(No Model.) 4 Sheets—Sheet 1.

S. W. WARDWELL, Jr.

COP WINDING MACHINE.

No. 589,587. Patented Sept. 7, 1897.

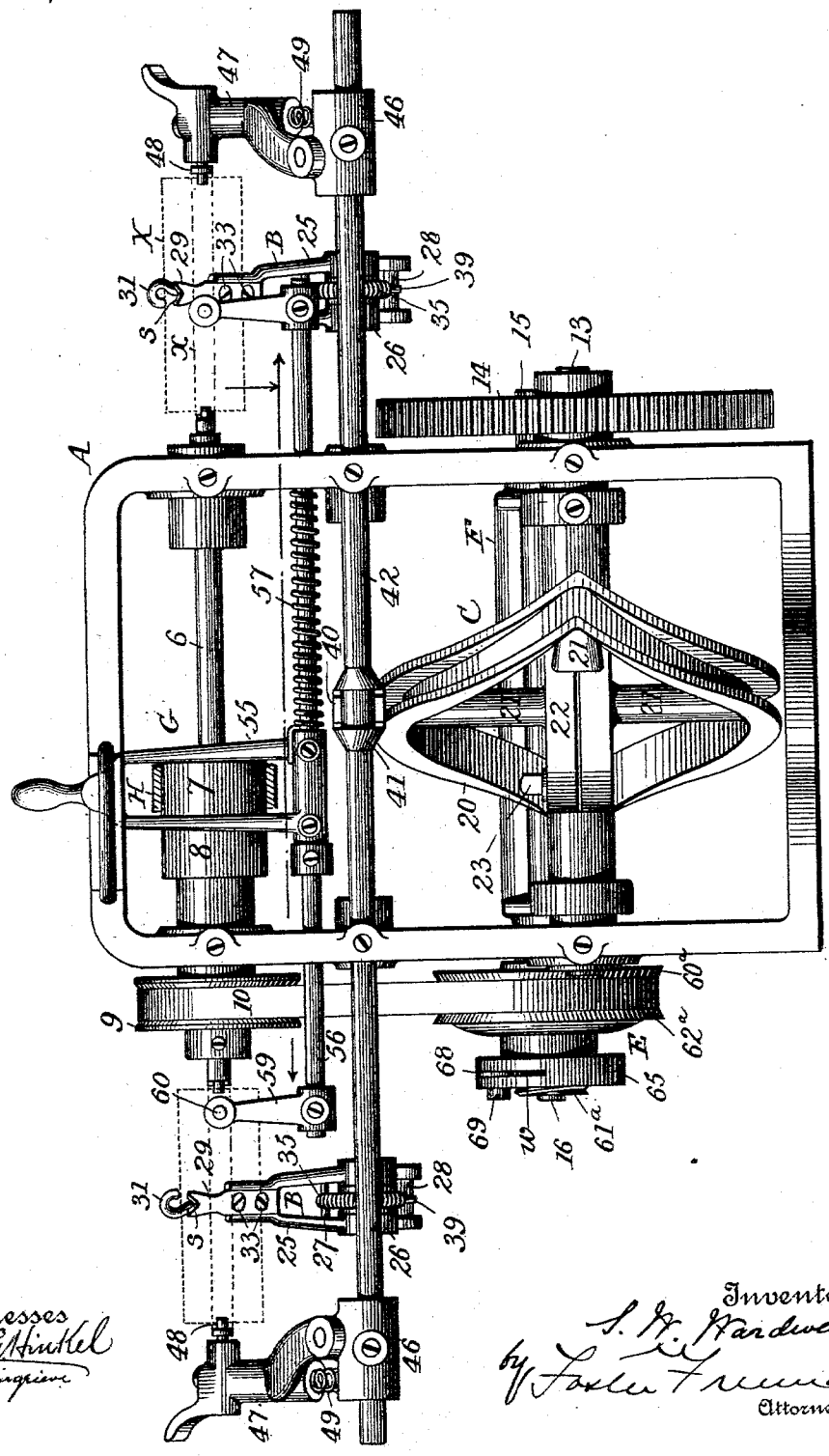


Fig. 1.

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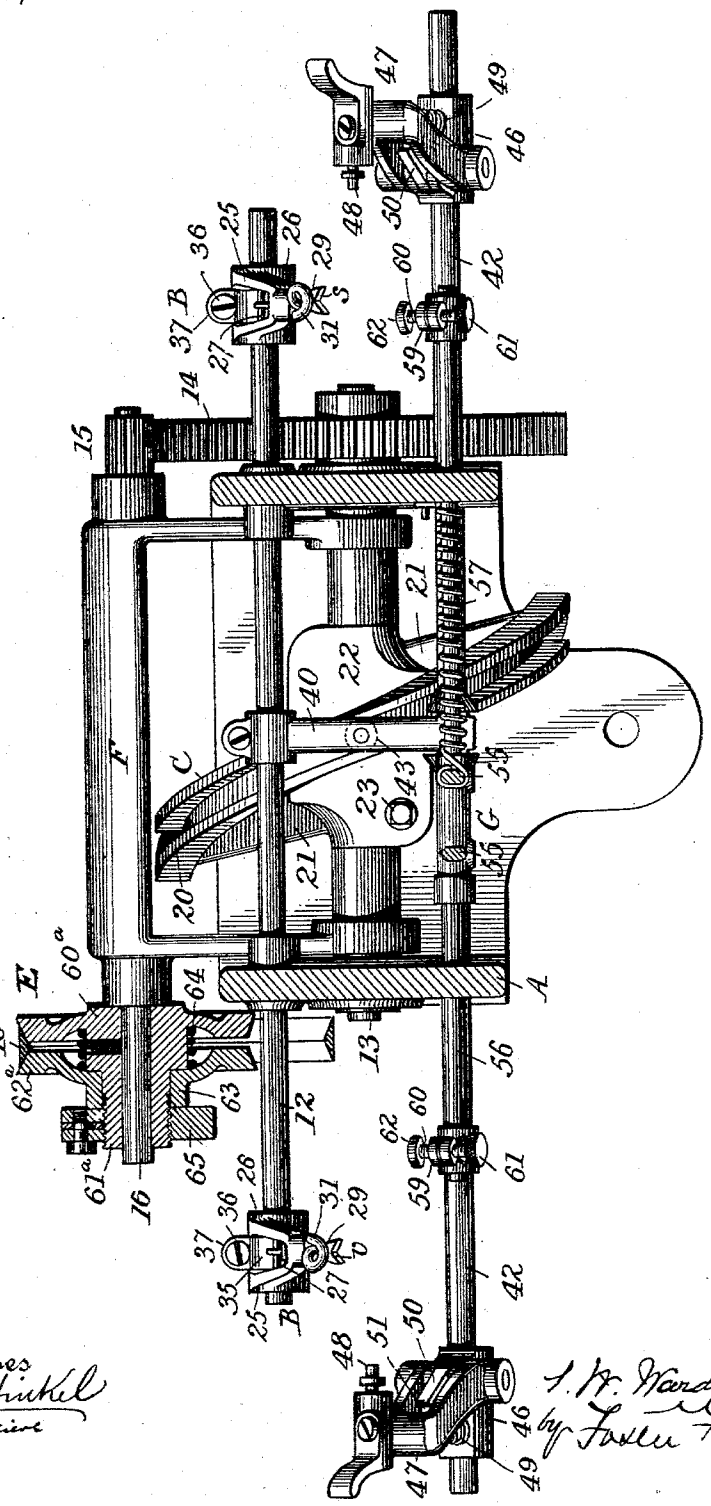
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Fig. 2.



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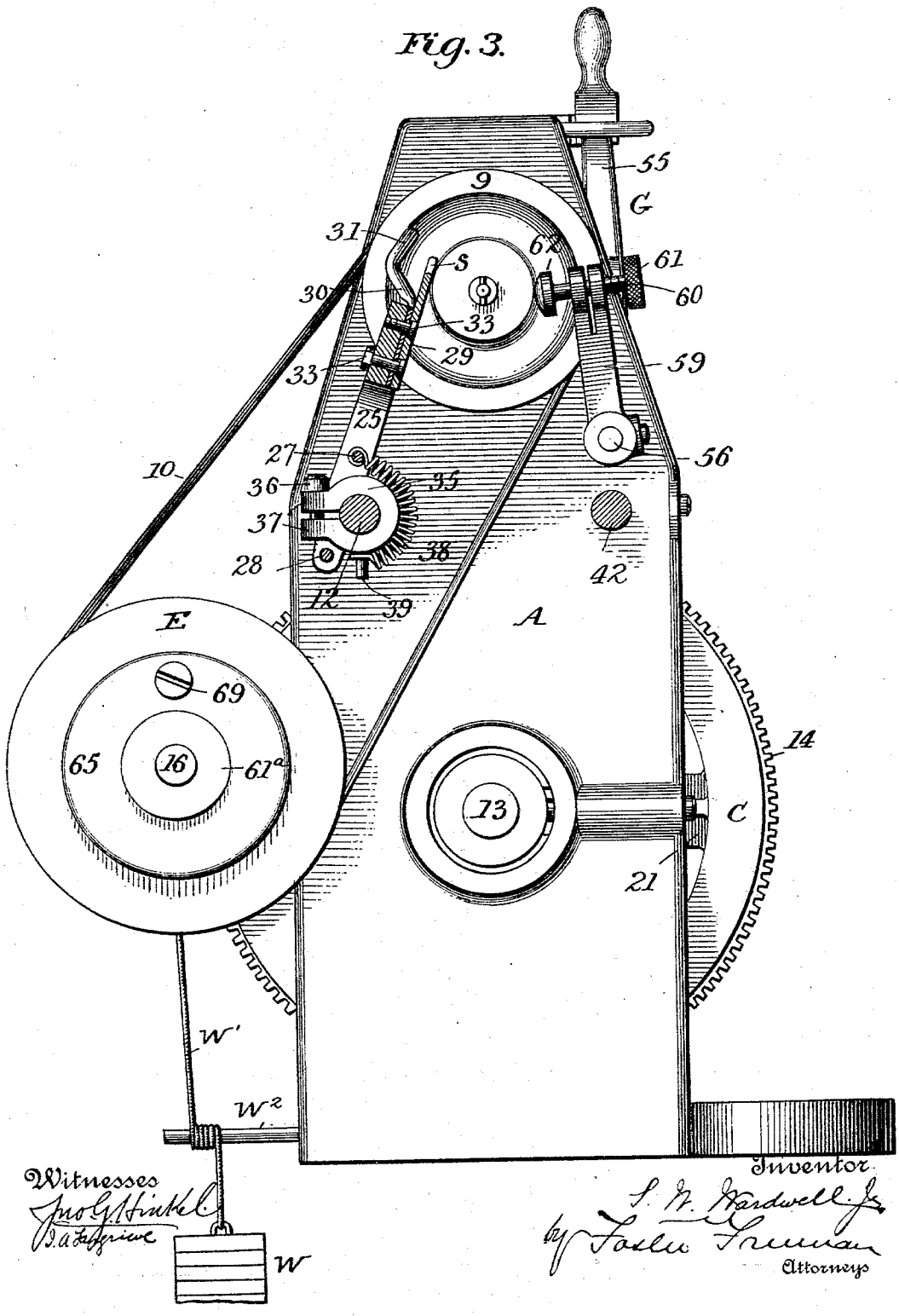
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S. W. WARDWELL, Jr.

COP WINDING MACHINE.

No. 589,587. Patented Sept. 7, 1897.

Fig. 3.



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S. W. WARDWELL, Jr.

COP WINDING MACHINE.

No. 589,587. Patented Sept. 7, 1897.

Fig. 4.

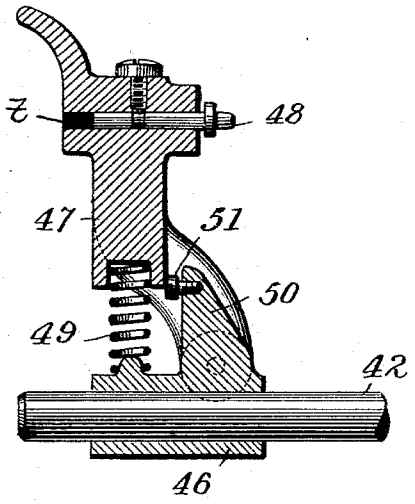
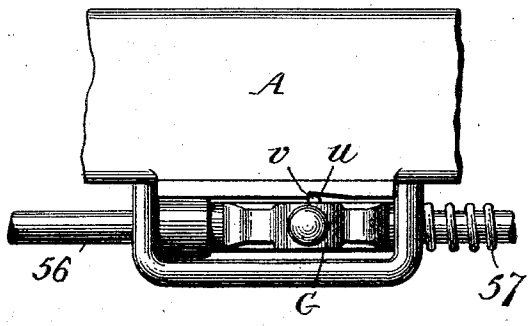


Fig. 5



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UNITED STATES PATENT OFFICE.

SIMON W. WARDWELL, JR., OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE UNIVERSAL WINDING COMPANY, OF PORTLAND, MAINE.

COP-WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 589,587, dated September 7, 1897.

Application filed November 16, 1895. Serial No. 569,188. (No model.)

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, Jr., a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Cop-Winding Machines, of which the following is a specification.

My invention relates to cop-winding machines, and more especially to machines which are adapted for winding cops of the general character shown and claimed in my United States Letters Patent Nos. 480,158 and 486,745.

The object of the invention is to provide a simple, cheap, and effective machine for winding cops, which shall be light of structure and capable of operating at a high speed and at the same time be capable of accomplishing the winding of the cops in a satisfactory manner; and to these ends my invention consists in the various features of construction and arrangement of parts for accomplishing the various purposes, substantially as hereinafter more particularly set forth.

Referring to the accompanying drawings, wherein I have illustrated a preferred embodiment of my present invention, Figure 1 is a front elevation of a cop-winding machine. Fig. 2 is a horizontal section of Fig. 1 on the plane of the arrows. Fig. 3 is an end elevation, in part section, of the machine. Fig. 4 is an enlarged sectional detail showing a means for supporting the outer ends of the cops, and Fig. 5 is an enlarged detail drawing showing part of the stop mechanism.

The support for all of the parts consists of a simple flat oblong frame A, adapted to be bolted to a standard and having bosses at the points where the shafts pass through the same. The main driving-shaft 6, at the top of the frame, has a fast pulley 7, a loose pulley 8, and a pulley 9 with a V-shaped groove to receive a V-shaped belt 10, the ends of the shaft 6 being constructed to receive the ends of tubes or blocks *x*, upon which the thread is wound to constitute the bobbins X.

The thread is laid upon each tube by means of a reciprocating guide B, the two guides being carried by a rod 12, which slides back and forth in bearings in the frame under the action of a cam C upon a shaft 13, which is provided with a gear 14, driven from a pinion 15 upon a shaft 16, the latter carrying an expansion-pulley E, around which passes the belt 10.

It has been found desirable in this class of winding-machines to reduce the weight of the parts connected to the reciprocating guides, because if the parts are heavy the momentum is very great when the guides are driven at a high rate of speed, and there is a tendency to misplace the thread, which, to effect the wind of my aforesaid Letters Patent, must be laid with the greatest regularity. My effort, therefore, has been to reduce the weight of these parts, while maintaining the guide in constant contact with the cop, permitting them to swing back as the cop increases in size and reciprocating them with the desired speed. I reduce the weight of the cam, forming it so as to constitute practically an open flanged ring 20, mounted by spokes 21, extending from a hub 22, angularly upon the shaft 13. This secures all the effective portions of the cam, dispensing with superfluous weight. I prefer to split the hub 22 at one side and pass a clamping-screw 23 through the slit portion, so as to tightly secure the cam to the shaft 13 without the use of any key and the necessity of slotting the shaft.

In order to maintain the belt 10 taut, I mount the shaft 13 in a frame F, pivoted to the shaft 16, so as to swing freely, thereby bringing the weight of the frame, shaft 16, and pulley E to bear upon the belt 10 to keep it under constant tension, and as the frame F swings upon an axis concentric with the axis of the gear 14 the pinion 15 is maintained in proper relation to the gear 14 regardless of the position of the frame F.

In order to aid in maintaining the belt 10 tight and to prevent any rebound of the frame F, I find it advantageous to use in some cases a weight W, hung by a cord W′ to the frame F, and the cord may be passed around a pin W^2 on the frame A to steady the frame F and prevent too rapid action.

Each guide B consists of a divided arm 25, extending from a split hub 26, which carries the two cross-pieces 27 28, a flat plate 29, having a V-shaped notch *s*, and a bent rod 30, hav-

ing a guide-eye 31 at the end, screws or bolts 33 passing through the plate 29 and rod 30 into the arm 25 and securing the plate and rod detachably to the arm, thereby permitting the character of the notch and the position of the guide-eye to be altered for different characters of thread.

To the rod 12, between the branches of each split arm 25, is secured a split ring 35, which may be clamped tightly to the rod by a screw 36, passing through ears 37 of said ring. A spring 38, connected at one end with a cross-bar 27, is attached at the other end to a stud 39 on the ring 35 and tends to carry the upper end of the guide toward the cop while permitting it to swing back readily, the cross-piece 28 by its contact with the long ear 37 limiting the swinging movement of the guide toward the cop. This construction of the guide secures all of the necessary features and actions, while greatly reducing the weight of the parts heretofore employed to secure both the reciprocating and swinging actions.

The rod 12 is driven from the cam C through the medium of a cross-arm 40; clamped to the rod and forked at one end to embrace a spool 41, sliding on a rod 42, and the cross-arm carries a pin with an antifriction-roller 43, which extends into the slot of the cam.

To facilitate the support and insertion and removal of the tubular holders or bobbins, I attach to the rod 42 blocks 46, each carrying a swinging arm 47, having a freely-rotatable stud 48 for receiving one end of the bobbin X, which stud is held in place by means of a screw working in the arm and entering a circumferential groove in the stud. The opposite end of the bobbin is supported upon the end of the shaft 6, and a spring 49 throws the arm 47 inward, so as to cause its stud to bear firmly against the end of the bobbin. The block 46 is provided with an arm 50, into which screws a set-screw 51, so as to regulate the extent of the inward movement of the swinging arm 47.

In devices of this character it is desirable to automatically throw the apparatus out of operation as soon as a bobbin reaches the proper size. For this purpose I make use of a belt-shifter G, consisting of a yoke 55 upon a sliding shaft 56, through which yoke passes the driving-belt H. A spring 57 tends to throw the shaft and yoke to a position to shift the belt onto the loose pulley and stop the machine. The frame of the machine is provided with a shoulder *u*, which is adapted to to be engaged by a projection *v* on the belt-shifter G, and the spring 57 is so applied as to tend to throw the yoke inward because of the shoulders being bent. At each end of the rod 56 is adjustably mounted an arm 59, through the outer end of which passes a screw 60, having a milled head 61 at the outer end and a bearing 62 at the inner end. (See Fig. 3.) When the machine is in operation, the parts are as shown in Fig. 1, with the belt H on the driving-pulley 7. The parts are so adjusted that when a cop reaches its proper size it bears against the bearing 62, and rocks the arm 59 and shaft 56, carrying the pin *v* away from the shoulder *u*, when the spring 57 throws the yoke so as to carry the belt H onto the idler-pulley 8.

The expansion-pulley E is simplified by forming the fixed section 60^a, which is bolted to the shaft 16, with a long hub 61^a, threaded at the outer end. The sliding section has a disk 62^a and a hollow collar 63, which slides on the hub 61^a, and an intervening spring 64 tends to throw the section 62^a outward. A nut 65 turns on the threaded end of the hub, and by turning this nut in one direction the movable section is brought toward the fixed section, and by turning the nut in the opposite direction the movable section is carried outward by the spring. Any suitable means may be employed for locking the nut, but I prefer to make a transverse slit *w* in the periphery of the nut at one side, to place a loose perforated disk 68 in this slit, and to pass a screw 69 through the slit portion of the nut and through the disk. When the screw 69 is loosened, the disk will accommodate itself to the movements of the nut, but when the screw is tightened the disk is held in engagement with the threads of the hub in such manner as to prevent the nut from being turned.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim as my invention—

1. In a winding-machine, the combination with the frame, of a shaft mounted thereon and adapted at each end to support one end of a bobbin, means for positively rotating the shaft, an adjustable support for the opposite end of each bobbin, a rod, means for reciprocating the same, and a plurality of guide-arms adapted to swing to and from the bobbin carried upon the rod, substantially as described.

2. The combination with the sliding rod 12 of a forked arm swinging on the rod, a ring on said rod provided with an ear constituting a stop, said ring being adjustable axially and arranged between the divided parts of the fork, a spring for swinging the said arm in one direction, substantially as described.

3. The combination of the reciprocating rod of a swinging guide-arm 25, supported thereon, the plate 29 detachably secured to said arm and notched at its outer end, and the thread-guide rod 30 also detachably secured to said guide-arm, substantially as shown and in the manner described.

4. The combination in a winding-machine, of a shaft adapted at each end to support the end of a bobbin, a support for the opposite end of each of said bobbins, a rod and means for reciprocating the same, and a plurality of swinging guide-arms carried by said rod, substantially as set forth.

5. The combination in a winding-machine, of a shaft adapted to receive one end of a bob-

bin, and a pivoted arm 47 secured to an adjustable block 46, and adapted to engage the opposite end of the bobbin, said pivoted arm carrying a rotatable stud substantially as set forth.

6. The combination with the shaft adapted to receive one end of a bobbin, of a rod supporting the adjustable block 46, an arm 47 pivoted to said block, a rotatable stud carried by said arm adapted to the opposite end of the bobbin, and a spring arranged to carry the arm toward the end of the bobbin, substantially as set forth.

7. The combination in a winding-machine, of a shaft adapted at each end to support one end of the bobbin and an adjustable bobbin-support for the opposite end of each bobbin, a sliding rod, guide-arms connected adjustably with said rod, and means for reciprocating the said rod, substantially as set forth.

8. An expansion-pulley consisting of a section having a disk and threaded hub, another disk sliding on said hub, an intermediate spring, and a nut turning on the threaded hub, whereby the parts retain their positions independent of the shaft to which they are applied, substantially as described.

9. The combination with the fixed section, of an expansion-pulley having a hub threaded at the outer end and with the sliding section and with the nut turning on the threaded end of the hub and having a peripheral slot *w*, of a loose perforated disk 68, and screw 69, substantially as set forth.

10. The combination in a winding-machine, of a main drive-shaft projecting at the end beyond its bearings and adapted to receive one end of a bobbin, an adjustable block supported adjacent to but beyond said end, a pivoted arm carried by said block, and a rotatable stud held in said arm coincident with said shaft and adapted to receive the other end of the bobbin, substantially as described.

11. The combination with the shaft adapted to receive one end of a bobbin, of a rod, an adjustable block on the rod, an arm pivoted to said block and carrying a rotatable device adapted to receive the other end of the bobbin, means for adjusting or regulating the inward movement of said arm, and means tending to carry the arm toward the end of the bobbin, substantially as described.

12. The combination with the shaft 6 adapted to receive one end of a bobbin, of a rod, an adjustable block on the rod, an arm pivoted to said block and supporting a rotatable device adapted to receive the other end of the bobbin, an arm and a set-screw for regulating the inward movement of said arm, and a spring normally pressing the arm toward the end of the bobbin, substantially as described.

13. The combination with an arm of the frame having a notch, of a rock-shaft having at the end an arm which is borne upon by the cop as the latter increases in size, a spring carried on said shaft and tending to move the same longitudinally in one direction and a yoke on the shaft engaging the notch of the frame-arm against the tension of said spring, the whole operating, substantially as described.

14. In a winding-machine, the combination with a shaft adapted to support one end of a bobbin, means for positively rotating the shaft, a spring-actuated support for the other end of the bobbin, and a rotatable stud carried by said support, a thread-guide arm, and means for reciprocating the same, substantially as described.

15. In a winding-machine, the combination with the frame, of a shaft mounted thereon and adapted to support two bobbins, means for rotating the shaft, two guide-arms coöperating with the bobbins, means for reciprocating the guide-arms, stop devices, an arm 59 for each bobbin adapted to be borne upon by the cop when of a predetermined size, and connections between the arms and the stop devices, said arms 59 being independently adjustable toward and away from the bobbins whereby cops of different relative sizes may be simultaneously wound, substantially as described.

16. In a winding-machine, the combination of a shaft adapted to support one end of a bobbin at its end, means for rotating the shaft, an arm adjacent the end of the shaft, a rotatable stud provided with a peripheral groove held in said arm and adapted to support the opposite end of the bobbin, and a screw carried by the arm, the end of which engages the groove of the stud, substantially as described.

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

SIMON W. WARDWELL, JR.

Witnesses:
ELIOT GLOVER,
E. D. COOK.