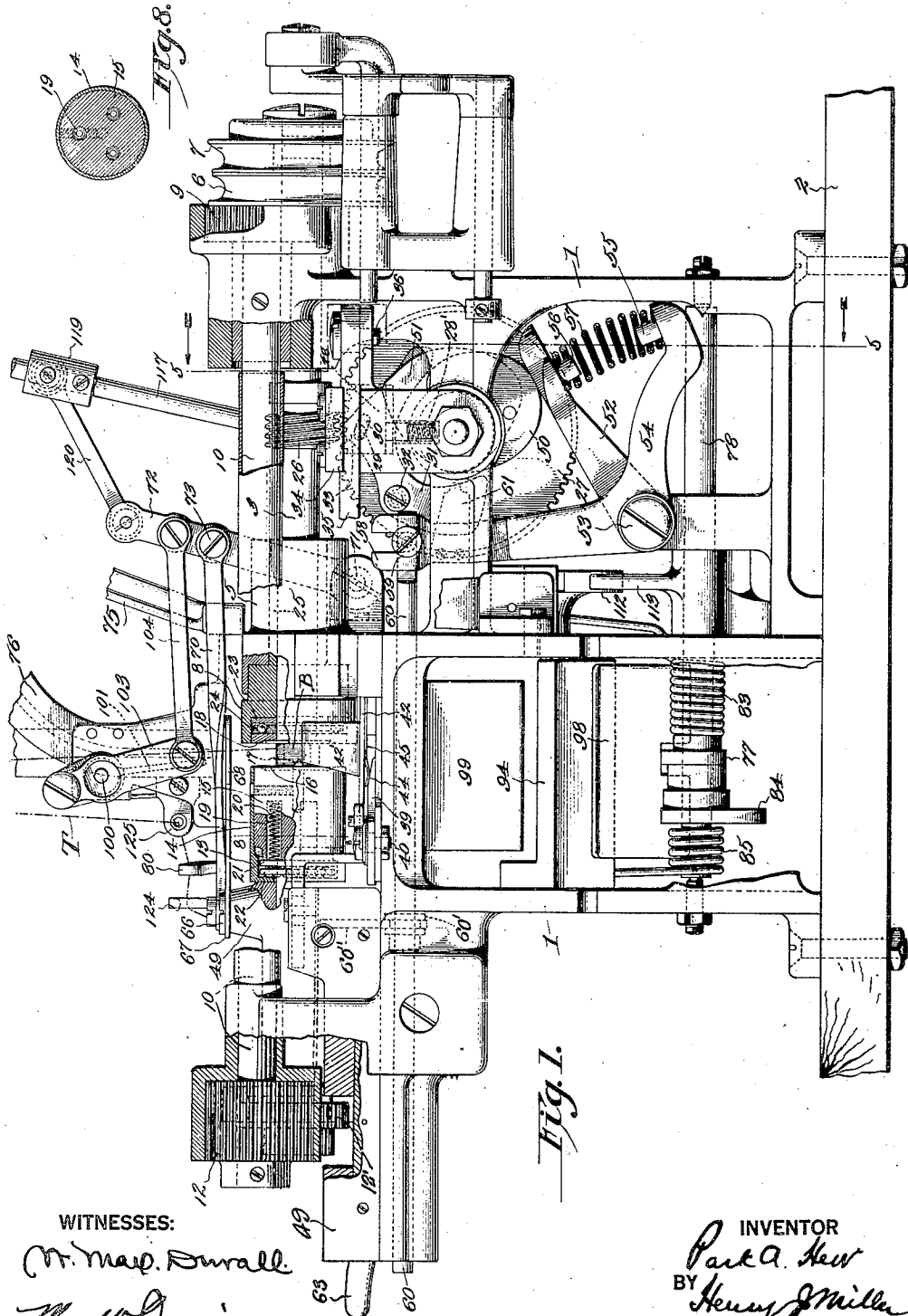


P. A. HERR.
BOBBIN WINDING MACHINE.
APPLICATION FILED DEC. 5, 1919.

1,430,079.

Patented Sept. 26, 1922.

6 SHEETS—SHEET 1.



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6 SHEETS—SHEET 2.

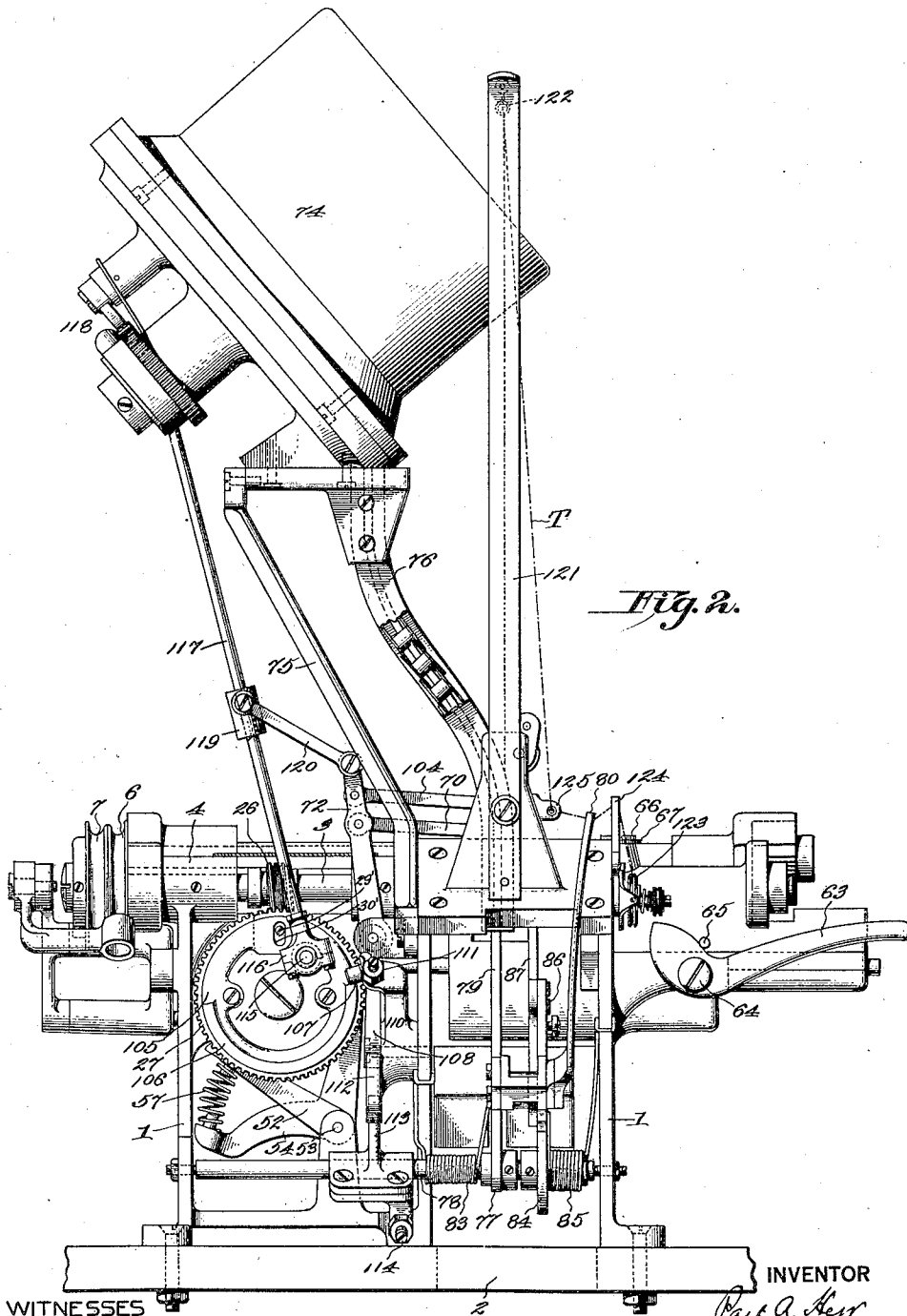


Fig. 2.

WITNESSES
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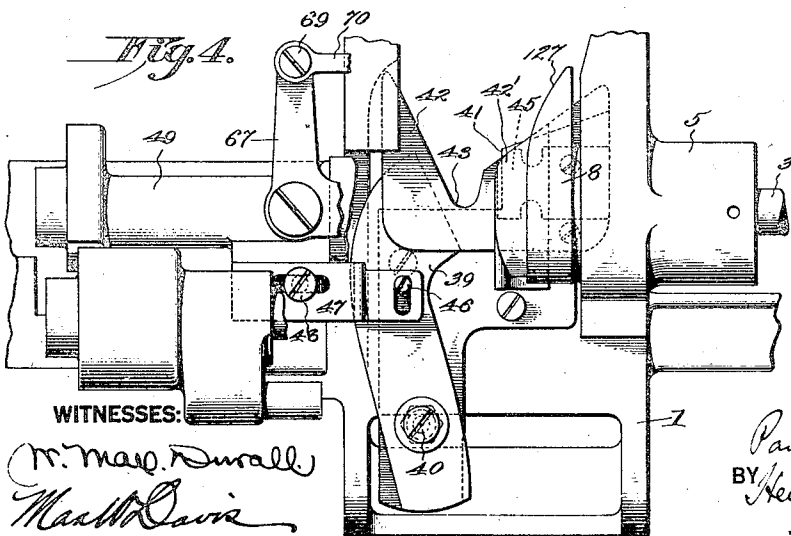
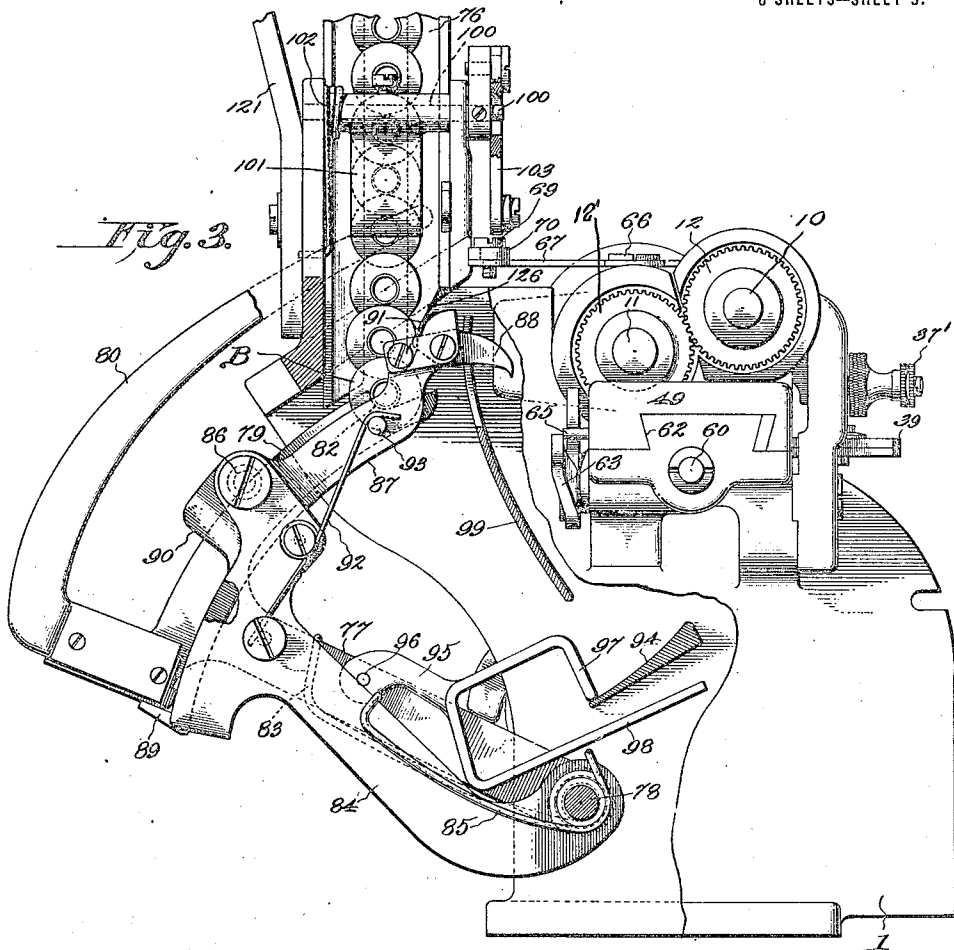
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6 SHEETS—SHEET 3.



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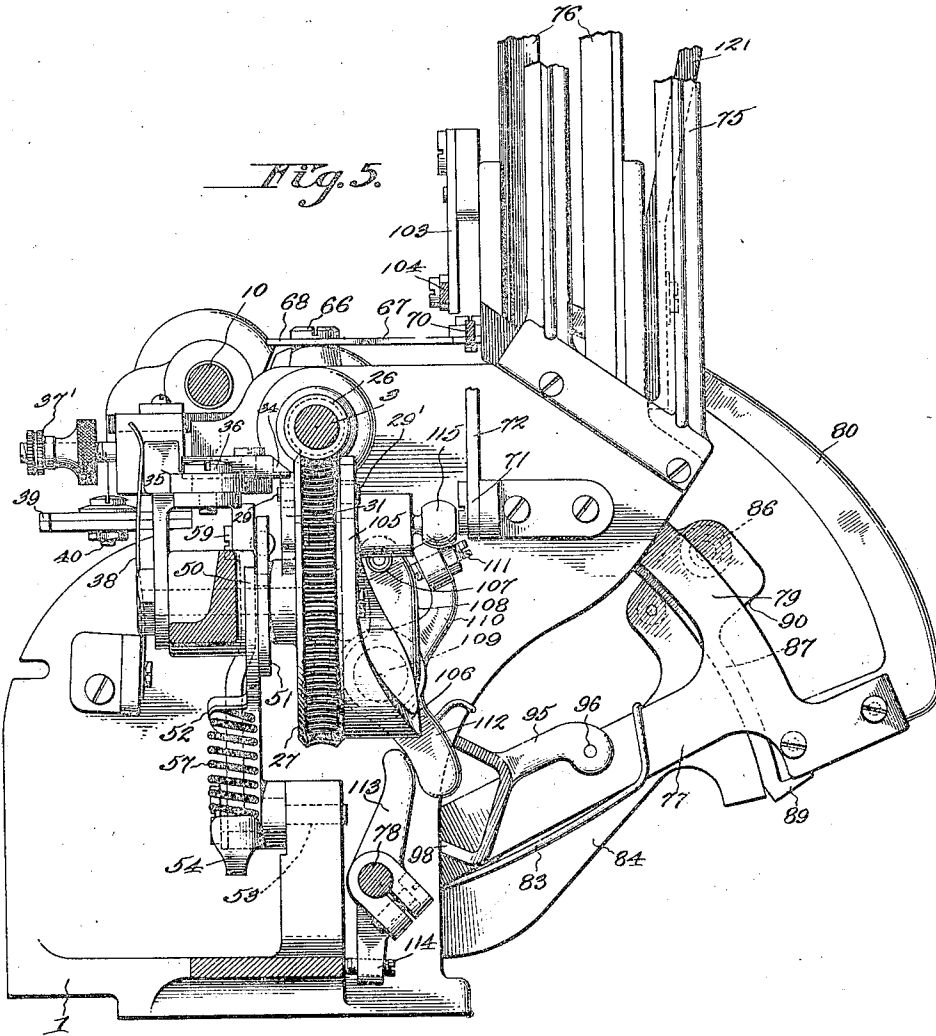
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6 SHEETS—SHEET 4.



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6 SHEETS—SHEET 5.

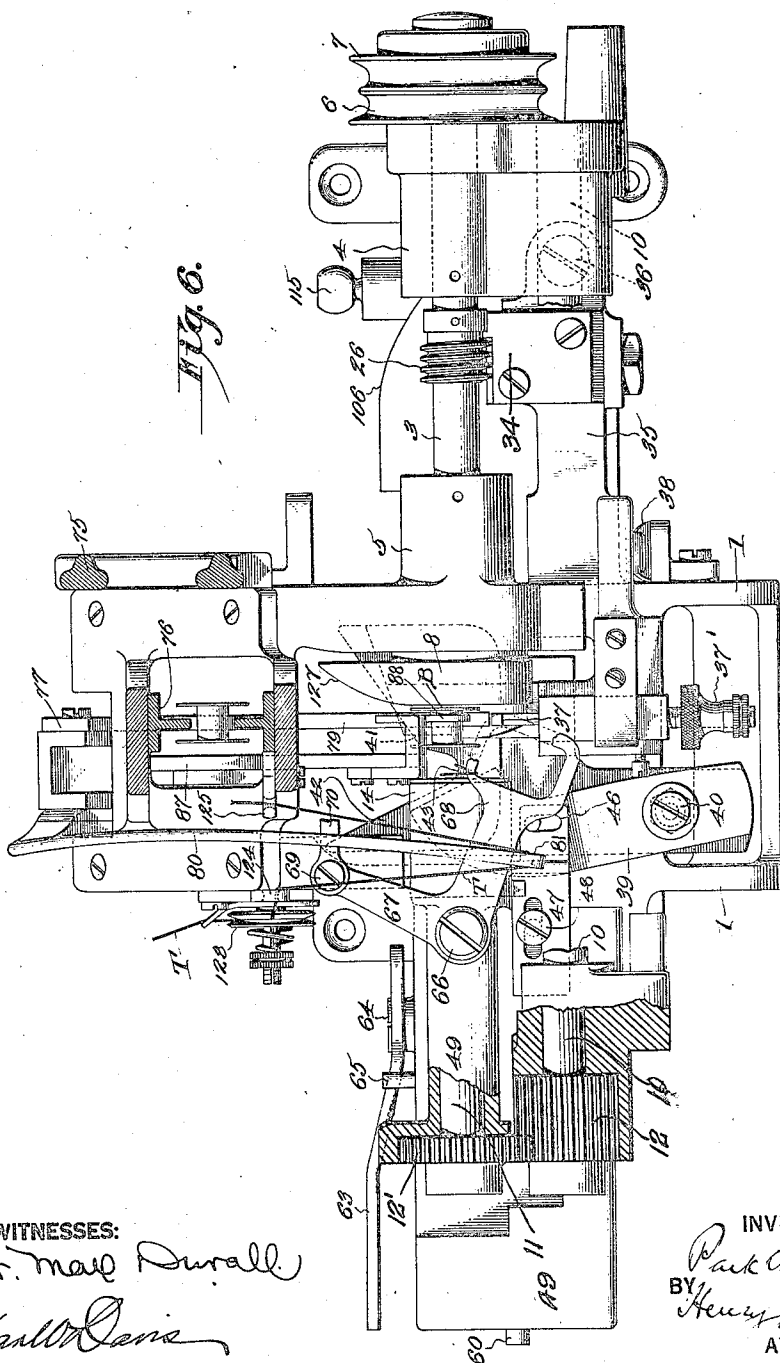


Fig. 6.

WITNESSES:

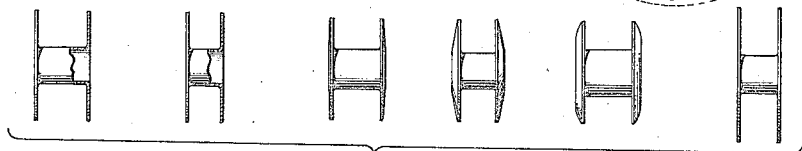
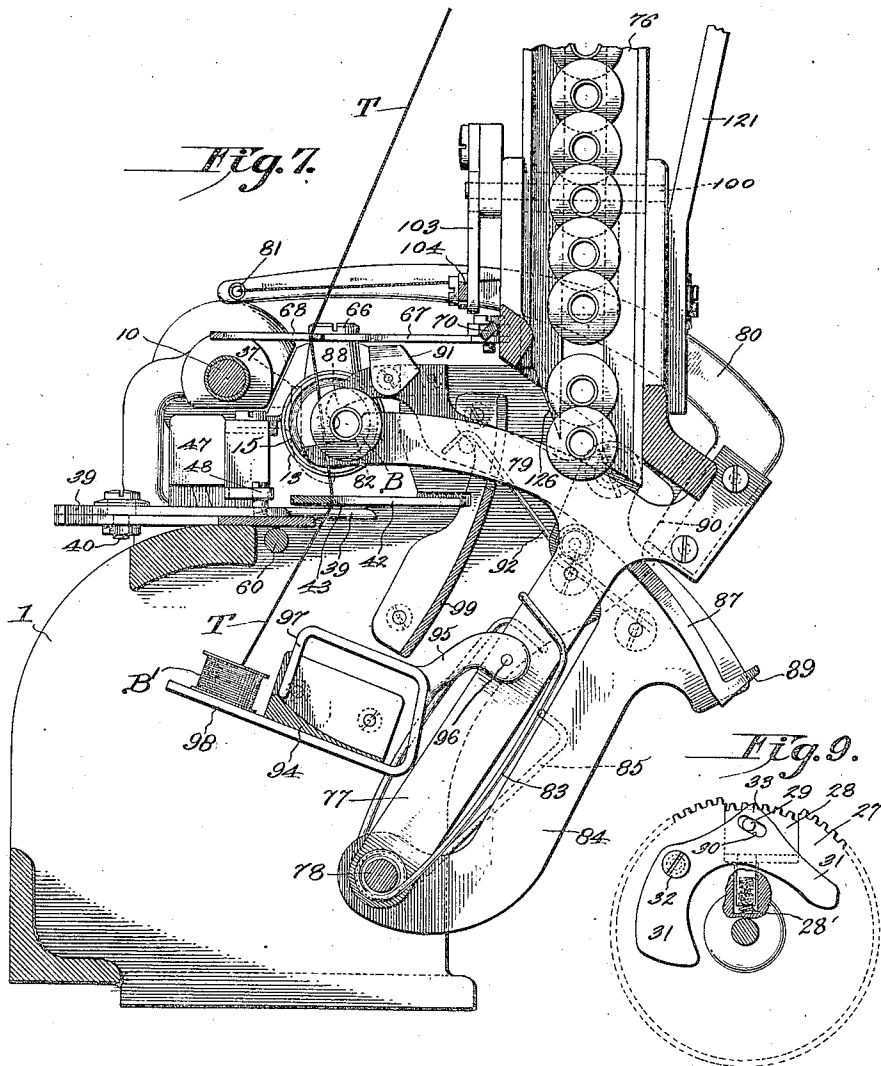
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1,430,079.

Patented Sept. 26, 1922.
6 SHEETS—SHEET 6.



WITNESSES:

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Fig. 10.

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UNITED STATES PATENT OFFICE.

PARK A. HERR, OF HILLSIDE, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY.

BOBBIN-WINDING MACHINE.

Application filed December 5, 1919. Serial No. 342,794.

To all whom it may concern:

Be it known that I, PARK A. HERR, a citizen of the United States, residing at Hillside, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Bobbin-Winding Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to machines for automatically winding bobbins one after another without attention and without stopping and which will discharge the wound bobbins with the thread running between them severed so that each bobbin is in condition to be placed in a sewing machine without further attention.

It aims to provide improved machines of the type mentioned which will wind a large number of different types and sizes of bobbins, taking them indiscriminately from a common receptacle and winding them one after another. It also aims to wind these bobbins rapidly and in a reliable manner, without waste of thread or injury to the bobbins.

A further object of the invention is to provide means for holding the end of the severed thread after a wound bobbin has been discharged until it is firmly clamped between the bobbin and the clamp-head or until at least one turn of thread is wrapped around the succeeding empty bobbins so that this free end of thread will not be pulled away from the winding mechanism before it is started on the empty bobbin, thus obviating the necessity of stopping the machine and manually resetting.

A still further object of the invention is to provide means whereby when an empty bobbin is placed in position the thread will not be severed by the sharp edges of the bobbin-flange, at least until this thread is safely started on the empty bobbin.

The invention also aims to provide means whereby when the thread is started on an empty bobbin there will be no sudden and severe strain imparted thereto thus obviating any danger of breaking the thread and insuring reliable operation.

Another object of the invention is to provide means for transferring the empty bobbins from the supply to the winding mechanism that will handle different types and

sizes of bobbins with equal facility and in a positive and reliable manner.

Other objects and advantages of the invention will become apparent from the detailed description thereof.

To attain the ends above mentioned the invention in its preferred form comprises a pair of rotary continuously and positively driven clamp-heads for holding the bobbin while it is being wound and one of which is retractable or movable from and toward the other to receive empty bobbins and release the filled bobbins. The machine is provided with a main-shaft, from which both clamp-heads are driven, and which is provided with a worm meshing with a gear having a movable section held out of mesh with the worm during the winding operation but which is automatically released by a spring pressed catch operated by the pressure of the thread thereon as it accumulates on the bobbin. The release of this section allows it to mesh with the worm thus starting operation of the worm-wheel. The worm-wheel is provided with a crank and a number of cams which operate the hopper feeding mechanism, the bobbin transferring mechanism, and thread holding, severing, guiding and clamping means in proper sequence to discharge a filled bobbin and insert an empty bobbin without stopping the machine.

The movable clamping head is provided with means for first yieldingly and gradually clamping the empty bobbin before the full pressure of the main clamping force is applied, to obviate sudden strains and breakage of the thread in starting the winding of an empty bobbin and also to insure that at least one turn of the thread is laid around the bobbin core before the full clamping force is applied so that there will be no danger of the thread being cut by the sharp edge of the bobbin-flange.

The machine also includes a new and improved device for transferring the bobbins from the chute leading from the hopper, to the clamping-heads. This transferring device is adapted to accommodate different sizes and shapes of bobbins and comprises a pivoted segment operating below the discharge end of the chute leading from the hopper and has cooperating therewith a clamping and locking means whereby the

empty bobbin is securely held and prevented from falling out until it is placed and clamped between the clamping-heads.

A yielding clamp is provided for holding the end of the severed thread while a new bobbin is being started which automatically accommodates itself to different sizes and types of thread.

This invention relates to the same general type of machine as that disclosed in my copending application for a bobbin winding machine, Serial No. 247,103, filed July 29, 1918, and this application is a continuation in part of said copending application.

Referring to the accompanying drawings for a more detailed description of the machine, Fig. 1 is a front elevation of the machine with parts broken away to more clearly indicate certain portions of the mechanism. Fig. 2 is a rear elevation on a reduced scale showing the feeding hopper in position. Fig. 3 is an end elevation looking from the left hand of the machine as viewed in Fig. 1, part of the frame being broken away. Fig. 4 is a detail plan view of the thread severing mechanism. Fig. 5 is a sectional elevation taken substantially on the line 5—5 of Fig. 1. Fig. 6 is a plan view with the hopper removed and showing the bobbin about to be clamped between the clamp-heads in winding position. Fig. 7 is a section on substantially a line, through the winding point adjacent the clamping face 18 and looking to the left as viewed in Fig. 1, the parts being in the same position as shown in Fig. 6. Fig. 8 is a detail cross section of the retractable clamping-head on the line 8—8, of Fig. 1. Fig. 9 is a detailed view of a portion of the worm-gear showing the means for operating the retractable section thereof. Fig. 10 is a view showing a few of the different sizes and types of bobbins which are adapted to be wound on the machine.

The machine comprises in its preferred form a frame 1 upon a support 2 and in which the various mechanisms are mounted for winding the bobbins. This mechanism comprises a main-shaft 3 mounted in the bearing heads 4 and 5, upon one end of which is mounted the fixed pulley 6 and the loose pulley 7, and at the other end is the clamping element or head 8. Driven from the main-shaft by means of the gear 9 is a countershaft 10 driving a secondary shaft 11 in line with the main-shaft 3 through the gears 12, and 12', one of which gears, in the present embodiment gear 12 on shaft 10, is of sufficient length that the head in which shaft 11 is mounted may be retracted without moving the gears out of mesh. A retractable clamping element or head 13 is provided which comprises a cylindrical shell 14 in which is yieldingly mounted the member 15 connected to one end of the

shaft 11. This member 15 is provided with a clamping face 16 and a center 17 for engaging the bobbin and pressing it against the face of the disk 18 of the clamp-head 8. The member 15 being secured to the end of the shaft 11 is driven thereby but has a slight longitudinal movement with the shaft when the bobbin is clamped in position. It has drilled therein a plurality of sockets 19 in each of which is a spring 20 bearing at one end against the bottom of its socket and at the other end against bearing collar 21, the combined force of these springs 20 being less than that of spring 57. Between the bearing collar 21 and the shell 14 is the ball-thrust bearing 22. The length of the shaft 11 is such that it floats in its bearing in the head 49, and when the pressure on the end of member 15 is removed by retraction of the head 49 this shaft is forced longitudinally to the right, as viewed in Fig. 1, by springs 20 until the gear 12' secured on the end of the shaft comes in contact with the end of the bearing. When the bobbin is clamped in position the pressure on the end 16 of member 15 forces this member and the shaft to the left until the inner end of member 15 bears on the face of the bearing disk or collar 21 as shown in Fig. 1. Between the disk 18 and the second bearing disk 23 is also a ball-thrust bearing 24. The disk 18 is secured upon the end of the main-shaft 3 and rotates therewith within the member 8, the member 8 being led into the bearing-head 5 and extending therethrough to form a bushing 25 for said main-shaft. The member 8 is stationary in the head 5. In imparting rotary movement to the bobbin it is sufficient if only one of the clamping members is positively driven which may be either the member 15 or the member 18 or the bobbin may be rotated by any other desirable means, but it is preferable that both of the clamping members be positively rotated as shown.

Also mounted on the main-shaft 3 is a worm 26 meshing with a worm-gear 27 mounted to rotate in the frame. The worm-wheel is provided with a section 28 cut therefrom and mounted so as to slide in guide-ways formed therein. Between this movable section and the body of the gear is a spring 28' tending to force it outwardly in line with the circumference of the body portion of the gear. The section 28 is provided with a pin 29 extending outwardly therefrom fitting in a slot 30 formed in a cam-plate 31, which is in turn pivoted at 32 on the body of the gear 27, and with a pin 29' guided in a second slot 30' in the member 105 mounted on the rear side of the gear. The plate 31 has a cam-portion 33 which cooperates with a member 34 as the gear rotates to force the section 28 out of mesh with the worm 26 thus stopping the rotation of the worm-gear by

said worm in the position shown in Fig. 1 and remaining in that position while the bobbin is being wound. The member 34 is mounted upon a catch 35 pivoted to the main frame at 36 and provided at its other end with a finger 37 so placed as to be forced outwardly by the accumulation of the thread upon the bobbin. The catch 35 is yieldingly held in the position shown in Figs. 5 and 6, so that the member 34 is in line with the cam-portion 33, by means of a flat-spring 38. When the thread accumulates upon the bobbin the finger 37 is forced outwardly carrying with it the catch 35 and the portion 34 which allows cam-member 31 and the gear-section 28 to be forced upwardly by the spring 28' thus completing the worm-wheel 27. The finger 37 may be adjusted upon the catch 35 by means of the adjusting screw 37' to control the amount of thread to be wound on the bobbins.

Mounted below the various driving shafts is the thread-severing means comprising the shear-blade 39 pivoted at 40. This shear-blade cooperates with the ledger-blade 41 located immediately below the guide-plate 42, which guide-plate is provided with a V-shaped recess as at 43 in which the thread is laid by mechanism later to be described, when a full bobbin is discharged from the machine and an empty bobbin is placed in winding position. Secured to the lower side of the plate 42 and cooperating with the upper surface 44 of the shear-blade 39 is a yielding thread clamping member 45 in the present instance formed of a sheet of spring metal so as to accommodate different sizes of thread and at the same time to provide sufficient pressure to securely clamp the thread against the surface 44 of the shear-blade. This spring also acts to press the shear-blade against the ledger-blade thus insuring severing of the thread at the proper time. The shear-blade is connected by means of a slot 46 to a connecting plate 47 which is adjustably connected by the pin-and-slot 48 with a retractable head 49 in which is mounted the secondary shaft 11. By means of this adjustable connection the shear blade may be timed to clamp and cut the thread at different times in the movement of the retractable head.

Mounted upon the gear 27 and adapted to rotate therewith are the cams 50 and 51. The cam 50 has cooperating therewith cam-follower 52 pivoted to the main-frame at 53. Also pivoted to the frame at 53 is a bellcrank-lever 54 and extending between one arm of this bellcrank-lever, which is provided with a pin or stud 55, and a pin or stud 56 on the cam-follower 52, is a coiled spring 57. The other arm of the bellcrank 54 is provided with a fork 58 in which is a roller stud 59 mounted on the rod 60. Also mounted on this arm of the bellcrank-lever

is a second cam-follower 61 which cooperates with the cam 51. The rod 60 is mounted so as to slide, within the frame 1 and is connected to the retractable head 49 by means of a grooved collar 60' and an arm 60'' connected to the head and provided with a fork fitting in the groove of said collar. The head 49 is mounted on the frame by a dove-tail connection as shown at 62 and may also be retracted manually by the lever 63 pivoted to the frame at 64 and cooperating with a pin 65 on said retractable head.

Pivoted to the retractable head 49 at the point 66 is a bellcrank-lever 67 one arm of which is provided with a thread-guide 68 and the other arm of which is pivotally connected at 69 to a link 70. Pivoted to the frame at 71 is a lever 72 which is pivotally connected at 73 with the other end of the link 70.

The empty bobbins to be wound are placed within a hopper 74 mounted above the winding mechanism upon the support 75 and leading from this hopper is a guide or chute 76 by means of which bobbins are fed from the hopper to the bobbin transferring mechanism, the chute 76 being formed of two spaced T-shaped members as shown in Fig. 6, the core of the bobbin fitting between the spaced edges of the legs of these T-shaped members and the flanges extending on the opposite sides thereof as clearly shown in said Fig. 6. Below the lower discharge end of the chute 76 is mounted the bobbin transferring mechanism which comprises a member 77 pivoted to the frame at 78 and having a segmental arm 79 located immediately below the discharge. Secured to this arm is a curved finger 80 provided with a thread-eye 81 at its end. The segmental arm 79 is provided at its forward end with a recess 82 adapted to receive the core portion of an empty bobbin, the flanges of the bobbin being on opposite sides of the arm. The member 77 is held in retracted position as shown in Fig. 3 by means of a spring 83 coiled about its pivotal support. Also pivoted to the frame in line with the member 77 is a second member 84 which is held in retracted position by a spring 85 similar to the spring 83. Pivoted to the member 84 at 86 is a member 87 provided at one end with a beak 88 and at its other end with a stop 89. The member 87 is provided with a stop-shoulder 90 and secured above the beak 88 is a second stop member 91. The forward end of the member 87 is held down by means of a spring 92 secured to the member 84 and acting upon the stud 93 upon the member 87. The beak 88 cooperates with the recess 82 in the segmental arm 79 to retain the empty bobbin therein while it is being transferred from the chute to the clamping-heads in a manner presently to be described.

Means is provided for temporarily hold-

ing a wound bobbin after it is released from the clamping-heads and until the thread running therefrom may be clamped and severed. This mechanism is located immediately below the plate 42 and comprises a stationary member or tray 94 having a curved upper surface as shown, the member being secured to the frame 1 in any desirable manner. Cooperating with this stationary member 94 is a member 95 pivotally supported upon the member 77 at 96 and provided with two portions extending on opposite sides of the stationary member 94 as shown. The upper portion has a downwardly bent end 97 resting upon the curved surface of the stationary member 94 and operates as a pusher to push the bobbin over the forward end of the stationary member. The lower portion 98 of the member 95 extends outwardly beyond the end 97 and as the bobbin is pushed off the forward edge of member 94 by the portion 97 it is caught and retained by this portion as shown in Fig. 7. Above the member 94 and between it and the winding mechanism is the curved guide 99 secured within the frame and adapted to guide the bobbin as it leaves the winding point to the member 94 and mounted immediately below the winding point upon the plate 42 is a second curved guide 42' which acts to guide or direct the bobbin to the recess 43 in the plate 42 after it is released.

In order to prevent the bobbins binding upon the upper curved edge of the segmental arm 79 as this arm is operated to transfer a bobbin from the chute to the winding point or is retracted therefrom, pivoted to the lower portion of this chute a slight distance above the discharge end at 100, is a yieldingly mounted gate 101. This gate is normally held against the legs of the T-members forming the chute by means of a spring 102. On the other end of the pivot for the gate 101 is a crank 103 which is connected at its lower end to the lever 72 by means of a link 104. For certain sizes of bobbins the length of the chute from the top of the segmental arm 79 to the lower portion of the hopper 74 is such that it will be just filled by a given number of bobbins but with a slightly larger or slightly smaller bobbin, the last bobbin would extend part way into the hopper and operation of the stirring mechanism within the hopper would jam on this bobbin and force the lower bobbin tightly upon the arm 79, thus greatly hindering its proper operation. With the use of the gate 101 all but say two of the bobbins are supported off of this segmental arm as shown in Fig. 7 when the stirring mechanism is operated and should the bobbins be forced downwardly by the feeding mechanism in the hopper there will be no clamping or binding on the segmental arm 79. In the preferred form of

hopper used the stirring mechanism is not operated continuously but is operated only during a small portion of a revolution of the gear 27. This hopper and the operation thereof is fully described in my copending application Serial No. 347,553. filed December 26, 1919.

Various mechanism for transferring an empty bobbin from the chute to the winding point for cutting thread, discharging the filled bobbins and clamping the unfilled bobbins in position is operated by rotation of the gear 27. For this purpose secured to the rear of this gear is a member 105 provided with a cam 106 with which cooperates a roller 107 mounted on the arm 108 pivoted to the frame at 109 and secured to the front of the gear are the cams 50 and 51 operating mechanism as previously described. Also pivoted to the frame at 109 is the bellcrank-lever 110 the upper end of which has an adjustable screw 111 with its end bearing upon the lever 108. The other arm 112 of the lever 110 contacts the upper end of the lever 113 clamped upon the shaft 78 upon which the segmental member 77 is mounted. At the lower end of the lever 113 is an adjustable stop 114 abutting against a portion of the frame 1. Also secured to the member 105 is a ball-stud 115 and clamped about this stud is a member 116 secured on one end of the rod 117. The other end of this rod operates the feeding and stirring mechanism within the hopper 74 through clutch-mechanism 118. Intermediate the ends of the member 117 is secured a collar 119 having connection with the lever 72 by means of the link 120.

Secured to the frame of the machine is the thread-guide 121 with the thread-eye 122 at its upper end. This guide 121 is of such a length that the thread will automatically feed back and forth on the bobbin in a well known manner. The thread is led from the supply through the tension 123 secured to the frame, the thread-guide 124, eye 81, guide 125 also mounted on the frame, to the eye 122 and thence to the bobbin.

The lower end of one member of the chute 76 is formed with an inclined portion as shown at 126 which acts as a stop for the member 91 and holds the beak 88 out of alignment with the discharge end of the chute when the transferring mechanism is retracted as shown in Fig. 3. The lower end of the chute is extended downwardly adjacent the top of the segmental arm 79 to prevent the bobbins in the chute from riding out on this arm when it is moved forwardly to place the bobbin held in the recess 82, in clamping position.

In operation an empty bobbin B and the end of the thread are clamped between the clamping members 15 and 18 which in the preferred form as shown are positively re-

tated by the main- and counter-shafts 3 and 10. As the thread accumulates upon the bobbin the finger 37 is pressed outwardly moving the catch 35 about its pivot 36 and withdrawing the extension 34 from in line with the cam 33 which allows the segment 78 of the gear 27 to be forced upwardly by means of spring 28' into mesh with the worm 26. Thus the gear 27 is rotated. One of the first effects of rotating this gear is to open the gate 101 through the elements 117, 120, 72, 104 and 103, and allow the bobbins in the chute to drop with the lower one resting on the top edge of the segment 79. Rotation of gear 27 also rotates the cam 50 which allows the follower 52 to rise and the spring 57 to expand, thus relieving the bellcrank 54 and therefore the bobbin of a greater portion of the force of this spring. The rotation of the wheel 27 further carries therewith cam 51 which is so shaped and timed that after the spring 57 is released, it contacts with the cam-follower 61 forcing the upper arm of the bellcrank-lever 54 to the left carrying therewith the rod 60 and retracting the head 49 and with it the clamping head 13. During this latter movement however, the spring is not compressed as cam-follower 52 and the arm 54 of the bellcrank-lever are maintained substantially at the same relative positions with the spring 57 expanded, the cam 50 still allowing the follower 52 to move upwardly.

In the old type of machine where force for clamping the bobbin was obtained by a coiled spring placed around the rod 60 with one end pressing against the left side of the collar 60' and the other end against the frame of the machine, this spring was compressed when the clamping head was withdrawn but was expanded when the bobbin was clamped in position. It therefore did its useful work of clamping the bobbin only when it was expanded and could exert its least pressure, but was contracted and exerting its greatest pressure when the clamping head was withdrawn. With this arrangement it is also to be noted that the spring had to be strong enough when nearly expanded to clamp the bobbin tightly between the clamp-heads and as it was compressed when the clamping head was retracted the pressure on the cam 51 was greatly increased. This resulted in rapid wearing away of both the cam and the follower. Under such circumstances the spring obviously was not used to greatest advantage.

With the use of the spring 57 however, as stated above when worm-gear 27 first begins to rotate, the cam 50 allows cam follower 52 to rise and spring 57 to expand thus reducing the force exerted thereby on the bellcrank-arm 54 and also on the bobbin. Then when cam 51 acts on the lug or follower 61 to withdraw the clamping head 13, the pressure of the cam on this follower is small and thus the wear on both the cam and follower and the reaction of the worm 26 and the end thrust on the bearing 24 are greatly reduced. After the empty bobbin is brought up to winding position cam 50 begins to compress spring 57 through follower 52 and the force of this spring brings the clamp-head 13 back to clamping position, the shape of cam 51 being such as to allow this. After the clamp-head is brought against the bobbin, continued movement of the cam 50 further compresses spring 57 and therefore causes it to exert its full force. Moreover in the old type of machine where only the coiled spring acting on the left end of collar 60' was relied on to give the clamping force for holding the bobbin, the full pressure of the clamping head on the end of the bobbin in the clamping operation was applied substantially instantaneously. If the bobbin happened to have a sharp edge on its flange, the thread was very likely to be cut in two before it had been wrapped around the bobbin. Also the starting of the winding operation was very sudden imparting a severe strain to the thread which was liable to break it. It will be noted, however, that in the use of spring 57 as above described, with certain lengths of bobbins, the first pressure exerted on the bobbin is a light one and as it is exerted with the spring expanded, the further action of cam 50 compresses the spring and thus gradually increases the pressure on the bobbin. This action prevents the full force of the clamping spring being suddenly applied to the bobbins and thus prevents the sharp edge of the bobbin flange from cutting the thread clamped between it and the clamping head 13 until at least one coil of the thread is wrapped around the bobbin core and safely started. It also prevents a sudden strain being imparted to the thread in starting the winding operation, which would be liable to break it, as a light initial pressure allows a certain amount of slippage between the bobbin and the clamp-head. This function and operation can be obtained, however, by means of spring 57 alone only when certain lengths of bobbins are used. If the bobbin is much longer or much shorter, the pressure is applied quickly, as obviously the shape of the cams 50 and 51 cannot be changed while the machine is operating and therefore the clamping element 15 contacts with the end of the bobbin sooner or later in the cycle of operations due to the change in the lengths of the bobbins. Therefore, in order to get this gradual application of clamping force with all lengths of bobbins used and without adjustment, the yielding clamping member 15 is pro-

5 vided. This latter member with associated
 members gives a gradual application of the
 clamping force regardless of the shape of
 cam 51 or the length of the bobbin. In the
 10 use of this device as the clamping head
 moves into contact with the end of the bob-
 bin, the springs 20, being weaker than the
 spring 57, yield until the inner end of mem-
 15 ber 15 abuts against member 21 and thus
 the first force applied is a very light one
 which gradually increases to a maximum as
 the clamp head continues its movement un-
 der the action of spring 57 through bell-
 20 crank 54. The force of the springs 20, how-
 ever, is sufficient to start thread winding
 around the bobbin, but it is not sufficient,
 in case the bobbin flange has a sharp edge,
 to cut the thread or to give full speed to
 25 the bobbin immediately and thus impart
 severe strain to the thread. From the time
 the clamping face 16 first contacts with the
 bobbin until the full force of spring 57 is
 applied thereto one or more layers of thread
 30 are wound around the bobbin core, thus
 safely starting the new bobbin, and if this
 full force should then cut the thread at the
 edges of the flange it will be immaterial.
 With the use of the yielding head 15 clamp-
 35 ing force is applied to the bobbin and thread
 gradually with all lengths of bobbins used
 within the capacity of the machine instead
 of being obtained only with certain limited
 lengths of bobbins where the spring 57 alone
 40 is used as described above. The yielding
 head 15 with its springs 20 may be used to
 obtain the same function in connection with
 the old style of spring placed around rod
 60 and bearing against collar 60' as men-
 45 tioned above.
 Retraction of the head 49 and clamp-head
 13 releases the filled bobbin which drops
 down onto the member 94. During this
 portion of the revolution of the gear 27 the
 50 transferring mechanism has remained in the
 normal position as shown in Fig 3. Fur-
 ther rotation of the gear 27, through the
 cam 106, roller 107 and members 108, 110,
 112, 113 and 78, moves the member 77 for-
 55 wardly about its pivot 78 and carries there-
 with in recess 82 an empty bobbin from the
 bobbin chute. During the first part of the
 movement of the member 77 the mem-
 ber 84 remains stationary thus the empty
 bobbin in the recess 82 is carried into
 60 contact with the beak 88. At this time the
 forward portion of the bent end of the mem-
 ber 80 contacts with the shoulder 90 and
 moves the members 84 and 87 along with
 the member 77. The beak 88 is pressed down
 65 upon the top of the bobbin retaining it in
 the recess 82 by means of the spring 92. It
 will thus be seen that within limits the size
 of the core of the bobbin is immaterial, dif-
 ferent sizes being accommodated as member
 87 is rotatable on its pivot 86 allowing more

or less space between the beak 88 and the
 recessed end of the segmental arm 79. In
 the old form of transferring mechanism, the
 bobbins merely rested in a recess similar to
 the recess 82. Although this operated very
 70 well in certain sizes of bobbins which fitted
 the recess, when different sizes of bobbins
 were used some of them would fall out on the
 movement from the chute to the winding
 point. With applicant's present structure
 75 however the spring-pressed beak 88 firmly
 clamps the bobbin in the recess and prevents
 its falling out until it is finally clamped be-
 tween the clamp-heads. After the bobbin is
 clamped between these heads the segmental
 80 arm 79 is retracted carrying with it the
 member 87 and beak 88, the beak 88 merely
 riding over the top of the bobbin core, as its
 support 87 is pivoted at 86, thus releasing
 the bobbin. 85

It is important for a satisfactory opera-
 tion of the machine that the bobbins are not
 allowed to accumulate on the temporary
 supporting means 94, 98 and that each bob-
 bin is fed off this temporary retaining means
 90 before the next succeeding bobbin is dropped
 thereon. If a number of bobbins are allowed
 to accumulate on the support some of them
 will rest on the short free ends of the thread
 leading from the others and when these
 95 other bobbins do finally fall off, as the ends
 of the threads are held by the bobbins which
 remain on the support, obviously consider-
 able thread will be unwound from the bob-
 bin, causing liability of tangling within the
 100 final receptacle, wastage of thread and much
 annoyance and loss of time to the attendants.
 With the applicant's construction, it is im-
 possible for filled bobbins to accumulate on
 support 94, because when member 77 is
 105 moved forwardly about its pivot, member
 95 is carried therewith, the end 97 moves
 along the curved surface of the stationary
 member 94 and pushes each individual bob-
 bin off the upper edge thereof. However,
 110 before this happens, the end of the lower
 portion 98 is extended beyond the edge of
 the member 94 in position to catch the bob-
 bin as shown in B' in Fig. 7. This operation
 at the same time lays the thread in the re-
 115 cess 43 of plate 42 as shown. Then as arm
 79 moves in clockwise direction, as viewed
 in Fig. 7, after the empty bobbin is clamped
 in winding position, the filled bobbin is
 scraped off the member 98 by member 94
 120 because the member 98 is retracted by this
 reverse movement. The filled bobbin drops
 into a receptacle, not shown, located under
 the frame of the machine.

Retraction of the head 49 and the clamp-
 125 ing head 13, together with the link 70 and
 the crank 72 operated from the rod 117,
 moves the thread-guide 68 about the pivot
 66 into the position shown in Figs. 6 and 7.
 This cooperating with the recess 43, in which 130

the thread is laid by action of the elements 94, 97 and 98, lays the thread across the end of the clamping head 15 as clearly shown in Fig. 7. The thread is now in position to be clamped between the end of the empty bobbin and the clamping member 15. Retraction of the head 49 also moves therewith through the connecting plate 47, the shear-blade 39 to its open position to the left of recess 43 before the thread is laid therein.

As the arm 79 brings the empty bobbin to the clamping position, clamping head 13 moves to the right as viewed in Fig. 1 coming back under the force of the spring 57 which has been depressed slightly by the cam-follower 52 under the action of the cam 50, the cam 51 being of such shape as to allow this backward movement. As the head 49 moves toward clamping position it carries with it, through the connection 47, shear-blade 39, the edge of which engages the thread immediately below the recess 43 and carries the thread under the clamping spring 45. This action firmly clamps the thread between the spring 45 and the portion 44 of the shear-blade. After the thread is clamped, further movement of the head 49 and shear-blade brings the thread to the ledger-blade 41 where it is severed. Soon after this the clamping member 15 clamps the thread between it and the end of the empty bobbin. In the old type of machine where there was no means corresponding to the means 45 for clamping the thread, the shear-blade and the clamping head had to be so timed that the thread was severed substantially at the moment it was clamped between the clamping head and the bobbin. If it were severed before being clamped it was liable to be pulled away from the clamping mechanism, thus necessitating the stopping of the machine and resetting manually, and if it were not cut until after being clamped, thread was withdrawn from the wound bobbin. Obviously such a device was not adapted for winding different lengths of bobbins indiscriminately without adjusting for each length of bobbin. By use of the present device however all that is necessary is to set the shear-blade to cut the thread before it is clamped by the clamp-head and bobbin for the longest bobbin to be wound, and it will operate with all the shorter bobbins as the thread is firmly held by spring 45 against the body 44 of the blade until it is secured between the clamping member 15 and the bobbin.

As the segmental arm 79 moves forwardly with a bobbin from the chute to the winding position, should the bobbin overhang to the right as viewed in Fig. 6, its flange contacts with the curved guide 127 formed on the head 8, which guides it into proper relation with respect to the clamping disk 18. As the members 79 and 87 come back to

normal position after delivering the empty bobbin to the winding point the stop 91 on the beak 88 contacts with the lower inclined portion 126 of the chute from the hopper and allows the arm 79 to be withdrawn from under the beak 88 and position the recess 82 immediately under the discharge from the chute. When the segmental arm 79 is moved forwardly it also carries therewith curved finger 80 which as it is disposed between fixed thread-guides 124 and 125 so that its movement forward increases the length of thread between these guides, takes up any slack which occurs in the thread due to release of the bobbin and as it retracts it gives up this slack supplying sufficient thread for the first several laps around the bobbin, thus making it unnecessary to draw thread through the tension 123 until it is safely started upon the bobbin.

Fig. 10 illustrates different examples of the bobbins which are adapted to be wound by this machine. These are merely illustrative. It will be seen that in some of these bobbins the flanges are comparatively close together while in others they are of considerable distance apart. It will also be seen that the flanges of some of them are flat, some curved and that they are of different diameters. It will be still further seen that the cores of these bobbins also vary considerably in size. The machine described will however, handle these different forms of bobbins together with many other different sizes and shapes taking them indiscriminately from the hopper and discharge end of the chute and setting them in winding position, clamping them therein and winding them in a reliable manner.

Having thus set forth the nature of the invention, what I claim herein is:—

1. In a device for winding bobbins or the like, separable clamping elements for gripping the bobbin while it is being wound, yielding means for exerting pressure on the bobbin to clamp it in position, and a separate yielding means for exerting a relatively light pressure on the bobbin when it is first clamped in position and before said first mentioned pressure means can exert its full clamping force.

2. In a device for winding bobbins or the like, separable clamping elements for gripping the bobbin while it is being wound one of said elements comprising relatively movable portions, yielding means adapted to exert a pressure on the bobbin through one of said portions, and a second yielding means stronger than said first yielding means adapted to exert a clamping pressure on the bobbin through one of said elements.

3. In a device for winding bobbins or the like, separable clamping elements for holding the bobbin while it is being wound,

- means for moving one of said elements relatively to the other to allow for the removal of a filled and the insertion of an empty bobbin, means for rotating one of said elements, 5 yielding means acting through one of said elements to exert a clamping action on said bobbin, and a second yielding means stronger than said first means for exerting a clamping action on said bobbin through one of 10 said elements.
4. In a device of the class described, means for winding bobbins or the like comprising clamping elements, means for rotating one of said elements, one of said elements comprising a non-rotating casing, a movable 15 clamping member mounted in said casing and yielding means between the casing and the clamping member.
5. In a device for winding bobbins and 20 the like comprising clamping elements, means for rotating one of said elements, yielding means tending to force the elements together to clamp the bobbin, one of said elements provided with a movable clamping 25 portion and yielding means weaker than said first yielding means between the clamping portion and the body portion of said element.
6. A device for winding bobbins or the 30 like, comprising means for clamping and rotating the bobbins, means for guiding the thread to the bobbin being wound, means for leasing the wound bobbin, means for severing the thread after the bobbin is released, 35 and yielding means bearing against the thread severing means and cooperating therewith to hold the severed thread until an empty bobbin is placed in winding position.
- 40 7. In a device for winding bobbins or the like, means for holding and rotating the bobbins, means for discharging the wound bobbins, means for severing the thread and 45 yielding means bearing against the severing means and cooperating therewith to hold the severed thread.
8. In a device for winding bobbins or the 50 like, in combination, clamping elements for the bobbin to be wound, means for rotating one of said elements, means for placing the empty bobbins between said elements, means 55 for retracting one of said elements to release the wound bobbins, yielding means tending to press one of the elements toward the other to clamp the bobbins and yielding means on one of said elements weaker than the first of said yielding means and located so that the clamping force is transmitted 60 through it to the clamping portion of said element.
9. In a device for winding bobbins or the 65 like, in combination, clamping elements for the bobbin to be wound, means for rotating one of said elements, means for placing the empty bobbins between said elements, means for guiding the thread to the bobbin, means for retracting one of said elements to release the wound bobbins, means for severing the thread and means for holding the severed thread, yielding means tending to press one 70 of the clamping elements toward the other, yielding means on one of said elements between its clamping portion and its body portion and weaker than the first said yielding means, and means for positioning the thread 75 between the end of the bobbin and one of said clamping elements.
10. A machine for winding bobbins or the like comprising a pair of clamping elements for gripping a bobbin while it is being 80 wound; means for rotating one of said clamping elements, means for retracting one of said elements to discharge the filled bobbin including a pivoted bellcrank-lever, a cam-follower, a spring between the cam-fol- 85 lower and one arm of said bellcrank-lever, a cam operating said follower to compress the spring which operates through the bellcrank-lever to move one of the clamping elements to clamp a bobbin in winding 90 position, a cam-follower on the other arm of said bellcrank-lever and a cam adapted to move said follower to retract said clamping element from bobbin clamping position.
11. A machine for winding bobbins or the 95 like comprising a pair of clamping elements for holding a bobbin while it is being wound, means for rotating one of said elements, means for moving one of said elements to and from clamping position including a pivoted bellcrank-lever, a connection 100 from one arm of said lever to said movable clamping element, a cam adapted to operate through one arm of said bellcrank-lever to retract the movable element from clamping 105 position, a cam adapted to operate through the other arm of the bellcrank-lever to move said element to clamping position, a yielding means between the latter cam and the bellcrank-lever which is compressed by the 110 cam when the bobbin is clamped, and means for operating the cams when releasing a bobbin to first release said yielding means and then move the movable clamping element from clamping position. 115
12. A device for winding bobbins or the like comprising means for holding and rotating the bobbin while it is being wound, means for discharging a filled bobbin, means 120 for supplying an empty bobbin to the winding point, and means for taking up slack in the thread and giving it up as the thread begins to wind on the empty bobbin.
13. In a machine for winding bobbins or the like comprising clamping elements, means 125 for exerting pressure on one of said elements for holding the bobbin to be wound, means for transferring bobbins to the clamping elements, means for laying the thread between the bobbin and one of the clamping elements, 130

means whereby the clamping action is a gradual one, and additional means for taking up slack in the thread and giving it up as it begins to wind on the empty bobbin.

5 14. In a machine for winding bobbins or the like, comprising a pair of separable clamping elements for holding the bobbin while it is being wound, means for discharging a filled bobbin, bobbin supply means, 10 means for transferring bobbins from the supply to the clamping elements and means operated by the transfer means for taking up the slack in the thread and giving it up as the thread begins to wind on the empty 15 bobbin.

15. In a bobbin winding machine having clamp-heads, a slidable carriage for one of the heads permitting it to be shifted relatively to the other, in combination with 20 means for guiding the thread across the face of the shiftable clamp-head before a bobbin is gripped between it and the other head, means for parting the thread between the filled bobbin and the winding point, and 25 means for taking up slack in the thread after the filled bobbin is released and before the empty bobbin is clamped in position to insure the location of the thread across the face of the shiftable head and to insure 30 the entrance of the thread into the parting mechanism.

16. In a bobbin winding machine having a rotary clamp-head fixed against axial displacement and a second head displaceable axially for the reception and release of bobbins, 35 a holder for a supply of empty bobbins, a thread-guide operated by displacement of one of the clamp-heads, a carrier for transferring one bobbin at a time to the winding point 40 between the clamp-heads, a thread-eye fixed to said carrier, means for advancing said carrier periodically from a position at one side to a position between the clamp-heads to locate a bobbin therebetween and to simultaneously 45 take-up slack in the thread, whereby during the release of a filled bobbin and the seizure of an empty bobbin location of the thread intermediate the face of the displaceable clamp-head and the bobbin is 50 insured.

17. In a machine for winding bobbins or the like, the combination with winding mechanism including bobbin clamping means one element of which is retractable 55 for the release of filled and the insertion of empty bobbins, spring means for urging the retractable element to clamping position, means for releasing the spring and separate means for retracting the clamping element, 60 said releasing means also adapted to compress the spring for holding the element in clamping position.

18. In a machine for winding bobbins or the like, in combination with winding mechanism including elements for clamping the

bobbins in winding position and one of which elements is retractable, spring means for urging the retractable element to the clamping position, cam means for releasing the spring and separate cam means for retracting the clamping element after the 70 spring has been released, said first cam means also adapted to compress the spring to urge the element to clamping position.

19. In a machine for winding bobbins, in combination, clamp-heads and means for rotating one of the same, a retractable carriage for one of the heads, yielding means urging the carriage toward the other of the heads, 80 means for retracting said carriage periodically to release a filled bobbin, means for locating the thread between the filled bobbin and the supply across the face of the head on said carriage, and means for increasing the pressure with which the thread is gripped 85 between the head on the carriage and the bobbin upon the commencement of a winding operation.

20. In a machine for winding bobbins, in combination, a clamp-head fixed against axial displacement, a second clamp-head displaceable axially relative to the first-mentioned head, means for rotating at least one of said clamp-heads, a carriage for the displaceable head, a spring normally urging the 95 carriage toward the axially fixed head, means for shifting the carriage to separate the heads and release a filled bobbin, means for parting the thread after the bobbin has been filled and released, means for locating 100 the thread across the face of the axially displaceable head and between it and an inserted bobbin, and means for increasing the pressure with which a bobbin is initially gripped upon the commencement of a winding 105 operation.

21. In a machine for winding bobbins, in combination, a pair of clamp-heads one fixed and the other movable axially relative thereto, a slidable carriage for the axially movable 110 head, a spring normally urging the carriage toward the axially fixed head, means for shifting the carriage periodically to release a filled bobbin, means for catching the filled bobbin below the winding point, means 115 for parting the thread leading from the filled bobbin to the supply after it has been released, means for locating the thread across the face of the displaceable head and between it and an introduced empty bobbin, 120 and a cam means for increasing the pressure with which the bobbin is initially gripped.

22. In a device for winding bobbins or the like, means for holding and rotating the 125 bobbins, means for discharging the wound bobbins and means for feeding the empty bobbins to the holding and rotating means comprising a chute, a pivoted segmental member adapted to move across the discharge 130

end of the chute and adapted to support a bobbin and a second member adapted to cooperate with the first member to retain the bobbin thereon.

23. In a device for winding bobbins or the like, means for holding and rotating the bobbins, means for discharging the wound bobbins and means for feeding the empty bobbins to the holding and rotating means comprising a bobbin supply means a pivoted segmental member provided with a recess in its periphery adapted to receive the bobbins from the supply means, and a second member adapted to cooperate with the first member to clamp a bobbin thereto.

24. In a device for winding bobbins or the like, means for winding and discharging the bobbins, means for automatically feeding the empty bobbins to the winding means comprising a bobbin supply means, a pivoted segmental member adapted to receive the bobbins therefrom, a second pivoted member cooperating with the first member to retain the bobbin thereon and having lost-motion with respect thereto whereby it may be held in inoperative position when the first member is in position to receive a bobbin from the supply means.

25. In a device for winding bobbins or the like, means for winding and discharging the bobbins, means for automatically feeding the empty bobbins to the winding means comprising a bobbin supply means, a pivoted segmental member adapted to receive the bobbins therefrom, a second member movable with the first member and cooperating therewith to retain a bobbin thereon and means for rendering the second member ineffective when the first member is in bobbin receiving position.

26. In a device for winding bobbins or the like, means for winding and discharging the bobbins, means for automatically feeding the empty bobbins to the winding means comprising a bobbin supply means, a pivoted segmental member provided with a recess adjacent one end adapted to receive a bobbin, a second pivoted member cooperating with the first member to retain the bobbin in the recess while it is being transferred from the supply to the winding means and means whereby the second member is held away from the recess when the first member is in bobbin receiving position.

27. In a device for winding bobbins or the like, means for winding and discharging the bobbins, means for automatically feeding the empty bobbins to the winding means including, a chute, means controlled by the accumulation of thread on the bobbin for transferring empty bobbins from the chute to the winding means, and means controlled by the same means for sustaining the weight of the majority of the bob-

bins in the chute off the transferring means while it is operating.

28. In a device for winding bobbins or the like, means for winding and discharging the bobbins, means for automatically feeding the empty bobbins to the winding means comprising a hopper, a chute leading from the hopper, means for transferring the empty bobbins from the chute to the winding means, and means independent of the transferring means for sustaining the bobbins in the chute.

29. A machine for winding bobbins or the like comprising means for winding and discharging the bobbins, means for automatically feeding the empty bobbins to the winding means including a chute, means for transferring the empty bobbins from the chute to the winding means, means for sustaining the weight of the majority of the bobbins in the chute off the transfer means while it is operating including a gate adjacent the discharge end of the chute and automatic means connected with the transfer means for operating said gate.

30. A machine for winding bobbins or the like comprising means for winding and discharging the bobbins, means for automatically feeding the empty bobbins to the winding means including a chute, means for transferring the empty bobbins from the chute to the winding means, means for sustaining the weight of the majority of the bobbins in the chute off the transfer means while it is operating, including a pivoted gate adjacent the discharge end of the chute and adapted to sustain one or more bobbins in the chute, yielding means tending to turn the gate to bobbin sustaining position, and automatic means for operating the gate to allow bobbins to pass.

31. In a machine for winding bobbins or the like, the combination with winding mechanism, thread severing means, means for catching a filled bobbin as it is released by the winding mechanism and temporarily holding it until the thread is severed and means for positively removing the filled bobbin from its holding means after the thread has been severed.

32. In a machine for winding bobbins or the like, the combination with winding mechanism, means for catching a filled bobbin as it is discharged from the winding mechanism, a bobbin supply, means for transferring an empty bobbin from the supply to the winding mechanism, and means operated by the transfer means for positively removing the filled bobbin from the bobbin catching means.

33. In a machine for winding bobbins or the like, the combination with winding mechanism including means for releasing a filled bobbin, means for temporarily hold-

ing a filled bobbin when it is released by the winding mechanism comprising a tray element, an element having portions arranged above and below the tray element and so arranged that movement of one of said elements toward the other will remove the bobbin from the tray element to the lower portion of the second element, and movement of said element in the opposite direction will remove the bobbin from said lower portion, and means for moving one of said elements.

34. In a machine for winding bobbins or the like, winding mechanism including means for releasing a filled bobbin and means for transferring an empty bobbin to the winding point, means for holding a filled bobbin when it is released by the winding mechanism comprising a tray section, a second section having portions extending above and below the tray section and so arranged that movement of one of the sections in one direction will remove the bobbin from the tray section to the lower portion of the second section and movement in the opposite direction will remove the bobbin from said lower portion, and means controlled by the bobbin transferring means for moving one of said sections.

35. In a machine for winding bobbins, the combination with winding mechanism, of means for catching a filled bobbin as it is released by the winding mechanism and temporarily holding it comprising a tray with relatively movable sections, one section being fixed in position below the winding point and the other section being connected to a movable part of the winding mechanism, the last-named section having two portions one of which is adapted to rest upon and move across the top of the fixed section for transferring a filled bobbin from the fixed section to the other portion of the movable section, and means for moving said two portions of the movable section.

36. In a machine for winding bobbins, the combination with winding mechanism including an arm for transferring bobbins one at a time to the winding point, of a tray for temporarily holding a filled bobbin when it is released by the winding mechanism comprising a section fixed in position below the winding point, a movable section connected at one end to said arm and supported at its other end by the fixed section with an extension thereof underlying the fixed tray,

means for shifting the arm to carry an empty bobbin to the winding point and to transfer a filled bobbin from the fixed tray section to the extension movable therebeneath and to scrape the filled bobbin from the extension on the return movement of the arm.

37. In a machine for winding bobbins, the combination with winding mechanism including a pivoted arm for carrying empty bobbins one at a time to the winding point, and with thread parting mechanism, of means for temporarily holding a filled bobbin comprising a fixed tray section below the winding point, a movable tray section connected to said arm and having portions thereof arranged above and below the fixed tray section, the upper portion of the movable tray section being adapted to push a filled bobbin from the fixed tray section on to the lower portion of the movable tray section, and means for oscillating the movable arm to scrape the bobbin from the lower portion of the movable section after the thread is parted.

38. In a machine for winding bobbins or the like, in combination, bobbin winding means, bobbin supply means, means for transferring bobbins from the supply to the winding means, and means for operating the transferring means comprising a gear having a segment adapted to be retracted from the line of the gear periphery, means for retracting the segment comprising a cam-plate hinged to the gear and having pin-and-slot connection with the segment, operating means controlled by the winding operation cooperating with the cam-plate, and a second driving gear cooperating with the first gear.

39. In a machine for winding bobbins or the like, in combination, means for winding the bobbins, means for discharging the wound bobbins and means for supplying empty bobbins to the winding means comprising a gear having a movable segment adapted to be retracted from the gear periphery, means for retracting the segment comprising a cam pivoted to the gear and connected with the segment, operating means controlled by the winding operation cooperating with the cam and a second gear for driving the first gear.

In testimony whereof, I have signed my name to this specification.

PARK A. HERR.