles to the revolving cutter-shaft B support a slide D′ and a truck-wheel D² attached to a table E which is movable toward and from the cutting tool. Said table has mounted upon it usual head and tail stock centers E′, E² respectively, to receive between them and rotate the work, the head-stock center E′ being driven from an auxiliary shaft C² by a sprocket chain C⁴, intermeshing gears C³ and C⁵ on the shafts C and C² effecting rotation of the latter.

The tail-stock center E² is mounted in a tail-stock E³, adjustable on the sliding table E, the tail-stock center being controlled by a lever E⁵ by which the said center can be retracted to discharge the finished article.

When the work, such as a blank, is brought into engagement with the centers, the table E is slid forward simultaneously, into the position shown in Fig. 3, the work at that time occupying substantially the position shown by the dotted circle W in Fig. 3, and after the work is centered, the table is moved rearwardly to carry the blank against the cutting tool to be turned thereby into proper shape.

The table may be moved by hand, or it may be moved automatically, the latter construction being shown herein.

The pulley C′ is loosely mounted on a sleeve F provided with a pinion F², the sleeve being loosely mounted on the shaft C, and a clutch F³ is arranged to connect the pulley C′ with the sleeve F.

An auxiliary shaft G, see dotted lines Fig. 1, is provided with a cam G′ and a gear G² which meshes with a pinion G⁶ fast on the driving shaft C.

A sleeve G³ on the auxiliary shaft G carries a gear G⁴ in mesh with the pinion F², hereinbefore referred to, the sleeve having an attached pinion G⁵ meshing with a gear F⁴ fast on the driving shaft C.

The pinions F², G⁵, and gears F⁴, G⁴, constitute speed-reducing mechanism to reduce

to the desired amount the speed of the shaft G below that of the driving pulley C′, the pinion G^6 and gear G^2 acting to reduce the speed of the cam-shaft G with relation to the main-shaft C.

A rock-shaft H mounted in bearings on the front of the stand A has an attached rocker-arm H^3 connected by a link H^4 with the table E, and a follower arm H^5 fast on the rock-shaft co-operates with the cam G′ and is held in contact with the latter by a suitable spring H^6.

The cam G′ is so shaped that at one complete revolution it will operate through the rock shaft H to slide the table E gradually toward the cutting tool, to permit the latter to act upon and properly turn the blank, and thereafter to slide the table back to starting position.

The clutch F^3 normally acts to operatively connect the pulley C′ and sleeve F, and said clutch is thrown out of operation to disengage the said pulley and sleeve by any suitable mechanism.

The table E is provided with a depending bearing L in which is slidably mounted a rod L′, enlarged at its front end at L^2, and a weighted latch lever L^3 is pivoted in the said bearing L and normally rests on the rod, so that as the table slides outward said latch lever will catch against the head L^2. Said rod is connected to a bell crank L^5 pivoted at the rear of the main frame, and the bell-crank in turn is connected by a link L^6 with a second bell-crank L^7, see dotted lines Fig. 1. The latter by means of link L^8 and lever L^9 is operatively connected with the clutch to move the latter into inoperative position.

When the operator positions the blank between the centers E′, E^2, the table is in its forward position and the latch L^3 in engagement with the head L^2 and rod L′, and at such time the clutch F^3 is inoperative. The operator then lifts the latch L^3 and releases the rod L′, and the clutch is moved into operative position connecting the pulley C′ and the sleeve F^2, whereby the shaft C is set in motion. Through the connections described the work is rotated at the proper speed, and at the same time the cam G′ is slowly revolved, the latter operating through the rock-shaft H and the described connections to feed the table E rearwardly, bringing the work into engagement with the cutting tool, and during such movement the latch L^3 drops onto the rod L, behind the head L^2. As the cam continues to revolve, the table is again moved forward, and as it nears its starting position, the latch L^3 engages the head L^2, and through the described connections rocks the lever L^9, throwing out the clutch F^3 and disconnecting the pulley C′ from the sleeve F, the movement of the table and the rotation of the centers E′, E^2 then ceasing.

So far as concerns the movement of the work after it has been placed in position between the centers, there is no particular danger to the operator, for as has been set forth the feeding movement of the work to the cutting tool, and the retraction of the work, after it has been turned, is automatic, but even when the table is in its outermost or forward position, there is no great distance between the cutting tool and the work-holding centers, and when the operative is placing the work between the centers, he is sometimes liable through carelessness or otherwise to place his hands or fingers within the range of the cutting tool, revolving at high speed. Herein I have shown the cutting tool as inclosed within a hood comprising a substantially semi-cylindrical lower portion 1, most clearly shown in Fig. 3, bolted or otherwise secured to the top of the main frame A, and having a hinged cover portion 2, provided with an outlet duct 3 for the chips and dust resulting from the turning operation.

The two parts of the hood are cut away at the ends and in front to leave an opening, as 4, through which the work passes when it is presented to the cutting tool.

Upon the ends of the hood cover 2, I mount segmental guideways or tracks 5 on which are slidably mounted carriers 6, each provided with a segmental slot 7, through which extend a pin or stud 8 projecting from the adjacent end of the hood cover 2. The carriers 6 are preferably made as castings and have inturned ears 9, see Fig. 1, to which is fixedly secured a curved shield or guard 10, partly broken out in Fig. 1 to show the cutting tool. The carriers 6 have formed thereon bearings 11 through which is extended a rod 12 provided at its ends outside the bearings preferably with rolls 13.

The shield 10 is of sufficient depth to cover the openings in the front of the hood, when said shield is in its normal position, as shown in Fig. 3, so that at such time the cutting tool is completely inclosed, the shield being interposed between the tool and the hands of the operator, so that by no possibility can any injury be caused.

I have provided means to control the shield by or through the movement of the table, so that when the table is moved to present the work to the cutting tool, the shield is lifted, exposing the cutter, and permitting the work to enter the opening in the hood, and as the table is returned to its forward position, the shield returns to position to close the hood and guard the tool. To this end I have provided cam-like brackets 14 and 15, the latter being attached to the top of the table at one side of the hood, as by a bolt $15^{\times}$, Fig. 1.

The bracket 14 has at its bottom an extension 16, see Fig. 3, secured to the back part of the table by a bolt $14^{\times}$, the differ-

ence in the mode of attaching the brackets and their slight differences in construction providing room for the head-stock and adjacent parts, as shown in Figs. 1 and 2.

Each of the brackets includes an upwardly and forwardly inclined face 17, and at the upper end thereof a horizontal portion 18, the cam faces 17 of the two brackets being arranged to co-operate with the rolls 13.

When the shield is in its closing position, the adjacent roll rests on the top of the enlarged face 19 of the bracket 14 to limit downward movement of the shield.

The studs 8 prevent any tendency of the shield to lift or separate from the curved guide 5 on which the carriers 6 slide.

Supposing the parts to be in the position shown in Fig. 3, as the table E is moved in the direction of the arrow 20, the inclined cam-faces 17 act upon the rolls 13, and lift the shield from the position shown in Fig. 3 to the position shown in Fig. 2, opening the hood and permitting the work to enter. Further movement of the table in the direction of arrow 20 causes the rolls 13 to travel upon the horizontal portions 18 of the brackets which are dwell portions as it were, the shield being thereby maintained in its lifted position while the table completes its inward or feed movement. The work having been properly acted upon by the cutting tool, the table is moved outward, and as it moves, the rolls 13 gradually travel down the inclined cam-faces 17 until the original position, shown in Fig. 3, is again resumed.

Whenever it is desired to change the cutting tool, or to adjust or alter the blades thereof, the top portion 2 of the hood is swung back and carries with it the shield, as will be manifest, the pins or studs 8 at such time preventing the carrier 6 to which the shield is attached from dropping off the hood top.

When the top is swung back the shield resumes its operative position as shown in Fig. 3, without any further attention or care on the part of the operator.

I do not herein claim any of the specific details of construction of the turning apparatus, *per se*, as the same are not of my invention, but so far as I am aware it is new in apparatus of this type to provide a shield for the cutting tool, and to automatically move the shield into and out of operative position with relation to the cutting tool, as the work is moved away from or toward such tool. My invention is therefore not restricted to the precise construction and arrangement of the turning mechanism, and changes or modifications may be made in the construction and arrangement of the shield and the means for operating it without departing from the spirit and scope of my invention as set forth in the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a turning lathe, a revolving cutting tool, a sliding table carrying head and tail stocks for the work and movable toward and from the cutting tool, a shield for the latter, and means governed by movement of the table to move the shield to expose the cutter as the work is brought into position to be acted upon by the cutting tool.

2. In a turning lathe, a revolving cutting tool, a shield therefor, a table movable toward and from the tool and provided with work-holding means, and means, operated by movement of the table to present the work to the cutting tool, to retract the shield, and to effect return of the shield to normal position as the table is moved to withdraw the work.

3. In a turning lathe, a revolving cutting tool, a shield movable to cover or uncover the tool, means to hold the work and present it to the cutting tool, and controlling connections between said means and the shield, to cause the latter to uncover the tool when the work is presented thereto and to cover the tool when the work is withdrawn.

4. In a turning lathe, a revolving cutting tool, a hood inclosing the same and having a work-receiving opening, a shield to normally close the opening, a table movable toward and from the tool, work-holding devices on the table, and means to retract the shield by movement of the table to present the work to the cutting tool and to effect return of the shield to normal position when the table is moved to withdraw the work from the cutting tool.

5. In apparatus of the class described, a revolving cutting tool, work-holding means movable toward and from the tool, a shield for the latter, and means to retract the shield and expose the tool when the work is presented to the tool.

6. In apparatus of the class described, a revolving cutting tool, an inclosing hood having a work-receiving opening, a shield slidable on the hood to close said opening, a table movable toward and from the tool, work-holding means on the table, and a cam device on the table to co-operate with the shield and lift the same to uncover the opening in the hood when the table is moved toward the tool.

7. In apparatus of the class described, a revolving cutting tool, an inclosing hood having a work-receiving opening, a shield to close the opening, shield-carriers slidably mounted on the hood and having rolls, a table movable toward and from the tool and provided with work-holding means, and cam devices on the table to engage the carrier rolls and lift the carriers and shield when the table is moved toward the cutting tool.

8. In apparatus of the class described, a

revolving cutting tool, a hood inclosing the cutter and having a work-receiving opening, said hood having a swinging top portion, a shield movably mounted on said top portion and adapted to cover the work-receiving opening, a table movable toward and from the tool and provided with work-holding means, and means on the table to lift the shield when the work is presented to the action of the tool, the opening movement of the top portion of the cover carrying the shield with it.

9. In apparatus of the class described, a revolving cutting tool, work-holding means, devices to cause relative movement of said tool and means toward and away from each other, a shield for the tool, and means to retract the shield and expose the tool when the work and tool are brought together.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ROBERT M. GOODNOW.

Witnesses:

EUGENE BEAUDRY,

CLARE HILL DRAPER.