L. C. BALDWIN.

BOBBIN BORING MACHINE.

APPLICATION FILED OCT. 11, 1909.

970,601.

Patented Sept. 20, 1910.

4 SHEETS—SHEET 1.

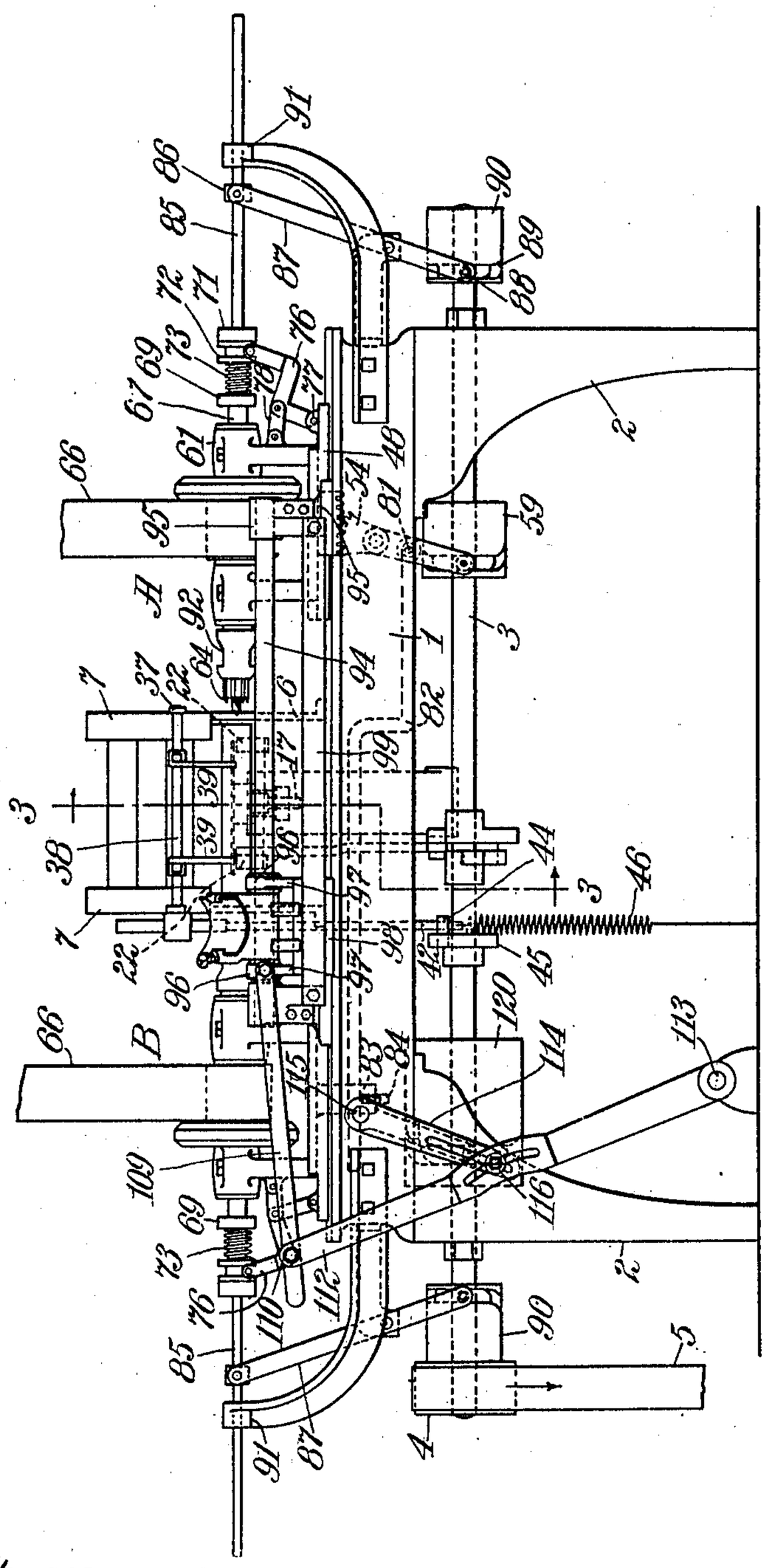

Fig. 1.

Witnesses:

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Marion D. Kimball

Inventor:

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by Robt. C. Harris.

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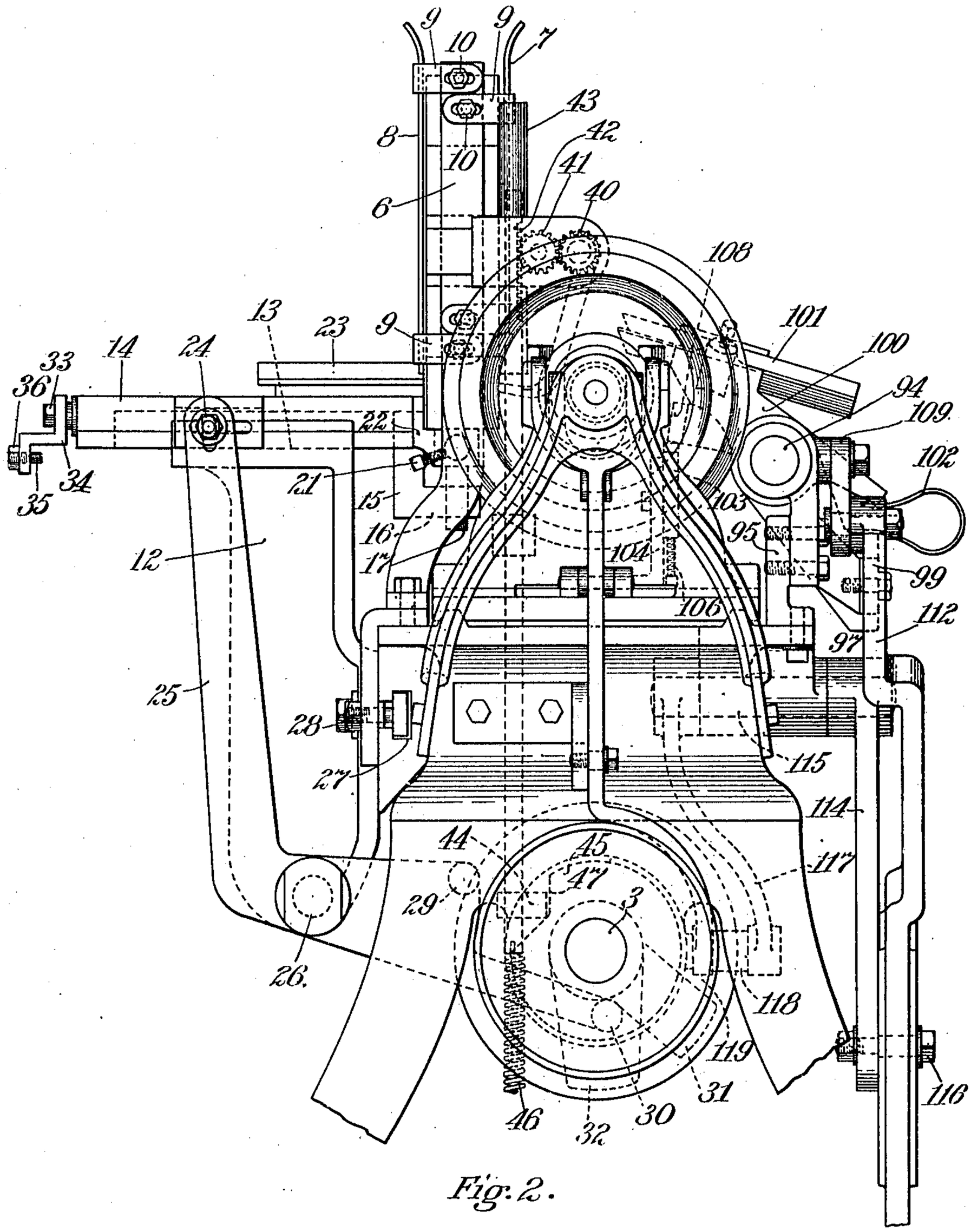

Fig. 2.

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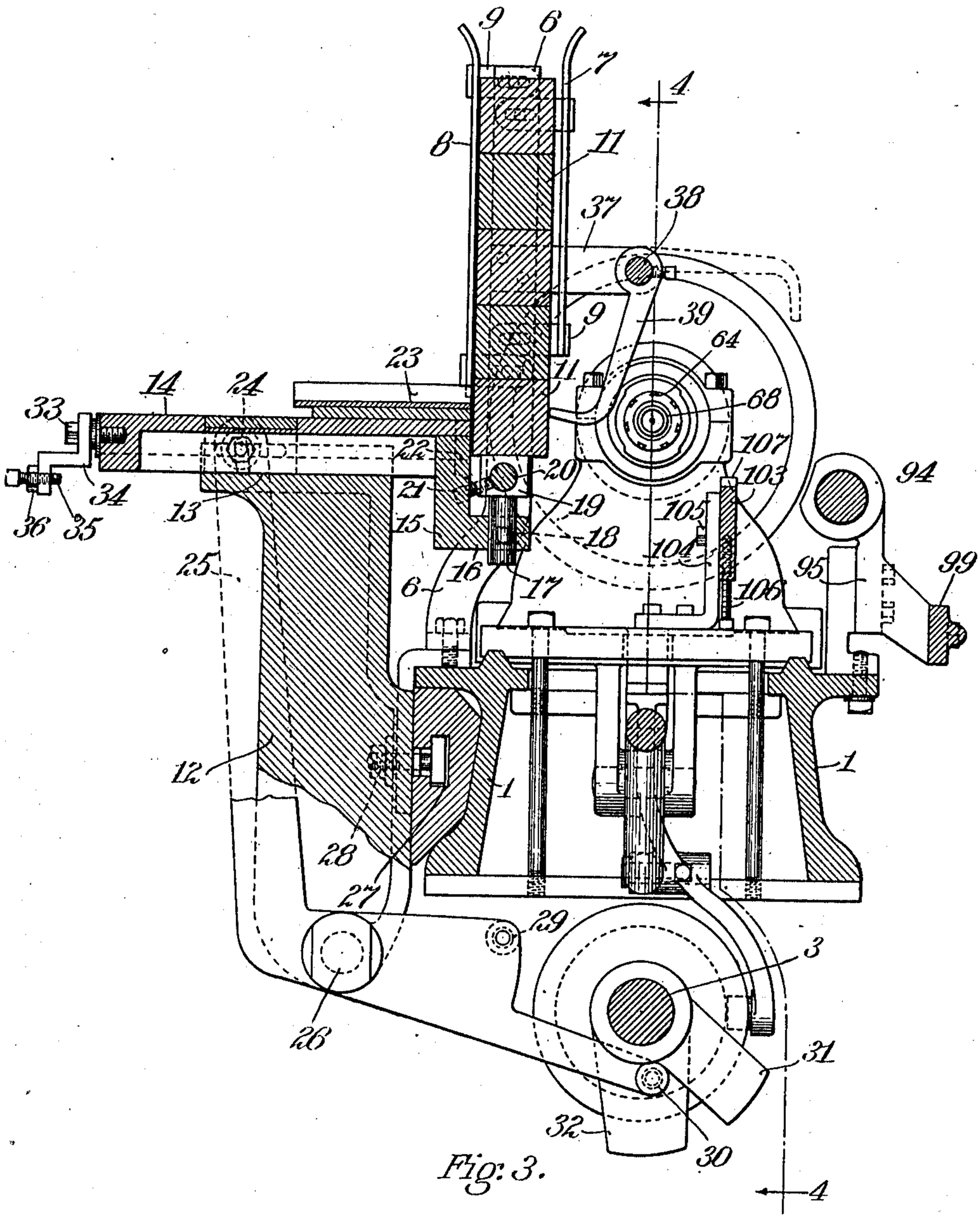

Fig. 3.

Witnesses:

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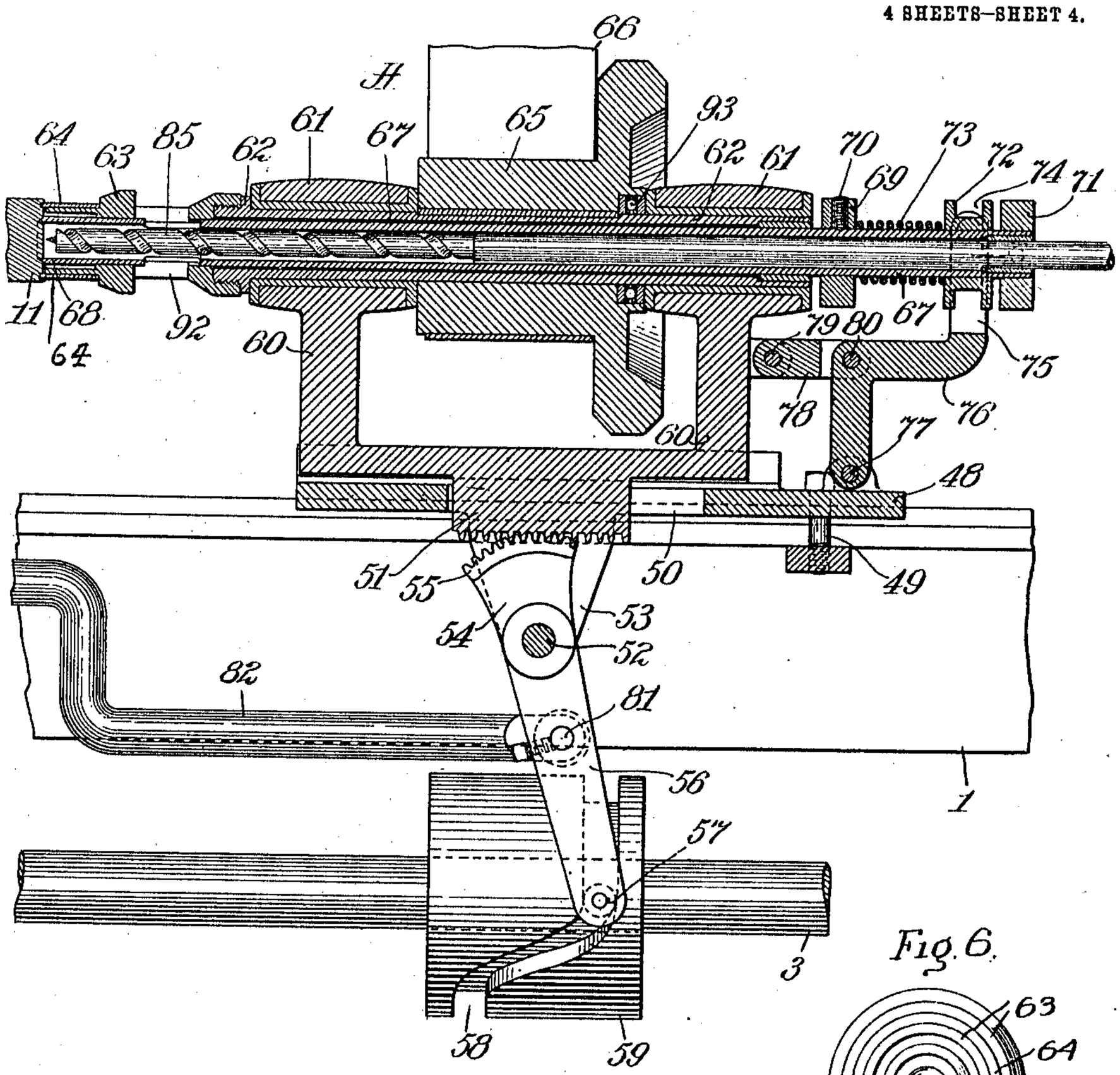
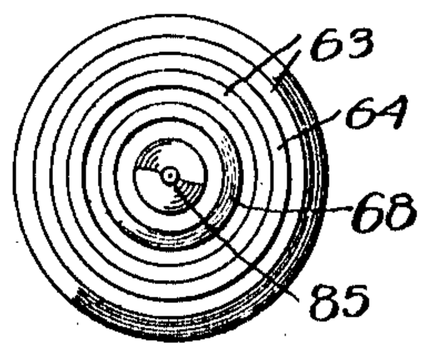


Fig. 4.

Fig. 6.



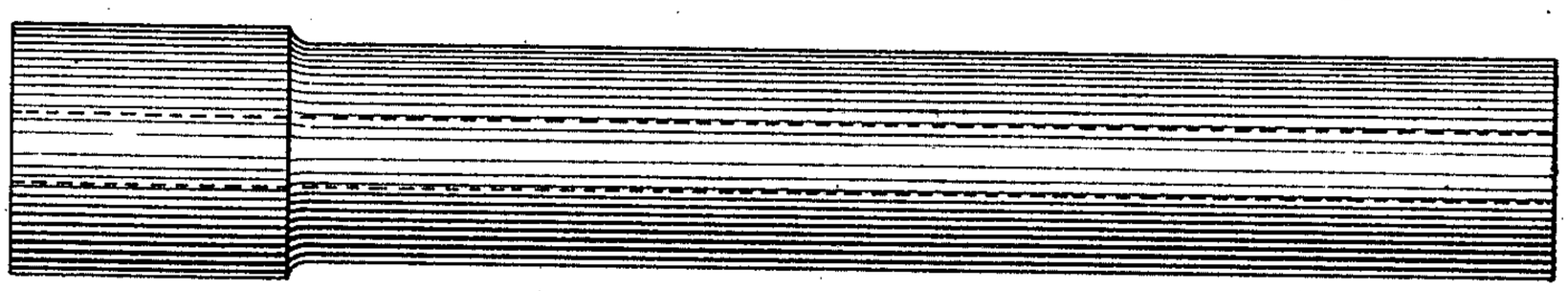


Fig. 5.

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UNITED STATES PATENT OFFICE.

LUTHER C. BALDWIN, OF PROVIDENCE, RHODE ISLAND.

BOBBIN-BORING MACHINE.

970,601. Specification of Letters Patent. Patented Sept. 20, 1910.

Application filed October 11, 1909. Serial No. 522,102.

To all whom it may concern:

Be it known that I, LUTHER C. BALDWIN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented an Improvement in Bobbin-Boring Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The invention to be hereinafter described relates to machines for boring bobbins such as are employed for spinning and winding yarn.

Bobbins for the purposes stated have a central bore extending longitudinally thereof and a cylindrical outer surface which may, if desired, vary in diameter. Since during the spinning operation the bobbins are supported by spindles extending centrally through them and are rotated at high speeds, it is of importance that the bore of the bobbins be not only uniform but that it be truly central, otherwise the bobbin presents an unbalanced load on the spindle which seriously affects the condition of the yarn spun and wound thereon and limits the speed at which the spindles may be driven, all as well understood by those skilled in the art.

With the above matters in view, the aims and purposes of the present invention are to provide a machine of simple construction which will accurately bore bobbins and impart the desired exterior contour thereto, as will hereinafter more fully appear from the following description in connection with the accompanying drawings of one form of means for carrying the invention into practical effect.

In the drawings: Figure 1 is a side elevation of a bobbin boring and shaping machine embodying features of the present invention; Fig. 2 is an end view thereof; Fig. 3 is a section on the line 3—3 of Fig. 1 on an enlarged scale; Fig. 4 is a central longitudinal section of one end portion of the machine substantially on the line 4—4, Fig. 3, some of the parts being omitted to more clearly show the structure of head; and Fig. 5 is an enlarged view of a bobbin having a central bore of uniform character made on the present machine. Fig. 6 is an end view of the centering tube, turning tube and bit, shown on the left in Fig. 4.

The machine frame may be of any usual or desired character and, as shown, comprises the machine bed 1, and supporting legs 2, said bed being provided with suitable bearings for a shaft 3 extending longitudinally thereof, as indicated in Fig. 1, and provided with a pulley 4 which may be driven by a belt 5 from any suitable source of power.

Disposed preferably at the rear central portion of the machine, and sustained by the bed 1, is a hopper for containing blanks or wooden blocks which may be of square or rectangular cross section. In the present form of the invention the hopper comprises the end supporting legs 6, to which are adjustably connected the front and back plates 7 and 8, Figs. 2 and 3, each of which may be provided with the slotted ears 9 to engage securing bolts 10 extending into the supporting legs 6, the construction being such that the said front and back plates may be appropriately adjusted toward and from each other to properly accommodate blanks or blocks 11 from which the bobbins are to be made.

Projecting upward from the rear of the bed 1 is a bracket 12 providing at its upper portion a guideway 13 for a feed slide 14, the forward or feed end of which has a bracket or downturned arm 15, Fig. 3, provided with a shelf or support 16. Extending from the shelf or support 16 is an upright or stud 17, which may be secured in adjusted position by a set screw 18, Fig. 3. Mounted on the upright or stud 17 is a block 19 through which passes a shaft 20 secured therein by a suitable set screw 21, said shaft at its end portions carrying blank supporting rests or blocks 22, Figs. 1 and 3, the construction being such that the upright 17 may be adjusted in the end of the slide to properly position the blank supporting rests 22 upon which and the central block 19 the lowermost blank 11 in the hopper may rest.

Secured to and movable with the slide 14 is a support 23 which passes under and sustains the column of blanks above the lowest blank as the latter is moved by the slide into position between the chucks or

bobbin turning heads, as will hereinafter appear.

In order that the feed slide may be properly moved to feed the lowermost blank, it is connected at 24, Figs. 2 and 3, with the upper end of an actuator 25 pivoted at 26 to the downwardly projecting portion of the bracket 12 or other suitable support which may preferably be adjustable with the bracket 12, as by means of the slot and bolt 27 and 28 in adjusting the parts into proper relation. The lower arm of the actuator 25 is provided with the two rolls 29 and 30, the latter being operatively related to the cam 31 on the driving shaft 3 for positively moving the feed slide 14 inward to transfer a blank to position between the chucks. The other roll 29 is operatively related to the cam 32 likewise secured to the driving shaft 3 for positively moving the actuator 25 and perforce the feed slide 14 backward, the construction being such that upon actuation of the driving shaft, the feed slide 14 will be positively moved in both directions.

In order to limit the forward movement of the feed slide 14, Fig. 3, the rear end portion thereof has connected thereto by means of a screw bolt 33, or otherwise, an arm 34 carrying an adjusting screw 35 which may be maintained in position by a lock nut 36, the end of said screw 35 being adapted to contact with the upper portion of the bracket 12 when the slide has reached the limit of its forward movement in positioning a blank between the chucks. It will be noted that the front and back plates 7 and 8 of the hopper terminate above the feed slide, and that the feed slide itself by means of its portions 15 and 16 and connected parts operates as the bottom of the hopper to hold the column of blanks therein when the parts are positioned as in Fig. 3.

Extending forward from the supporting legs 6 of the hopper are the side brackets 37, 37, Figs. 1 and 3, in which is rotatably mounted the shaft 38 carrying the fingers 39, the end portions of which, Fig. 3, are adapted to contact with the front surface of the lowermost blank in the hopper when the parts are in position as indicated in Fig. 3 and just prior to the forward feeding movement of said blank, the construction being such that the lowermost blank 11 is positively held on the front portion of the feed slide and between it and the fingers 39 as it moves to position between the chucks.

It is desirable that the fingers 39 be so controlled as that while they assist in holding the blank positively in position as it is fed, they may, when the blank has assumed position between the chucks and during the boring operation, be held in an upper or inoperative position, substantially as indicated by dotted lines in Fig. 3. To this end, the shaft 38 has secured thereto a pinion or gear 40 which meshes with a corresponding pinion 41 supported at the side of the hopper, said pinion 41 being itself engaged, Fig. 2, by a rack 42, the upper portion of which extends into a tube 43, Fig. 2, and the lower portion of which is provided with a toe 44, see dotted lines Fig. 2, adapted to engage a cam 45 on the driving shaft 3. Secured to the lower end of the rack 42 is a spring 46 which normally acts to draw the rack downward. It will be noticed that the cam 45 has a groove portion 47 and that the remainder of the cam is substantially circular, the construction being such that when the parts are in position as indicated in Fig. 2, and the feed slide is about to move forward and carry a blank between the chucks, the toe 44 of the rack will be free from the surface of the cam 45 and, in response to the spring 46, will drop into the cutaway portion 47 of said cam, thereby carrying the ends of the fingers 39 into contact with the front surface of the lowermost block or blank in the hopper, and as the feed slide 14 moves forward the toe 44 will ride up the cam 45, raise the rack bar 42 and turn the fingers 39 eventually into an upright position, as indicated by dotted lines in Fig. 3.

The present invention contemplates boring the blank or bobbin simultaneously from each end thereof, in view of which two boring heads are provided, which, being similar in construction and general operation, one only thereof need be described. Viewing Fig. 1, the boring heads are disposed preferably longitudinally of the machine bed 1 opposite the end portions of the hopper, said boring heads being identified in Fig. 1 as A and B respectively.

Fixed to the bed 1 of the machine frame is a head support 48, Fig. 4, it being preferably connected thereto by means of suitable bolts and nuts 49 and provided with a guide slot 50 through which extends the toothed portion 51 connected to the boring head. Pivotally mounted at 52 in a suitable bracket 53 secured to the machine frame is a segment rack 54, Fig. 4, the teeth 55 of which engage the teeth of the toothed portion 51 of the boring head. The end of the segment rack opposite the pivot 52 is extended downward into an arm 56 carrying at its end a roll 57 which engages the cam groove 58 of a cam 59 secured to the driving shaft 3, Fig. 4, the construction being such that upon rotation of the driving shaft the rack bar 54 will be given an oscillatory movement to carry the boring head A longitudinally of the machine frame.

The boring head A comprises the uprights 60 providing bearings 61 for an exterior or

turning tube 62, the engaging end portion 63 being provided with holding teeth 64 for engaging and positively driving the blank 11. Secured to the exterior or turning tube 62 is a suitable driving pulley 65 about which passes a belt 66 for driving said tube from any suitable source of power.

Centrally disposed of the exterior or turning tube 62 is a centering tube 67, Fig. 4, the end portion 68 of which is adapted to engage the end of the blank 11, said end 68 of the centering tube being preferably formed without teeth. The centering tube 67 is extended to the right, Fig. 4, beyond the bearings for the exterior or turning tube 62 and is there provided with a collar 69 which may be secured to said centering tube by a set screw 70. Likewise secured to the end portion of said centering tube 67 is a second collar 71 and loosely mounted on said centering tube between the collars 69 and 71 is a sleeve or collar 72 between which and the collar 69 is a spring 73, the construction being such that upon movement of the sleeve 72 to the left, Fig. 4, the spring 73 will act upon the collar 69 and force the centering tube to the left yieldingly, and on movement of the sleeve or collar 72 to the right the centering tube 67 may be withdrawn or moved to the right. The sleeve or collar 72 has a groove 74 which is embraced by the bifurcated end portion 75 of an angle lever 76 pivoted at 77 to the machine bed or plate 48 secured thereto. Connecting the angle lever 76 with the column 60 of the head A is a link 78, said link being pivotally jointed to the part 60 and angle lever 76 at 79 and 80 respectively.

From the construction thus far described, it will be apparent that when the rack bar 54 is moved by its cam 59 to carry the head A into operative engagement with the blank 11, such movement of the head will, through the link 78 and angle lever 79, be transmitted to the centering tube 67, but owing to the construction described it will be apparent that the rate of movements of the head A, and perforce the exterior or turning tube 62 and the centering tube 67, will be differential, that is to say, the centering tube will move to the left at a greater speed than will the exterior or turning tube, with the result that the centering tube will first engage the end of the blank 11 and center it after which, owing to the spring 73, its movement may cease, whereupon the end of the exterior or turning tube and its engaging prongs will meet the end of the blank and be forced into the wood to form a positive driving connection therewith. Likewise, on the reverse movement of the head A, and owing to the yielding action of the spring 72, the exterior or turning tube will first move to the right to withdraw its holding prongs from positive engagement with the end of the blank, after which the centering tube will be withdrawn from contact with the blank or bobbin and permit the same to drop into a proper receptacle.

As hereinbefore pointed out, the heads A and B are similarly constructed and operate in substantially the same manner. In order to effect this corresponding action of the two heads, the rack bar 54 has connected thereto at 81, Figs. 1 and 4, a connecting rod 82, the opposite end portion of which is connected to a lug 83, Fig. 1, projecting downward from the head B, such connection being accomplished through the means of a set screw 84 or other suitable device. Extending longitudinally and centrally of the tubes 62 and 67 is a non-rotatable boring bit 85, Figs. 1 and 4, having connected to its outer portion a collar 86, Fig. 1, which is itself pivotally jointed to a lever 87, the lower end of which carries a roll 88 engaging the cam groove 89 of a cam 90 secured to the driving shaft 3. In order to maintain the boring bit in proper axial alinement with the tubes 62 and 67, the outer portion thereof passes through a bearing 91, Fig. 1.

From the construction thus far described, it will be seen that the blank 11, after having been fed into position between the heads A and B, is first grasped and centered by the end of the centering tube 67 and, when correctly centered and held thereby, the end of the blank is positively engaged by the teeth 64 on the end of the exterior or turning tube, which positively rotates the blank through the medium of the pulley 65 and its driving connections with the source of power. As the blank 11 is thus turned by the exterior or turning tube, the non-rotatable boring bit 85 is moved axially into engagement therewith, it being understood that the boring bit at the opposite end of the blank operates in substantially the same manner. As the boring bits thus act upon the blank and the chips move away from the cutting end of the boring bits, they are permitted to escape through suitable chip openings 92, Figs. 1 and 4, formed in the exterior and centering tubes.

In order that the non-rotatable boring bits may properly act upon the blank to provide a complete axial and uniform bore thereto, they are given movements by their respective cams 90 in a manner such that one of said boring bits will arrive at and pass the mid-length of the bobbin before the other and, as the first moves back in response to its actuating cam, said other will proceed lengthwise of the blank to a point beyond its mid-length, whereupon it will retreat, the construction being such that the actuating cams 90 for the boring bits 85 will cause their respective movements to be made without in-

terference the one with the other and yet will provide the bobbin with an axial bore of uniform character.

Since there is some end thrust on each of the heads A and B which is taken up by their supporting standards 60, a thrust or ball bearing 93 is interposed between the driving pulley 65, and perforce the exterior or turning tube, and one of the bearings 61, as indicated in Fig. 4.

Extending longitudinally of the machine bed, to one side of the axial line passing through the boring bits, is a shaft 94, Figs. 1, 2 and 3, carried by suitable supports 95 secured to the machine bed. Loosely mounted upon the shaft 94 so as to move longitudinally thereon are the two sleeves 96 having downwardly projecting tails or arms 97, Figs. 1 and 2; the lower ends of said tails or arms being connected by the bar 98 provided with a recess which embraces a longitudinal bar 99 extending parallel to the shaft 94. Mounted upon the shaft 94 between the sleeves 96 is the knife carrier 100 having a knife or gouge 101 adapted to act upon the exterior of the blank 11, said gouge or knife 101 being normally held in contact with the outer portion of the blank by means of a spring 102, Fig. 2. Also extending longitudinally of the machine bed 1 and parallel with the shaft 94 is a bar 103, Figs. 2 and 3, said bar being supported by brackets 104 to which it may be adjustably secured by bolts 105, Fig. 3, suitable adjusting screws 106 being provided for determining the position of said bar on its supports. The upper surface 107 of said bar 103 is preferably formed to correspond to an exterior element of the finished bobbin, and the knife carriage or carrier 100 has a roll 108, Fig. 2, which rests upon the surface 107 of said bar. The knife carriage 100 is preferably moved longitudinally of the blank while it is being turned by means of a link 109, Fig. 1, pivotally connected at 110 to the lever 112, Fig. 1, which is pivoted at 113 to a suitable support and is operated by means of a link 114 connected to a shaft 115, Fig. 1, and having a pin and slot connected at 116 with said lever 112. Projecting downward from the shaft 115 is an arm 117, the lower end of which has a pin 118, Fig. 2, which engages the cam groove 119 in the cam 120 secured to the driving shaft 3, the construction being such that as the driving shaft rotates, the knife carriage 100 will be moved in a direction longitudinal of the blank being turned, and the gouge 101 will act upon the exterior surface during such movement to impart thereto the contour defined by the surface 107 of the bar 103, the spring 102 acting to hold the knife in engagement with said blank.

While the details hereinbefore described present a good, practical form of the invention, it is to be understood that means other than that described may be employed within the true scope thereof as definitely pointed out by the claims.

What is claimed is:

1. In a bobbin boring machine, the combination of a hopper for containing a series of blanks to be turned and bored, two boring heads carrying a turning tube and a centering tube, means for carrying a blank from the hopper to position between the boring heads, means for simultaneously moving the turning tube and centering tube longitudinally at different speeds to cause the latter to center and hold the blank and the former thereafter to engage and positively turn the blank, and non-rotatable boring means to act upon the blank as it is being turned.

2. In a bobbin boring machine, the combination of two boring heads, each carrying a turning tube and a centering tube, a non-rotatable boring bit axially movable within said tubes, means for moving said tubes at the same time and at different speeds to cause the centering tubes to first engage the ends of and center the blank and the turning tubes to thereafter positively engage the ends of the centered blank, and means for moving the axially movable boring bits as the turning tubes turn the blank.

3. In a bobbin boring machine, the combination of two boring heads each carrying a turning tube, having teeth to positively engage the ends of a blank, and a centering tube, a non-rotatable boring bit axially movable within said tubes, means for simultaneously moving said tubes longitudinally at different speeds in first one and then in the opposite direction to cause the centering tubes to first engage the ends of and center the blank and the turning tubes to thereafter positively engage the ends of the centered blank, and then to cause the turning tube to be first withdrawn from the blank and thereafter the centering tube to be withdrawn and means for moving the axially movable boring bits as the turning tubes turn the blank.

4. In a bobbin boring machine, the combination of a boring head having a turning tube, a centering tube to engage the ends of and center the blank prior to its engagement with the turning tube, a boring bit movable axially in said tubes, means for yieldingly moving the centering tube into engagement with the end of the blank to center and hold the same and to thereafter cause the turning tube to positively engage the end of the centered blank, and means for axially moving the boring bit.

5. In a bobbin boring machine, the combination of a boring head having a turning

tube, said tube having end prongs to positively engage the end of the blank, means for rotating said turning tube, a centering tube to engage the ends of and center the blank prior to its engagement with the turning tube, a non-rotatable boring bit movable axially in said tubes, means for yieldingly moving the centering tube into engagement with the end of the blank to center and hold the same and to thereafter cause the turning tube to positively engage the end of the centered blank, and means for axially moving the boring bit.

6. In a bobbin boring machine, the combination of two boring heads, means for placing a blank between said heads, each of said heads having a turning tube and a centering tube, means for moving said heads toward each other to cause the turning tubes to engage and turn the blank, and connections between the said boring heads and centering tubes respectively operative as said heads are moved toward each other to cause the centering tubes to engage the ends of the blank and center the same prior to the engagement of the turning tubes with said blank.

7. In a bobbin boring machine, the combination of two boring heads, means for placing a blank between said heads, each of said heads having a turning tube and a centering tube, means for moving said heads toward each other to cause the turning tubes to engage and turn the blank, connections between the said boring heads and centering tubes respectively operative as said heads are moved toward each other to cause the centering tubes to engage the ends of the blank and center the same prior to the engagement of the turning tubes with said blank, and a spring in said connections.

8. In a bobbin boring machine, the combination of two boring heads, means for placing a blank between said heads, each of said heads having a turning tube and a centering tube, means for moving said heads toward each other to cause the turning tubes to engage and turn the blank, connections between the said boring heads and centering tubes respectively operative as said heads are moved toward each other to cause the centering tubes to engage the ends of the blank and center the same prior to the engagement of the turning tubes with said blank, a non-rotatable boring bit movable longitudinally in said tubes, and operating means therefor.

9. In a bobbin boring machine, the combination of two boring heads each provided with a turning tube and a centering tube, means for moving the turning tubes simultaneously toward and away from the ends of the blank, and connections between said means and the centering tubes for causing the latter to engage and center the blank prior to the engagement therewith of the turning tubes and to free the blank subsequent to the disengagement of the turning tnbes.

10. In a bobbin boring machine, the combination of two boring heads each provided with a turning tube and a centering tube, means for moving the turning tubes simultaneously toward and away from the ends of the blank, connections between said means and the centering tubes for causing the latter to engage and center the blank prior to the engagement therewith of the turning tubes and to free the blank subsequent to the disengagement of the turning tubes, non-rotative boring bits extending longitudinally of said tubes, and means for advancing them axially as the blank is turned.

11. In a bobbin boring machine, the combination of two opposed boring heads, each provided with a turning and a centering tube, a lever operatively connected to one of said boring heads, connections between said lever and the other boring head, a cam for operating said lever to move the boring heads toward each other and cause the turning tubes to engage the end of a blank between said heads, connections between the respective boring heads and centering tubes to cause the latter to engage and center the blank prior to the engagement of the turning tubes therewith and to release the blank after the turning tubes have been disengaged therefrom, and a boring bit acting at each end of the blank.

12. In a bobbin boring machine, the combination of two opposed boring heads, each provided with a turning and a centering tube, a lever operatively connected to one of said boring heads, connections between said lever and the other boring head, a cam for operating said lever to move the boring heads toward each other and cause the turning tubes to engage the end of a blank between said heads, connections between the respective boring heads and centering tubes to cause the latter to engage and center the blank prior to the engagement of the turning tubes therewith and to release the blank after the turning tubes have been disengaged therefrom, a non-rotatable boring bit acting at each end of the blank, and means for moving the boring bits toward each other as the turning tube turns the blank.

13. In a bobbin boring machine, the combination of two boring heads, each provided with a turning tube and a centering tube, means for moving the turning tubes simultaneously toward and away from the ends of the blank, connections between said means and the centering tubes for causing the latter to engage and center the blank prior to the engagement therewith of the turning

tubes and to free the blank subsequent to the disengagement of the turning tubes, a non-rotatable boring bit acting at each end of the blank, a driving shaft, and means operated thereby and connected to the boring bits for moving them longitudinally toward each other and causing said boring bits to successively pass the transverse central point of the blank.

14. In a bobbin boring machine, two opposed boring heads, each having a turning and a centering tube, means for moving the heads simultaneously toward each other, connections between each head and its respective centering tube to impart differential movements of the turning and centering tubes as the heads are moved toward each other to cause the centering tubes to advance ahead of the turning tubes and engage the ends of and center a blank prior to the engagement of the turning tubes with the blank, non-rotary boring bits extending axially through each of the centering tubes, and means to cause the boring bits to move longitudinally and successively past the transverse central point of the blank.

15. In a bobbin boring machine, the combination of a boring head, a turning tube mounted thereon, a centering tube within the turning tube, a collar fixed to the centering tube, a second collar loose thereon, a spring interposed between said collars, an angle lever connected to said loose collar and having a fixed fulcrum, connections between the boring head and angle lever, and means for moving the boring head longitudinally to impart differential longitudinal movements to the turning tube and centering tube.

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

LUTHER C. BALDWIN.

Witnesses:

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DANA R. CRAWFORD.