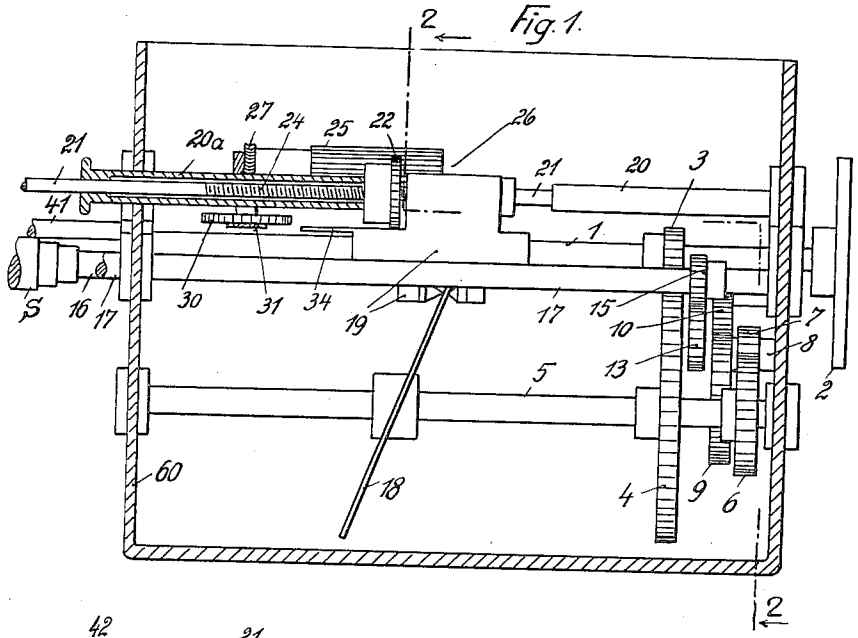
Feb. 6, 1934. E. SCHWEIZER 1,945,659

MACHINE FOR WINDING QUICK TRAVERSE BOBBINS, ESPECIALLY FOR ARTIFICIAL SILK

Filed Feb. 17, 1931 3 Sheets-Sheet 1

Fig. 1.



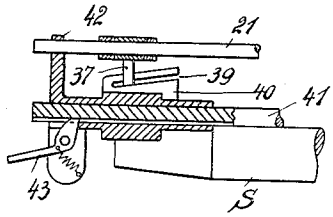


Fig. 1a.

Fig. 2.

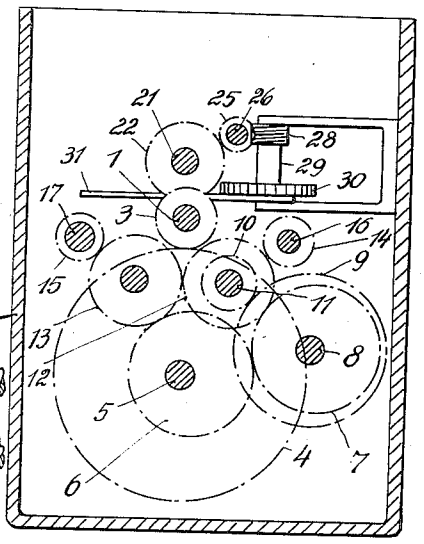
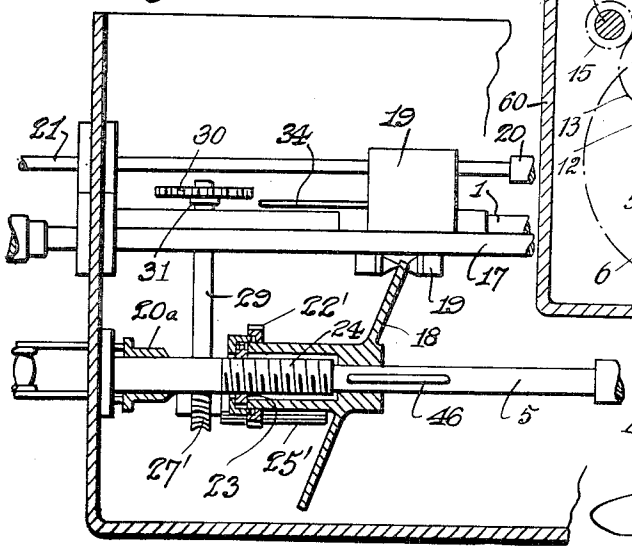


Fig. 7.



Inventor:
Ernst Schweizer
John B. Brady
Attorney

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Fig. 3.

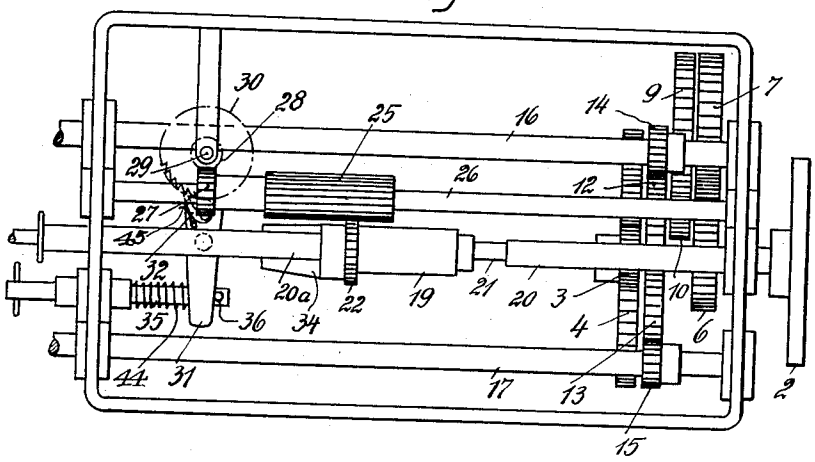


Fig. 3a.

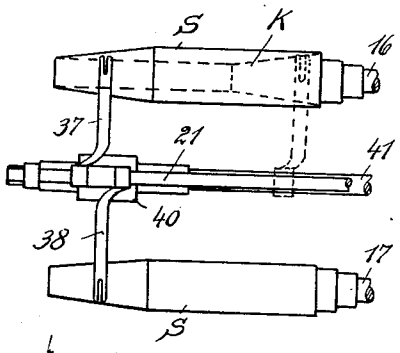
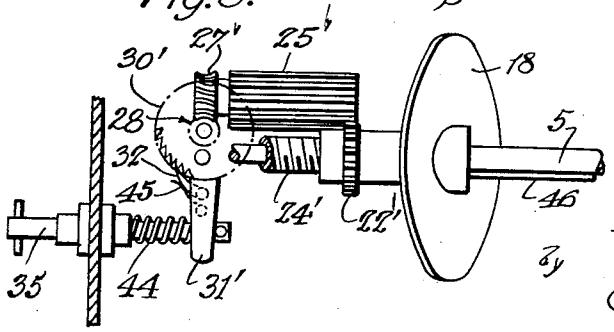


Fig. 8.



Inventor:
Ernst Schweizer,
John C. Brady
Attorney

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Fig. 4.

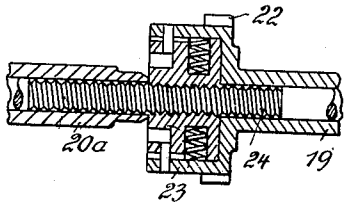


Fig. 5.

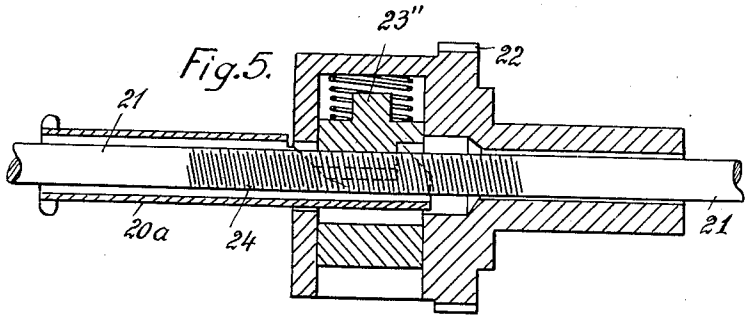
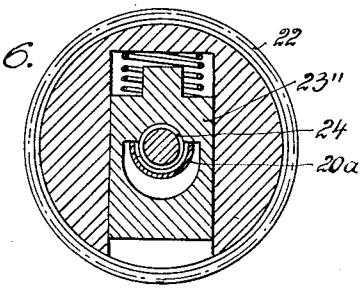


Fig. 6.



Inventor:
Ernst Schweizer,
by John B. Brady
Attorney

Patented Feb. 6, 1934 1,945,659

UNITED STATES PATENT OFFICE

1,945,659

MACHINE FOR WINDING QUICK-TRAVERSE BOBBINS, ESPECIALLY FOR ARTIFICIAL SILK

Ernst Schweizer, Zurich, Switzerland

Application February 17, 1931, Serial No. 516,427, and in Switzerland December 19, 1929

12 Claims. (Cl. 242—31)

It is a well known fact that artificial silk is being only gradually and reluctantly employed in the weaving industry. The main reason given by the weavers is that the greater portion of the artificial silk wound on weft bobbins is excessively drawn or overstrained, in which case it no longer returns into its original position. The result is that, in addition to the impaired tenacity of the thread, it undergoes a change, on the surface, which alters the lustre of the thread. The fabric displays shiny patches (glazed-weft effect, moiré effect and the like) which, in consequence of the unfavourable conditions for the absorption of the dye, become particularly noticeable in the fabric and lower the value of the goods. Moreover, the creasing or wrinkling of artificial silk, causing the threads to stick out in an unsightly manner in the fabric, is mainly due to the uneven tension of the weft threads, owing, as is well known, largely to defective winding on the bobbins.

The fundamental causes of all these imperfections reside in the defective construction of the known bobbin-winding machines, in which the special properties of artificial silk in respect of tension, are not taken into consideration, or else only with inadequate means.

In the known weft-bobbin systems the thread is always wound on a conical shell or along a cone formed by the winding itself. The spindles are run at a constant speed, but the rate of draft of the thread undergoes considerable fluctuations, in that the thread has, at one time, to traverse the path from the smaller to the larger diameter of the bobbin and, at another, the path from the large diameter to the smaller. This entails continual fluctuations in the rate at which the thread is drawn.

Experience has shown that this fluctuation cannot be obviated even by those systems in which attempts are made to balance the rotational velocity of the spindles in accordance with the difference in the diameter of the conical bobbins, by the employment of cone driving rollers for the winding. This results in the silk becoming abraded, especially in the finer counts, slipping between the roller and the winding, and not least, the known risk of inaccurate adjustment of the cone which drives the rollers, in relation to the winding cone, whereby, in any event, an injurious mechanical effect on the layers of the winding is produced.

Despite the greatest care in the construction and operation of known bobbin winding machines, it is apparent that in the winding of delicate threads, particularly of artificial silk for use in weaving, any coaction between the parts of the machines which is secured by means of friction or other non-positive gearing is liable to disarrangement on account of slip between the friction elements, so that with the resulting loss of co-ordination between the various parts a faulty building up of the bobbins occurs, together with more or less serious fluctuation in the winding tension.

An object of the invention is to provide a machine for winding quick-traverse, conically wound bobbins, especially for artificial silk, without fluctuation of the thread tension or damage to the thread, by a combination of means securing positive actuation of the thread-guide in both directions, positive adjustable forward feed of the thread-guide rod in accordance with the count of the thread being wound, and positive driving of the bobbin shaft at a rotational velocity which varies during each stroke of the thread-guide rod.

These factors are the more important because material of second and third quality, with low tenacity, is not infrequently employed for the weft, or for weft bobbins.

The invention enables even the most inferior textile fibres to be wound, as soft weft bobbins, under a constant moderate thread tension and at increased working speed, without giving rise to difficulties in drawing-off the thread in weaving or turns of the thread slipping off or any formation of the known knots and intertwinings between the warp ends.

So-called "bottle" bobbins can also be wound with the same mechanism, since a weft bobbin corresponds in structure to a small "bottle" bobbin.

Typical embodiments of the invention are illustrated in the accompanying drawings, in which:—

Fig. 1 is a longitudinal section of a winding machine;

Fig. 1*a* is supplementary to Fig. 1;

Fig. 2 is a cross section along the line A—A of Fig. 1;

Fig. 3 is a plan;

Fig. 3*a* is supplementary to Fig. 3;

Fig. 4 is a sectional elevation of the thread-guide adjustment;

Figs. 5 and 6 represent a modification of what is shown in Fig. 4;

Fig. 7 is a fragmentary longitudinal view of a modification of the means for feeding the thread-guide rod forward; and

Fig. 8 is a fragmentary plan of the same.

For the sake of clarity details indicated in Figs. 1 to 3 have been omitted from the remaining figures. Like parts are indicated by the same reference numerals in all figures of the drawings.

A pinion 3, engaging with a pinion 4, is secured on a hollow shaft at one end of the guide rod 1 (Figs. 1 and 3) which is rotatably mounted in the casing wall 60 and is driven by a friction wheel 2. The pinion 4 is keyed on a rotatable shaft 5, which also carries a fixed eccentric pinion 6 gearing with another eccentric pinion 7 keyed on a rotatable shaft 8. The shaft 8 carries a fixed pinion 9 gearing with a pinion 10 secured on a rotatable shaft 11, which also carries a fixed pinion 12 gearing with another pinion 13. The pinions 14, 15, which are keyed on the spindle shafts 16, 17, gear with the pinions 12, 13.

The purpose of this pinion gear drive is to impart to the spindles 16, 17, by means of the eccentric pinions 6, 7, a variable rotational velocity per stroke of the thread guide, in such a manner as to assure a uniform rate of application of the thread on to the fundamental cone K of the weft bobbin S, per stroke of the thread guide.

The shaft 5 carries a swash or cam-plate 18. The shaft 1, on which is loosely mounted the thread-guide member 19, also serves to guide the latter. 20 (Fig. 1) is a tube slotted on one side, and in which the thread-guide rod 21 is guided by means of a nose. The thread-guide rod 21, which is integrally connected with the thread-guide member 19, is guided on the other hand by a longitudinally displaceable tube 20*a*. The thread-guide member 19 carries a toothed crown 22 rotatably connected with a thread-guide member 19. As shown in Fig. 4, there is mounted in this toothed crown 22 a detachable, divided travelling nut 23 both portions of which are spring controlled. The nut 23 is adapted to be brought into engagement with a threaded spindle 24 on the rod 21. The halves of the travelling nut 23 can, on the other hand, be disengaged from the threaded spindle, and adjusted by means of an axial wedge-like pressure of the longitudinally displaceable tube 20*a*. This adjustment is necessary after the winding of a weft bobbin S has been completed.

The extent of the effective ratchet movement can be modified by means of a rod 35 (see Fig. 3) in that there is disposed below a ratchet wheel 30 mounted on a shaft 29, a loosely-mounted ratchet lever 31 carrying a pawl 32, both 31 and 32 being controlled by springs 44 and 45 respectively. At each contact of the reciprocating thread-guide member 19, the lever 31, and with it the pawl 32, is advanced a step, each thrust of the member 19 working against the action of the spring 44. A worm wheel 28, which is mounted on the shaft 29 and meshes with a worm 27 on the shaft 26, turns with the ratchet wheel 30. The shaft 26 carries a toothed roller 25 which gears with a pinion 22, of normal breadth, on the thread-guide member 19. During the travel of the member 19, the pinion 22 slides continuously in the corresponding tooth (which serves as a slot) on the toothed roller 25. Through the contact of the thread-guide member with the ratchet lever 31, the pinion 22 is finally rotated by the roller 25, the thread-guide 21 being consequently adjusted in the screw thread 24.

The reciprocating guide member 19 carries, at 34, a striker, which strikes against the ratchet lever 31 during its forward movement, thereby imparting a stepwise movement to the ratchet wheel 30. The control spring 44 returns the ratchet lever 31 into its original position every time. The rod 35, which is longitudinally displaceable, and therefore serves to modify the extent of the ratchet movement, is provided, at one end, with a stop 36 for the ratchet lever 31. This longitudinally displaceable rod 35 enables the stroke of the ratchet lever 31 to be modified, thus also modifying the intermittent movement of the ratchet wheel 30. In this manner, a larger or smaller rotational movement is imparted to the worm 28 and operatively connected parts.

Through the ratchet movement thus set up, the thread-guide rod 21 is slowly advanced in the longitudinal direction (by means of the advancing movement of the travelling nut 23 gearing with the thread 24 on the rod) in such a manner as to adapt itself to the thickness of the thread which is being wound for the time being. Consequently, the movement of the thread guide and the building of the bobbin are not effected either by means of feelers or any similar devices which would come into contact with and are likely to damage the material which is being wound. Two thread guides 37, 38 (Figs. 1*a* and 3*a*) are rockably mounted on the thread-guide rod 21 and slide to and fro with the rod in guide slots 39 formed in a sliding member 40 and disposed parallel with the fundamental cone K. The slider 40 is displaceably mounted on a rod 41 and is displaced longitudinally by the forward movement of the thread-guide rod 21, with which it is in connection by means of the stop 42 (see Fig. 1*a*). The shaft 41 is provided with a longitudinal slot which is engaged by a catch 43 detachably connected with the rod 41. The position of the guide slot 39 in relation to the fundamental cone K of the weft bobbin prevents the thread guides 37, 38 from coming into contact, at any time, with the material which is in course of winding and thus again protects the bobbin material.

Figs. 5 and 6 represent a modification of the thread-guide adjustment according to Fig. 4. The thread 24 of the rod 20, 21 is engaged by the spring-controlled half-nut 23'' in the casing of the pinion 22, the spring control in this case being, of course, unilateral. In place of a wedge, the sleeve 20*a* is provided with a channeled extension which, in turning, brings the half-nut 23'' out of engagement against the action of its spring.

In the modification illustrated in Figs. 7 and 8 the ratchet mechanism is disposed to effect axial movement of the oblique plate 18 upon the shaft 5. For the purpose of causing the plate 18 to rotate while permitting it to slide upon the shaft 5, the latter is provided with a key or feather 46. The hub of the plate 18 is extended and carries the pinion 22', which is rotatable thereon, but prevented from axial movement relatively thereto by inter-engaging annular shoulders formed on said hub and the pinion. The end of the shaft 5 remote from the driving pinion 4 is supported in a fixed hollow member 24', which is externally screw-threaded and is engaged by the spring-controlled internally threaded members 23' housed within the pinion 22'. The yoke means or thread-guide member 19 is rigidly secured to the thread-guide rod 21 and carries a striker 34. At the end of every stroke of the thread-guide, the striker actuates the lever 31', which by means of the pawl 32 effects a partial rotation of the ratchet wheel 30'. The shaft 29' to which the

ratchet wheel 30' is secured extends downwardly and carries a worm engaging the worm wheel 27' rotatable with the toothed roller 25', which engages the teeth of the pinion 22'. Thus on every actuation of the lever 31' by the striker 34 a small rotary movement will be imparted through the gearing described to the roller 25' which in turn will partly rotate the pinion 22' and the threaded members 23' therein enclosed. By the reaction of these threaded members with the fixed threaded member 24' the pinion 22' and the oblique plate 18 will be moved axially relative to the shaft 5. The axial movement of the plate 18 necessarily imparts a similar axial movement to the yoke means 19 and the thread-guide rod 21. For the return to their original positions of the reciprocating and feeding means, comprised by the plate 18, the yoke means 19, rod 21 and the pinion 22', on the completion of the winding of the bobbin, the wedge means 20a is actuated by hand to raise the threaded members 23' from the threaded member 24', so that the whole of the said reciprocating and feeding means may be caused to slide back along the shaft 5.

I claim:—

1. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, oblique plate means on the operating shaft and yoke means co-operating therewith for reciprocating the thread-guide rod with constant amplitude, adjustable ratchet-actuated, screw-and-nut means associated with said co-operating means for feeding the thread-guide rod forward without changing the amplitude of its reciprocations and in accordance with the count of the thread being wound, at least one bobbin shaft, and eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod.

2. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means on the operating shaft and yoke means co-operating therewith for reciprocating the thread-guide rod, and positively actuated, adjustable means associated with said co-operating means for feeding the thread-guide rod forward in accordance with the count of the thread being wound, said feeding means comprising ratchet means, gears driven by the ratchet means, a toothed roller driven by the gears, a pinion engaging the roller, an internal screw thread associated with the pinion, and a non-rotating screw-threaded member co-axial with and engaging the internal screw thread.

3. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means on the operating shaft and yoke means co-operating therewith for reciprocating the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the thread-guide rod forward in accordance with the count of the thread being wound, said feeding means comprising a ratchet shaft, a lever fulcrumed on the ratchet shaft, a pawl carried by the lever, spring means controlling the lever, spring means controlling the pawl, striker means associated with the thread-guide rod for operating the lever and the pawl, an adjustable stop for regulating the stroke of the lever, a ratchet wheel on the ratchet shaft rotated by the pawl, gears driven by the ratchet shaft, a toothed roller driven by the gears, a pinion engaging the roller, an internal screw thread associated with the pinion, and a non-rotating screw-threaded member co-axial with and engaging the internal screw thread.

4. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means on the operating shaft and yoke means co-operating therewith for reciprocating the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the thread-guide rod forward in accordance with the count of the thread being wound, said feeding means comprising ratchet means, gears driven by the ratchet means, a toothed roller driven by the gears, a pinion engaging the roller, a spring-controlled threaded member housed in the pinion, and a non-rotating screw-threaded part engaging said member, and wedge means movable upon said screw threaded part for separating and disengaging said member and said screw-threaded part.

5. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means on the operating shaft and yoke means co-operating therewith for reciprocating the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the thread-guide rod forward in accordance with the count of the thread being wound, said feeding means comprising ratchet means, gears driven by the ratchet means, a toothed roller driven by the gears, a pinion engaging the roller, a spring-controlled threaded member housed in the pinion, and a non-rotating screw-threaded porton of the thread-guide rod engaging said member.

6. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means on the operating shaft and yoke means co-operating therewith for reciprocating the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the thread-guide rod forward in accordance with the count of the

thread being wound, said feeding means comprising ratchet means, gears driven by the ratchet means, a toothed roller driven by the gears, a pinion engaging the roller, a spring-controlled threaded member housed in the pinion, and a non-rotating screw-threaded portion of the thread-guide rod engaging said member, and wedge means embracing said thread-guide rod and slidable thereon for separating and disengaging said member and said screw-threaded portion for the return of the thread-guide rod.

7. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means on the operating shaft and yoke means co-operating therewith for reciprocating the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the thread-guide rod forward in accordance with the count of the thread being wound, said feeding means comprising a ratchet shaft, a lever fulcrumed on the ratchet shaft, a pawl carried by the lever, spring means controlling the lever, spring means controlling the pawl, striker means associated with the thread-guide rod for operating the lever and the pawl, an adjustable stop for regulating the stroke of the lever, a ratchet wheel integral with the ratchet shaft rotated by the pawl, gears driven by the ratchet shaft, a toothed roller driven by the gears, a pinion rotatably mounted on the yoke means and engaging the roller, a spring-controlled threaded member housed in said pinion, and a screw-threaded portion on the thread-guide rod engaging said member, and wedge means embracing the said thread-guide rod and slidable thereon for separating and disengaging said member and said screw-threaded portion for the return of the thread-guide rod.

8. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means rotating with and slidable upon the operating shaft, yoke means secured to the thread-guide rod and co-operating with the oblique plate means for reciprocating and feeding forward the thread-guide rod, and adjustable ratchet-actuated, screw-and-nut means associated with said co-operating means for moving the oblique plate means, the yoke means and the thread-guide rod forward continuously and uniformly in accordance with the count of the thread being wound.

9. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means rotating with and slidable upon the operating shaft, yoke means secured to the thread-guide rod and co-operating with the oblique plate means for reciprocating and feeding forward the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the oblique plate means, the yoke means and the thread-guide rod forward in accordance with the count of the thread being wound, said feeding means comprising ratchet means, gears driven by the ratchet means, a toothed roller driven by the gears, a pinion rotatably mounted on the hub of the oblique plate means and engaging the roller, an internal screw thread associated with the pinion, and a non-rotating externally screw-threaded member engaging the internal screw thread.

10. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means rotating with and slidable upon the operating shaft, yoke means secured to the thread-guide rod and co-operating with the oblique plate means for reciprocating and feeding forward the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the oblique plate means forward in accordance with the count of the thread being wound, said feeding means comprising a ratchet shaft, a lever fulcrumed on the ratchet shaft, a pawl carried by the lever, spring means controlling the lever, spring means controlling the pawl, striker means associated with the thread-guide rod for operating the lever and the pawl, an adjustable stop for regulating the stroke of the lever, a ratchet wheel integral with the ratchet shaft rotated by the pawl, gears driven by the ratchet shaft, a toothed roller driven by the gears, a pinion rotatably mounted on the hub of the oblique plate means and engaging the roller, an internal screw thread associated with the pinion, and a fixed, externally screw-threaded member engaging the internal screw thread.

11. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread-guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the thread-guide rod, oblique plate means rotating with and slidable upon the operating shaft, yoke means secured to the thread-guide rod and co-operating with the oblique plate means for reciprocating and feeding forward the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the oblique plate means, the yoke means and the thread-guide rod forward in accordance with the count of the thread being wound, said feeding means comprising ratchet means, gears driven by the ratchet means, a toothed roller driven by the gears, a pinion engaging the roller, a spring-controlled threaded member housed in the pinion, and a fixed, externally screw-threaded member engaging the spring-controlled member, and wedge means embracing said screw threaded member and movable thereon for separating and disengaging said spring-controlled member and said screw-threaded member for the return of the oblique plate means, the yoke means and the thread guide rod.

12. In a machine for winding quick-traverse, conically wound bobbins, the combination of a thread guide rod, an operating shaft, means for driving the operating shaft, at least one bobbin shaft, eccentric gear means positively gearing the bobbin shaft to the operating shaft for imparting to the bobbin shaft a variable rotational velocity during each stroke of the the thread-guide rod, oblique plate means rotatable with and slidable upon the operating shaft, yoke means secured to the thread-guide rod and co-operating with the oblique plate means for reciprocating and feeding forward the thread-guide rod, and positively-actuated, adjustable means associated with said co-operating means for feeding the oblique plate means forward in accordance with the count of the thread being wound, said feeding means comprising a ratchet shaft, a lever fulcrumed on the ratchet shaft, a pawl carried by the lever, spring means controlling the lever, spring means controlling the pawl, striker means associated with the thread-guide rod for operating the lever and the pawl, an adjustable stop for regulating the stroke of the lever, a ratchet wheel integral with the ratchet shaft and rotated by the pawl, gears driven by the ratchet shaft, a toothed roller driven by the gears, a pinion rotatably mounted on the hub of the oblique plate means and engaging the roller, a spring-controlled threaded member housed in the pinion, a fixed, externally screw-threaded member engaging the spring-controlled member, and wedge means embracing said screw-threaded member and slidable thereon for separating and disengaging said spring-controlled member and said screw-threaded member for the return of the oblique plate means the yoke and the thread-guide rod.

ERNST SCHWEIZER.