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MACHINE FOR BORING WOODEN BOBBINS.

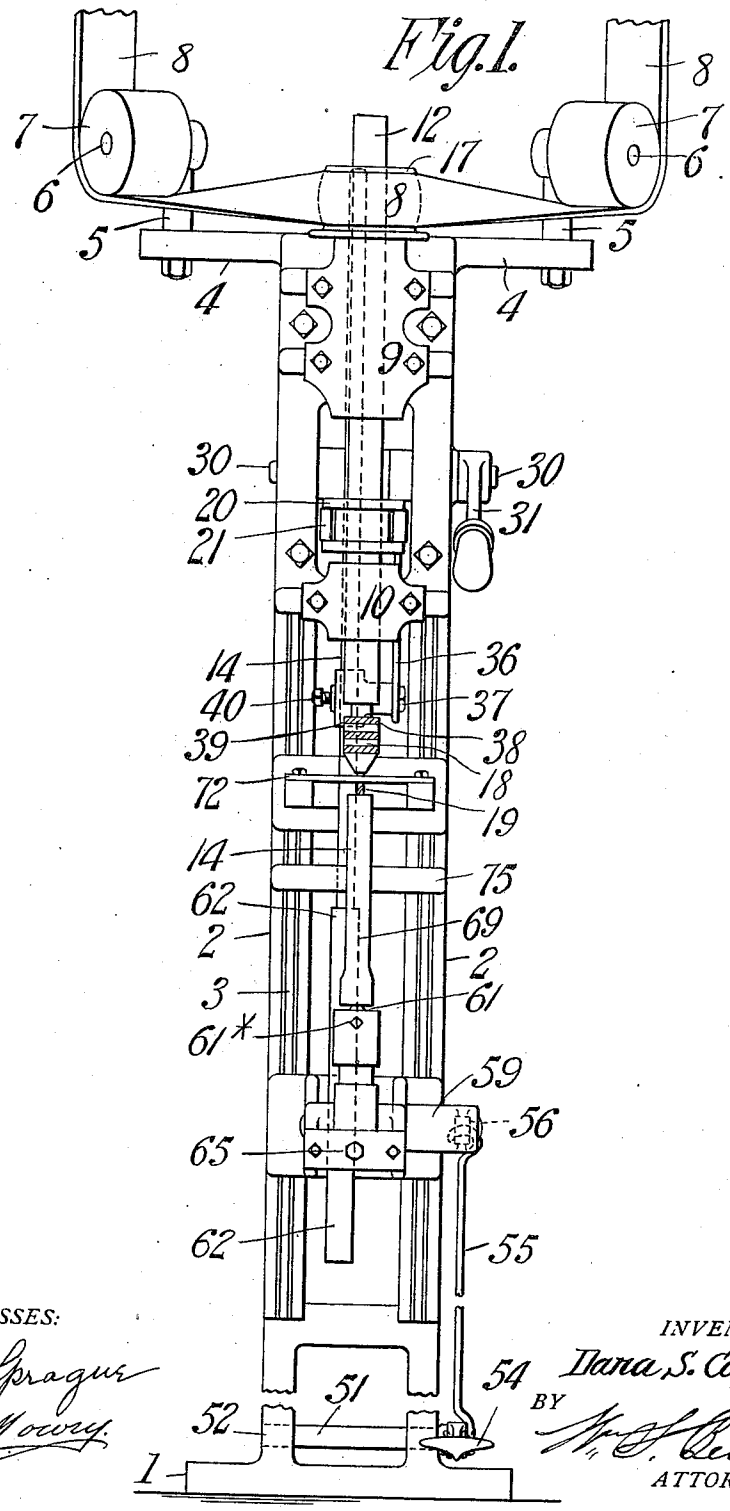
APPLICATION FILED JUNE 10, 1910.

1,043,205.

Patented Nov. 5, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

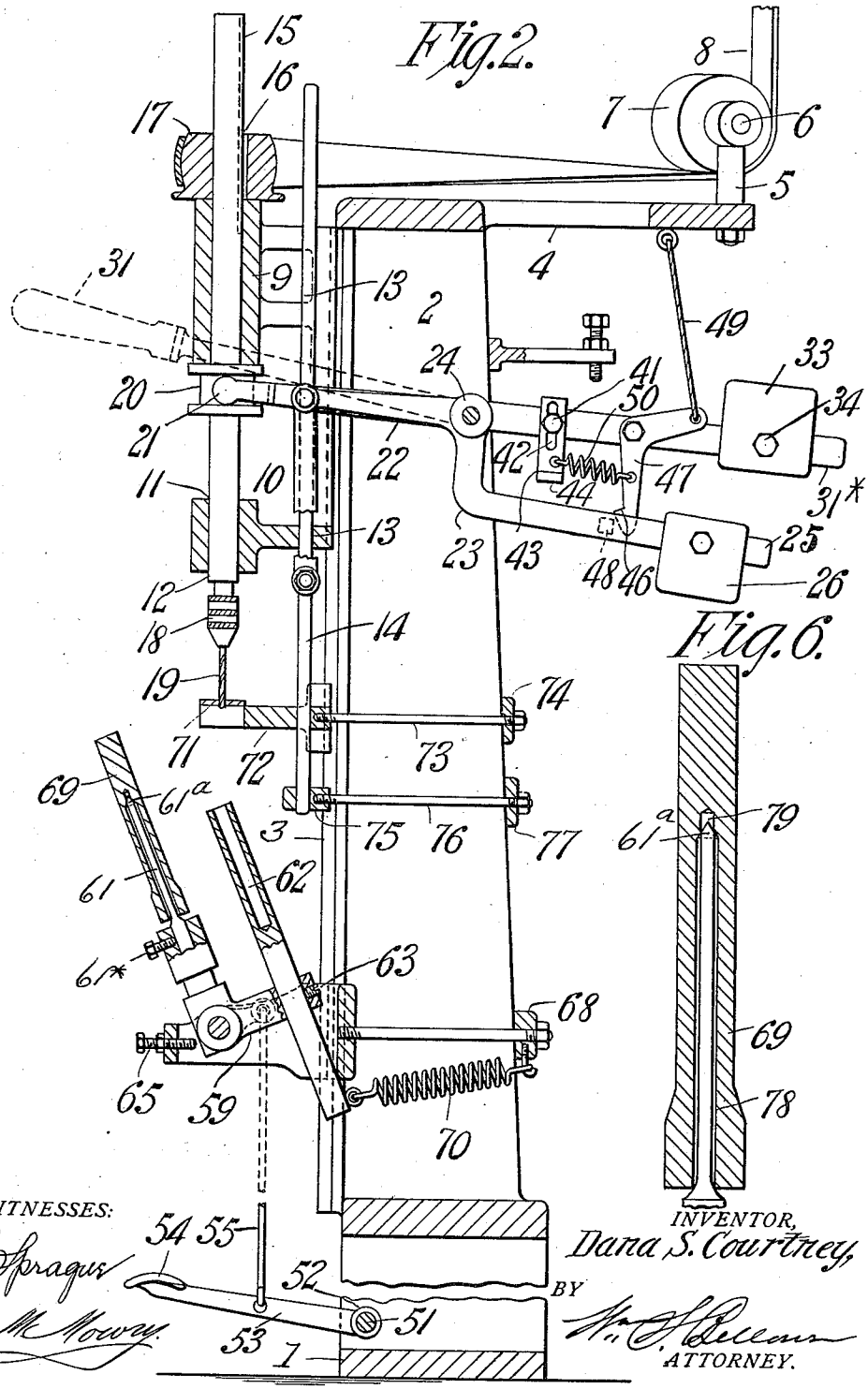

Fig. 6.

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4 SHEETS—SHEET 3.

Fig. 3.

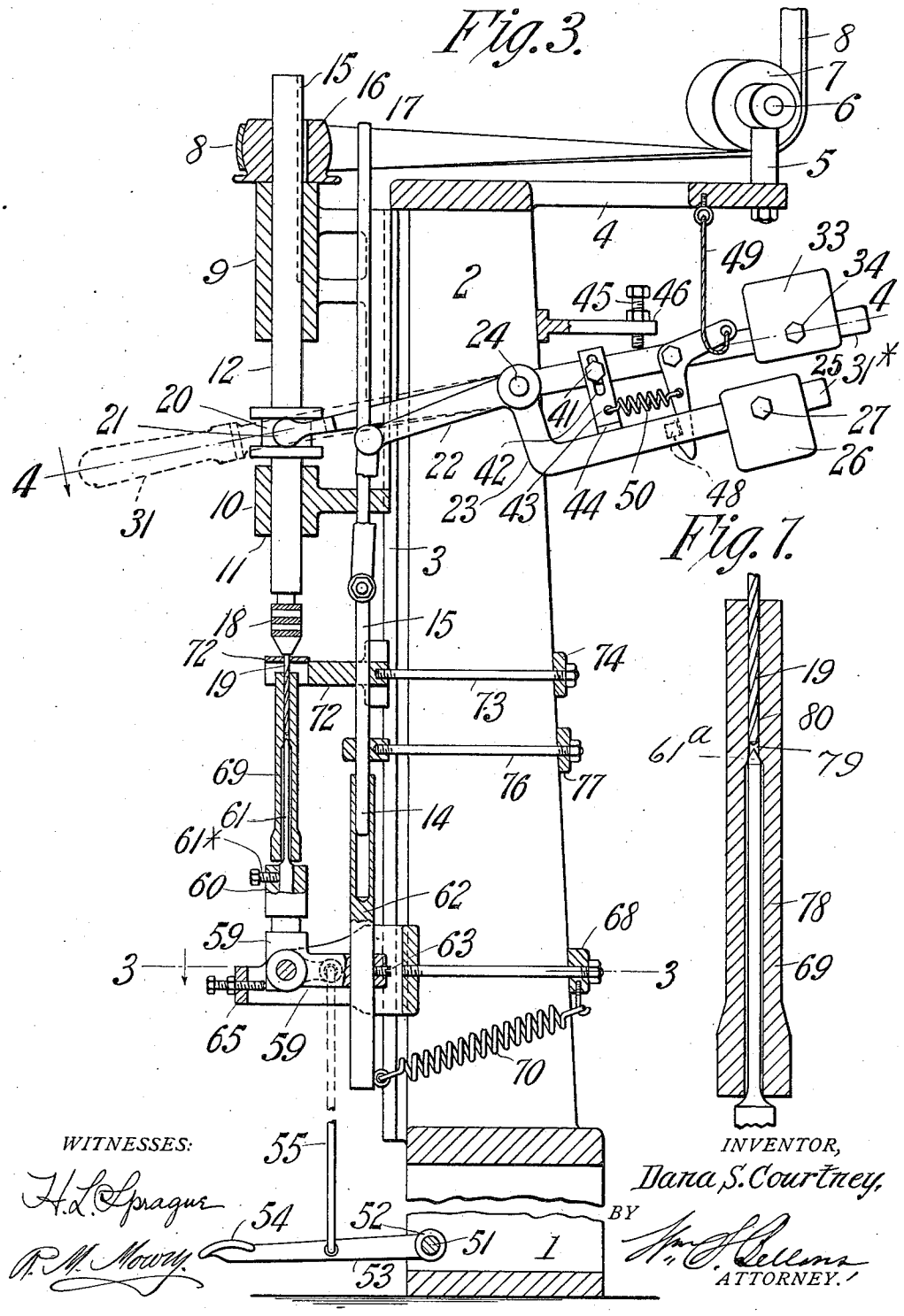

Fig. 7.

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4 SHEETS—SHEET 4.

Fig. 4.

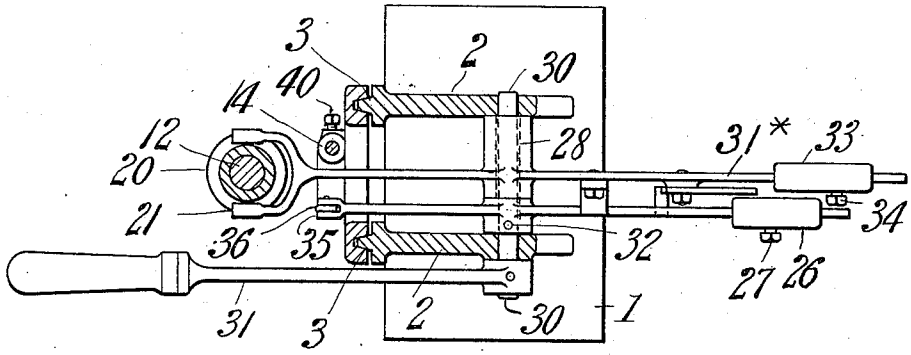
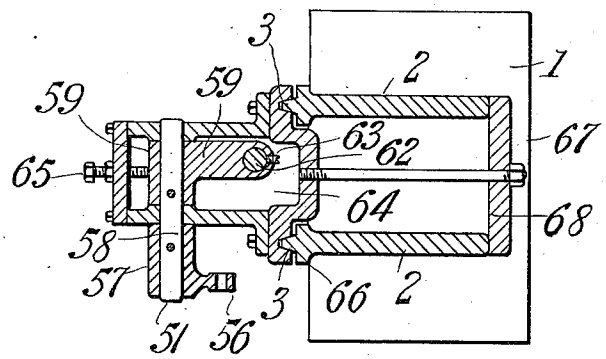


Fig. 5.



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MACHINE FOR BORING WOODEN BOBBINS.

1,043,205. Specification of Letters Patent. Patented Nov. 5, 1912.

Application filed June 10, 1910. Serial No. 566,190.

To all whom it may concern:

Be it known that I, DANA S. COURTNEY, a citizen of the United States of America, and resident of Chicopee, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Machines for Boring Wooden Bobbins, of which the following is a full, clear, and exact description.

The present invention,—relating to wood working machinery,—especially pertains to a machine for the boring of wooden bobbins such as are very extensively used on the spindles of spinning machines. Each bobbin of the kind referred to, as well known, usually has a hole axially therethrough which is of different diameters at different portions of the length of the article; and an object of this invention is the provision of a machine for operating upon the bobbin after it has been bored part way through its length with a hole of one diameter, for accomplishing the further boring of the bobbin with a hole in or through another portion of its length which is in axial alinement with the first bored hole, and with such accuracy and speed of operation that bobbins are not only more cheaply produced but are of more perfect character. One method heretofore pursued has been to bore the bobbin or the piece or blank therefor throughout its entire length with a hole of comparatively small diameter and to then counterbore or ream the bobbin at one end portion thereof for making the hole part way through the bobbin of the larger diameter; but this operation has not been altogether satisfactory because of its being time consuming and also because in the boring at one time entirely throughout the length of the piece a very long bit is required and which in its operation will unavoidably "wind" or take a sidewise lead so that a perfectly straight hole is not produced. Another method heretofore followed has been to bore the bobbin longitudinally from its lower or butt end, partway through with a hole of comparatively large diameter, and to thereafter subject the partially bored bobbin to the action of a tool comprising at its rear or butt portion a rotatable mandrel which tightly fits and has its bobbin-centering action in the already bored comparatively large hole in the piece, and which tool is, furthermore, provided at its forward extremity with a bit of small size for the further boring of the comparatively small hole in a forward direction through the piece. This operation is comparatively slow and unsatisfactory for the reasons that the acts of forcing the rotatable mandrel with a tight fit into the partially bored bobbin, and its subsequent withdrawal, are slow, and the slender bit, for boring the smaller hole, located far away from the support for the mandrel portion causes the small bit to "lead" offside from the desired axial line of the piece being worked upon.

The present invention contemplates the provision of means for operating on a bobbin,—which has been bored from one end partially of its length and with a hole of a comparatively large diameter,—which means comprises a stem or spindle of suitable length and of smaller diameter than that of the hole already bored in the bobbin, and which stem or spindle is provided with a conical end for the centering of the partially bored piece (which piece, as will be here stated has the hole partially formed therethrough of the comparatively large diameter continued in an axially extending socket or cavity of smaller diameter, as produced by bits of the well known counterbore class), so that the partially bored bobbin may be loosely slipped over such spindle or stem and by the conical point of the latter centered at its attenuated hole, and a bit or drill of suitably small diameter having suitable supporting and operating means therefor so that in coaction with the stem or spindle it produces a hole commencing at the unbored end of the piece, which is in axial alinement with the hole which has been already bored of the larger diameter from the other end. Such an action in the making use of the mechanical means provided permits the most rapid placing of the bobbins on the centering stem or spindle and the removal thereof therefrom, while the final boring is most quickly performed as by the manner of the working of a drill press. And a machine for carrying out of this invention is fully described in conjunction with the accompanying drawings and is set forth in the claims.

In the drawings:—Figure 1 represents a front elevation of the complete machine, the parts being in the position they assume or occupy when the drill is in the act of boring the opening or passage in the upper portion

of the bobbin and with the guide and retaining means in operative position. Fig. 2 represents a central vertical sectional view with the mechanism comprising the machine shown in the position occupied just previous to the presentation of the bobbin and the guiding and retaining devices; Fig. 3 represents a central vertical sectional view with the parts in the position assumed when the bobbin is being retained and bored. Fig. 4 represents a sectional view on the line 4—4, Fig. 3; Fig. 5 represents a sectional view on the line 3—3, Fig. 3; Fig. 6 represents an enlarged central sectional view of the bobbin mounted upon the spindle in the condition upon which it is presented for boring; and Fig. 7 represents a similar view of the bobbin after it has been bored by my machine, more particularly to show by comparison the condition of the bobbin before and after it has been bored by my machine.

Referring by numerals to the drawings, in which similar numerals of reference designate corresponding parts in the several views,—the frame or supporting structure of my machine comprises the base 1, the pair of uprights or standards 2 formed upon their forward edge with the ribs 3 constructed to provide guides as will hereinafter appear; and mounted upon the standards is the head 4 in which is secured the adjustable posts 5 carrying studs 6 upon which revolve the pulleys 7 over which passes the driving belt 8. From this construction it will be apparent that I provide a frame or supporting structure which assumes a vertical position and which possesses great strength and durability, but is of compact form; and I provide the upper portion of the frame with the brackets 9 and 10 provided with the spindle carrying shaft bearings 11 in which is mounted the spindle carrying shaft 12 and the sliding bolt bearings 13 in which is guided the sliding retaining bolt 14; and the spindle bearing shaft 12 is provided with a channel or key way 15 in which fits the key 16 of the pulley 17 over which, and the pulley 7, passes the driving belt 8; and from this construction it will be noted that the spindle bearing shaft has a rotary and reciprocating movement, and that the sliding rod or bolt has a vertical or reciprocating movement only, and the spindle carrying shaft has mounted upon its lower end the chuck 18 carrying the drill 19.

Upon the spindle carrying shaft 12 is mounted a grooved collar 20 in which fits the fork 21 of the lever 31^{x}, which lever has the fulcrum sleeve or hub 28 thereof loose upon the shaft or spindle 29. Secured to the outer end 30 of shaft 29 is hand operated lever 31 which rocks said shaft, and in consequence of said rocking imparts to the lever 23 a similar rocking movement, due to the fact that the lever 23 has its sleeve 32 rigidly secured to the shaft 29. Lever 31^{x} is substantially straight throughout, and has upon one end the balancing weight 33 provided with a set screw 34. Angle lever 23 is fulcrumed at 24 upon the shaft 29 and carries upon its free end 25 a balancing or counterpoise weight 26 adjustable through the medium of the set screw 27. The free end of the arm 22 of angle lever 23 is formed with a bifurcation 35 receiving the upper end of the vertical plate 36, the latter having its lower end connected at 37 to the stud 38 formed with the vertical sleeve 39 in which fits the sliding bolt 14, the latter being retained in the sleeve 39 by means of the set screw 40. The said lever 31^{x} is provided with a pin 41 fitting in the slot 42 of the plate 43, having its lower end formed with a stop 44 adapted, when said lever is tilted through the medium of the hand lever 31 to bring the stop 44 in contact with the arm 25 of the angle lever, and upon continued depression of the said hand lever 31 bringing the ends of the levers to the parallel position shown in Fig. 3, until the plate on the straight lever contacts with the adjustable stop 45 in the bracket 46 and bringing the sliding bolt into operative position as well as the drill; and upon the completion of the drilling, the parts return to the position shown in Fig. 2 through the medium of the weights 26 and 33, which operation releases the catch 46′ of the angle shaped lever 47 from the keeper 48 on the arm 25, the other end of the angle lever catch being connected with the frame by means of the cord or chain 49, and also being connected with the plate 43 by means of the spring 50.

In the base portion 1 of the frame is located the shaft 51 upon which is mounted the sleeve 52 formed on the foot lever 53 provided with a treadle 54; and to said lever is connected the lower end of the rod 55 having its upper end connected to the arm 56 on the sleeve 57; said sleeve being mounted fast upon the shaft 58 for imparting a rocking motion to the member 59 which carries respectively the holder 60 for the bobbin carrying stem or spindle 61 retained in position by the set screw 61*, and the socket piece 62 which receives and retains the lower end of the sliding bolt 14, the socket piece 62 being retained in the member 59 by means of the screw 63; and said member has a rocking or swinging action to bring the bobbin supporting spindle and the socket piece into and out of operative position through the medium of the foot lever 53 and connecting rod or link 55. It is particularly noted that the upper end 61^{a} of the stem or spindle 61 is made of a conical form as clearly shown in the drawings.

The rocking member 59 is located in the frame 64 carrying at its outer portion the

set screw 65 for engaging and limiting the movement of the rocking member 59; and the frame is provided upon its inner portion with the grooves 66 in which fit the ribs 3 of the main frame, and the said frame 64 is adjustably connected to the main frame by means of the rod 67 having its inner end connected to the frame carrying the rocking member, and its outer end fitted in the cross piece 68 bearing and clamped against the standards 2 of the frame.

It will be observed that pressure upon the foot lever tilts or rocks the member 59 and brings the socket piece 62 and bobbin supporting spindle carrying the bobbin 69 into vertical position to receive the sliding retaining bolt 14 and to place the bobbin in position to be drilled; and after the drilling has been effected the release of the hand lever permits the sliding bolt to be withdrawn and simultaneously the drill and the rocking member under the impulse of returning spring 70 tilts the rocking member to the position shown in Fig. 2, permitting the instant application of the bobbin to the supporting spindle.

To insure the drill traveling in the exact vertical position, I provide the drill guide 71 carried by the bracket 72 adjustable on the frame and secured at the desired adjustment by means of the rod 73 mounted in plate 74; and to also insure the retaining bolt 14 traveling exactly parallel with the drill to insure vertical movement, I provide the guide 75 adjustably mounted on the frame by means of the bolt 76 fitting in the plate 77.

The bobbin 69 before being bored by my machine is provided with the vertical passage 78 which is of comparatively large diameter, extending from the lower portion of the bobbin upward and but partially therethrough, terminating in the socket or cavity 79 of a diameter smaller than that of hole 78, and also somewhat less than the diameter of the stem or spindle 61; and the purpose of my machine is to bore from the upper end of the bobbin the opening or passage 80 of a reduced diameter to meet and be in axial alinement with the passage 78.

In the operation of my machine, assuming the parts to be in normal or initial position as shown in Fig. 2, the partially bored bobbin is loosely placed about the spindle, the conical end 61^a of which is efficient for so centering the piece that it is axially coincident with the spindle and the foot lever lowered, bringing the bobbin and socket piece to a vertical position or directly under the slide bolt 14 and the drill 19; and the lowering of the hand lever 31 rocks the shaft 29 upon which it is mounted, moving first the straight lever 31^x and the sliding bolt 14 until it enters the socket piece 62; and after the sliding bolt has entered said socket piece and the depression of the lever is continued, the plate 43 brings the stop 44 thereof against the angle lever with the catch 47 carried by the lever 31^x when the keeper 48 is engaged by the catch 47, causing the two levers to move in unison; and the bolt 14 having entered the socket piece 62 the drill is brought into engagement with the upper end of the bobbin and the boring is effected, and when the work of the drill has been completed, the hand lever is released, the weighted levers fall and remove the drill and bolt, the rocking member carrying the drill bobbin and the socket piece is moved to normal position under the impulse of the spring and is ready to receive another bobbin and repeat the operation as stated.

The operation of my drilling machine will be clearly understood by reference to Fig. 2, which shows the parts in their initial position, and by Fig. 3, which shows the parts in the position assumed when the drilling is being effected, it being observed that the rocking member is operated by the foot lever to bring the socket piece and bobbin into vertical position and that after the operation of drilling the spring rocks the member and returns the parts to normal position; and that the hand lever operates first the sliding retaining bolt, and after said bolt is in retaining position, the continued downward movement of the hand lever lowers the drill carrying shaft and brings the drill into contact with the upper end of the bobbin; and such a construction can be operated and controlled by a person of ordinary intelligence to expeditiously and perfectly effect the drilling of the bobbins.

It is evident that my machine insures the boring of the opening or passage through the bobbins in a most rapid and perfect manner and dispenses, to a great extent, with the work of reaming said opening; also that it is impossible for the bobbin to move from its proper position in the machine, and, furthermore, that the machine can be readily controlled and quickly manipulated by a single unskilled person. It will also be observed that the various adjustments of my machine enable a person to bore bobbins of any length as circumstances require, thus adapting the machine to any character of work.

I claim:—

1. The combination with a drill of a stem or spindle having a conical centering end, means for rotating the drill, means for causing relatively a reciprocating movement as between the drill and stem, and means for causing alined relative positions of the stem and drill and the displacement of one of said parts from its alinement with the other.

2. In combination with a drill carrying shaft, a rocking member carrying a bobbin

support, means to lock the member when the bobbin support is in alinement with the drill shaft, unitary means for reciprocating said drill shaft and for operating said locking means, and means to automatically restore said member to normal position after release of said locking means.

3. In a machine of the character described, the combination of a supporting structure, a shaft, a drill carried by said shaft, a sliding bolt mounted in the frame, parallel with the drill carrying shaft, a counterpoise lever fulcrumed to freely move on a shaft mounted on the frame and having one end engaging the drill carrying shaft, a lever fulcrumed on the shaft with said lever and connected at one end with the sliding bolt, means for connecting the levers to cause them to move in unison to reciprocate the drill shafts and sliding bolt, and a bobbin carrier adapted to be brought in line with the drill shaft and means arranged parallel with the bobbin carrier to be engaged by the sliding bolt for retaining the bobbin carrier in alinement with the drill shaft.

4. In a machine of the character described, the combination of a supporting structure, a shaft mounted in said structure and carrying a drill, a sliding bolt mounted in a structure and arranged parallel with the drill shaft, a shaft mounted in the frame in a horizontal plane with reference to the drill shaft, a lever fulcrumed on said shaft and having one end connected with the drill shaft, a lever mounted on the same shaft with the first mentioned lever having one end connected with the sliding bolt, means for operating the levers to impart a sliding movement to the sliding bolt and drill shaft, means for limiting the movement of the levers connected with the drill shaft and sliding bolt, means for connecting said levers and causing them to move in unison, consisting of a catch mounted upon one lever and engaging the other and an adjustable stop plate mounted upon one lever and engaging the other, said stop plate and catch being connected for joint operation, and a bobbin carrier carrying means to be engaged by the sliding bolt for securing the bobbin carrier in alinement with the drill shaft.

5. A machine for boring bobbins, including a movable socketed bobbin carrier, a rotatable reciprocable drill, locking means for engaging in said socket of the carrier, means to actuate said carrier to aline same with the drill, and unitary means to successively actuate said locking means to hold the carrier stationary and to then reciprocate said drill.

6. A machine for boring bobbins, including a drill, a movable bobbin carrier normally out of alinement with the drill, means to move the carrier into alinement with the drill, locking means to engage the carrier, and unitary means to successively actuate said locking means to hold the carrier stationary and to then reciprocate said drill.

7. A method of boring a bobbin partially bored to form a socket having an attenuated portion which comprises the centering of said bobbin upon a stem adapted to but partially enter said socket and be spaced from the closed end of the attenuated portion and the advancing of a drill toward the free end of said bobbin so as to enter the attenuated end of the socket without contacting with said stem.

Signed by me at Springfield, Mass., in presence of two subscribing witnesses.

DANA S. COURTNEY.

Witnesses:
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