Dec. 14, 1926. 1,610,619

H. SCHWEITER

CROSS WINDING MACHINE FOR TEXTILE THREADS AND YARNS

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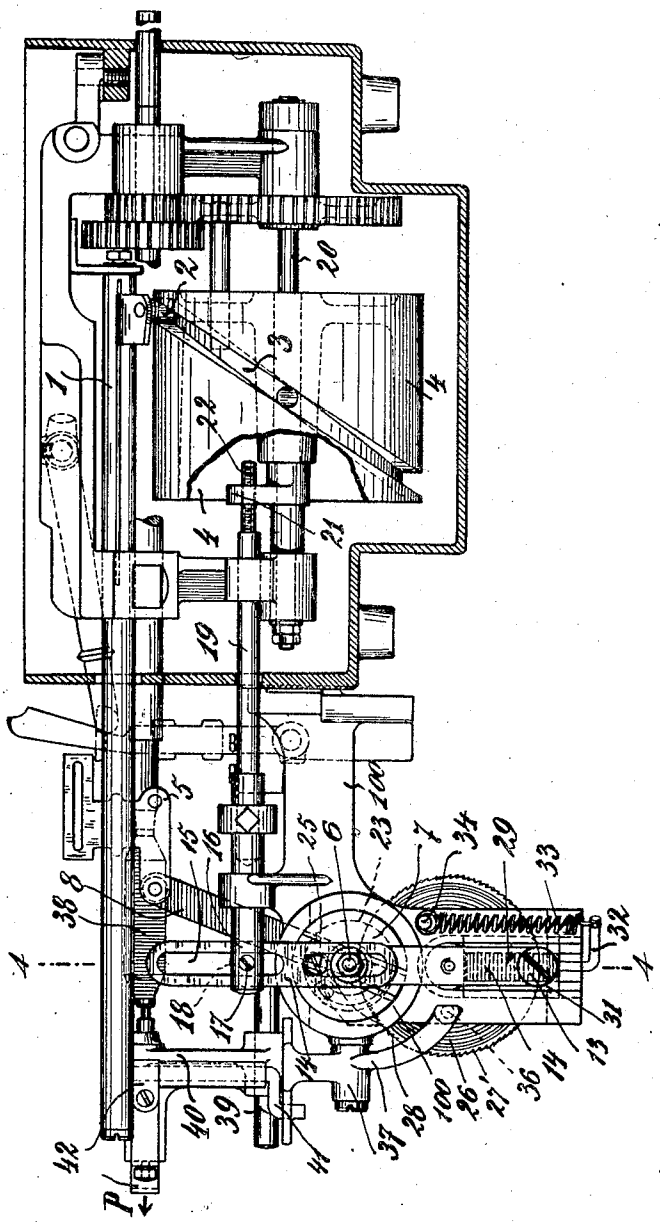
Fig. 1.



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Dec. 14, 1926. **1,610,619**

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CROSS WINDING MACHINE FOR TEXTILE THREADS AND YARNS

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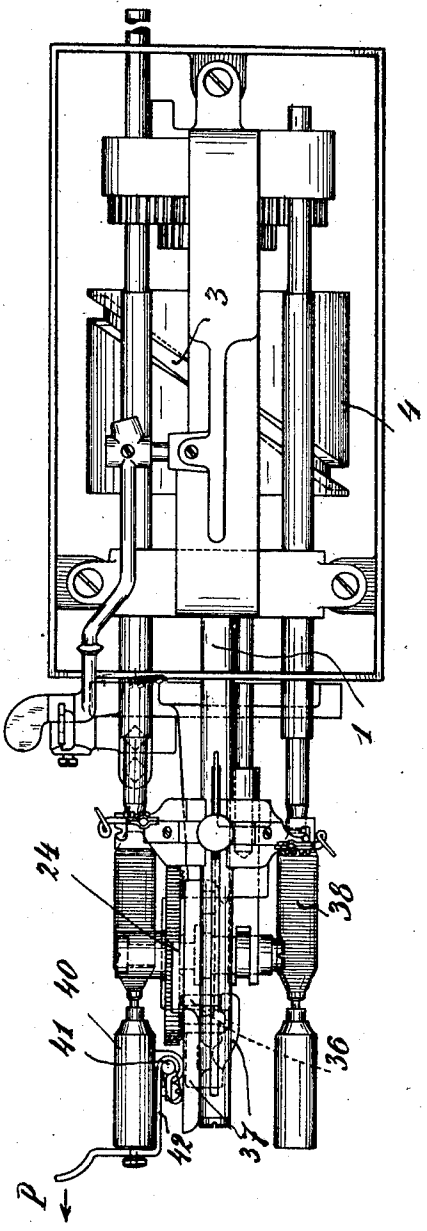
Fig. 2.



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CROSS WINDING MACHINE FOR TEXTILE THREADS AND YARNS

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Fig. 3.

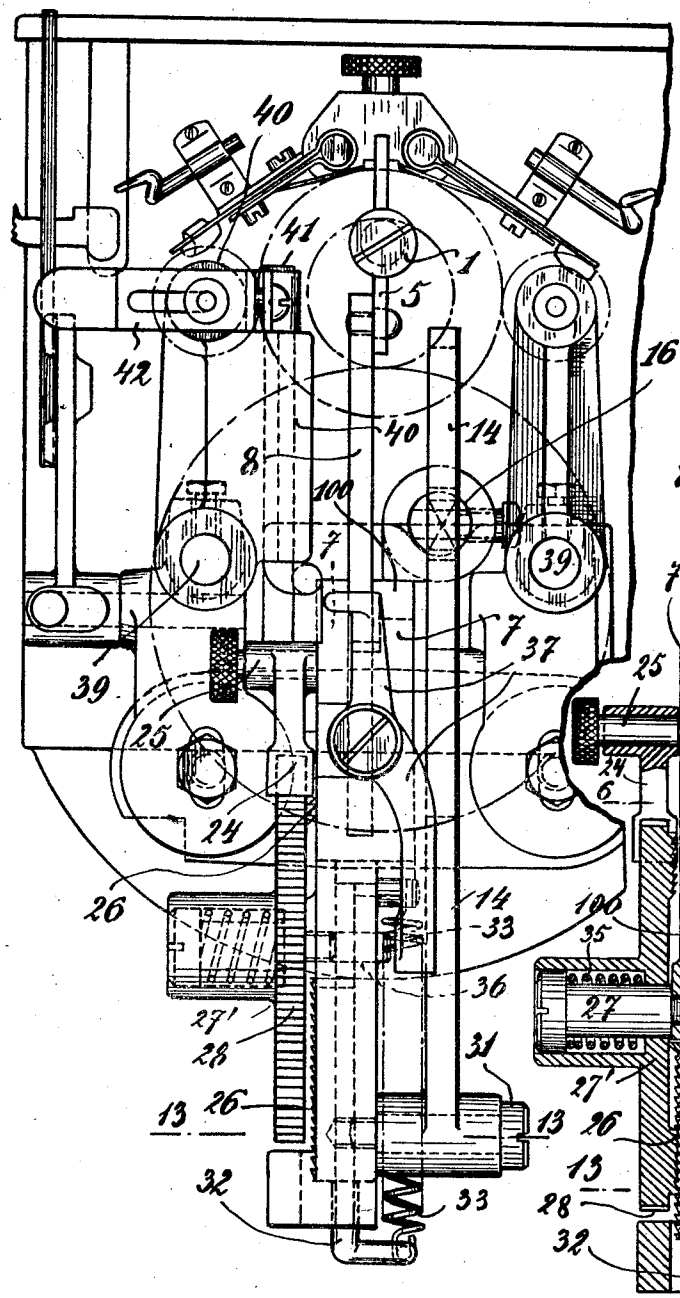
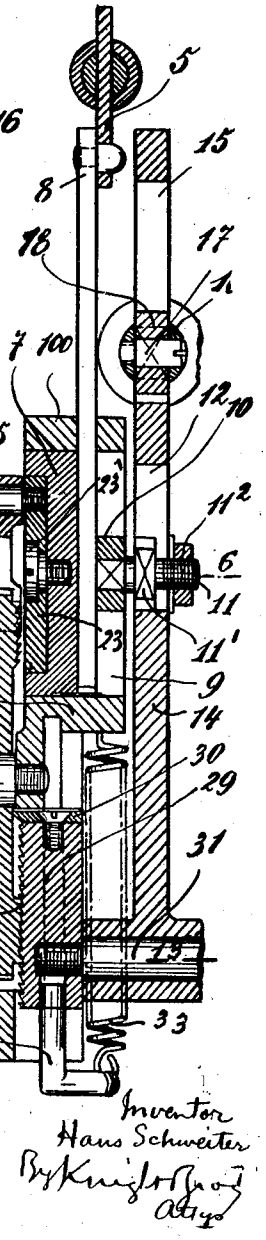


Fig. 4



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CROSS WINDING MACHINE FOR TEXTILE THREADS AND YARNS

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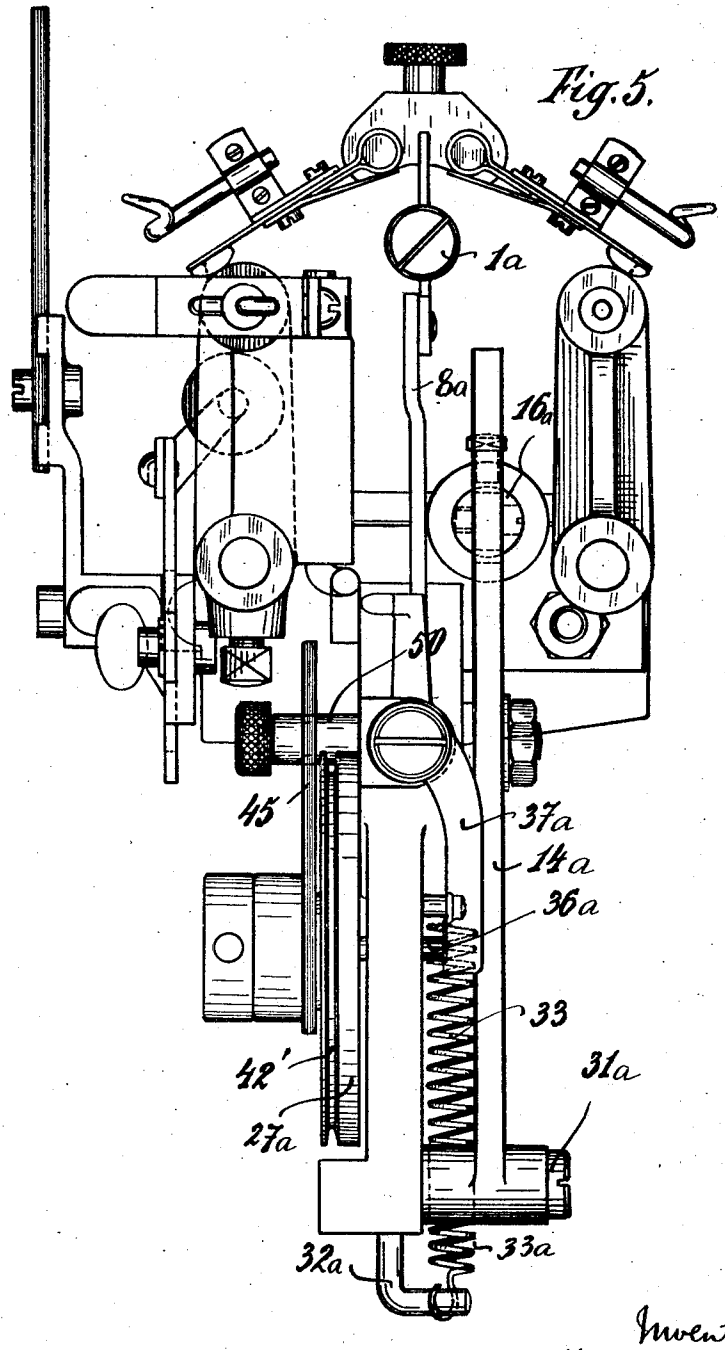
Fig. 5.



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CROSS WINDING MACHINE FOR TEXTILE THREADS AND YARNS

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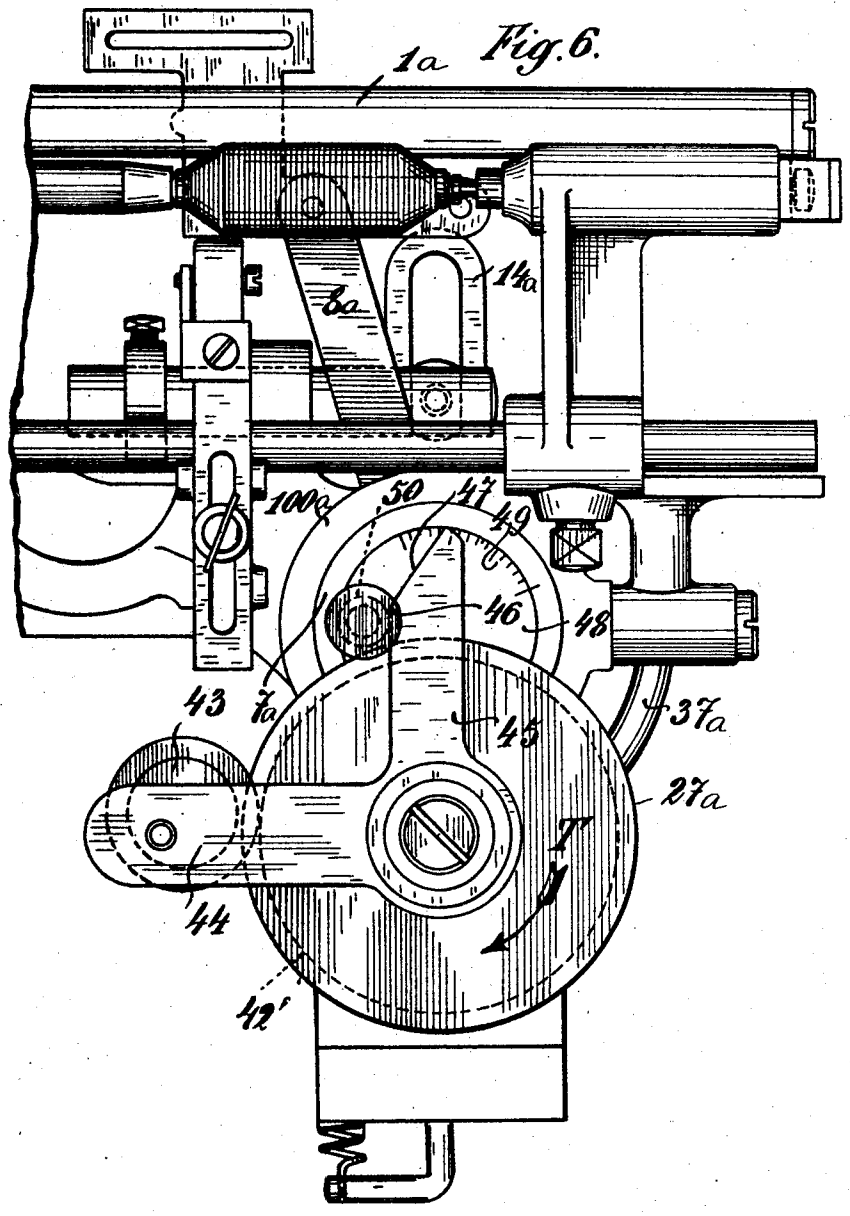
Fig. 6.



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CROSS WINDING MACHINE FOR TEXTILE THREADS AND YARNS

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Fig. 7.

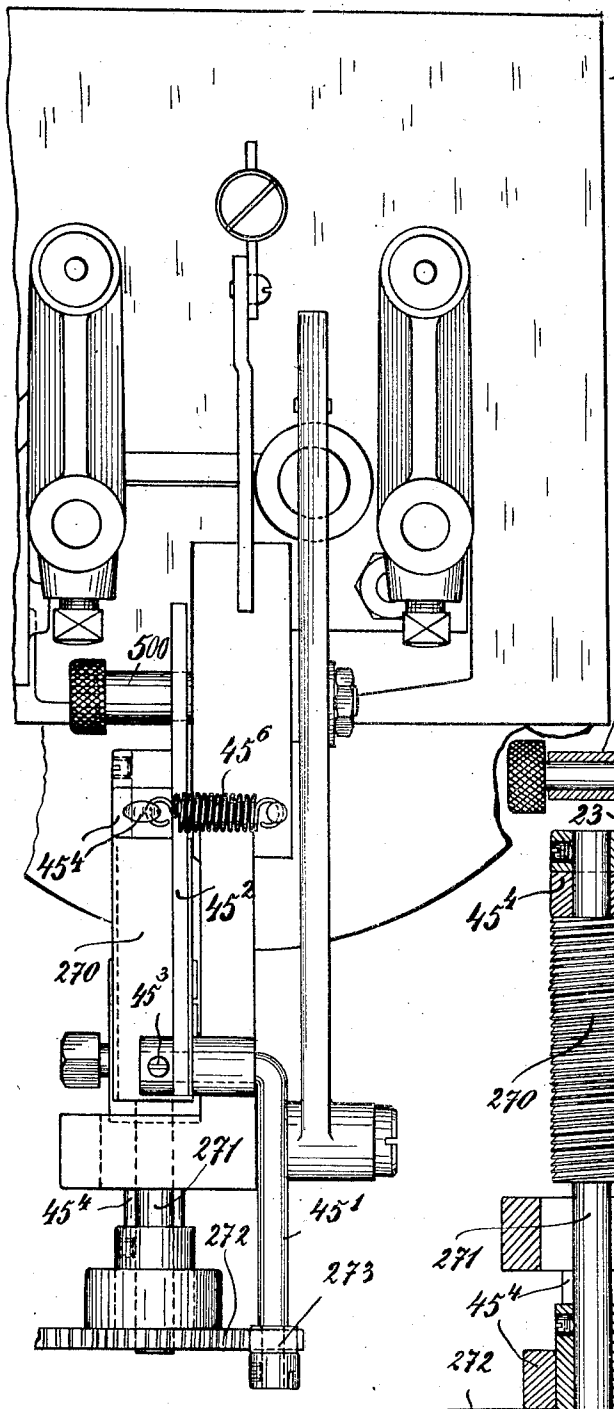
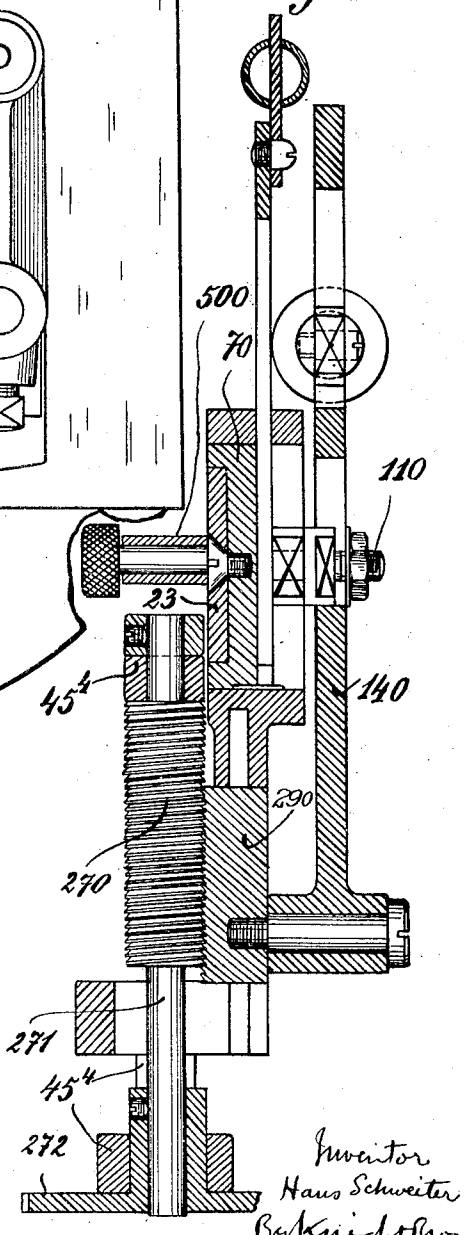


Fig. 9.



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CROSS WINDING MACHINE FOR TEXTILE THREADS AND YARNS

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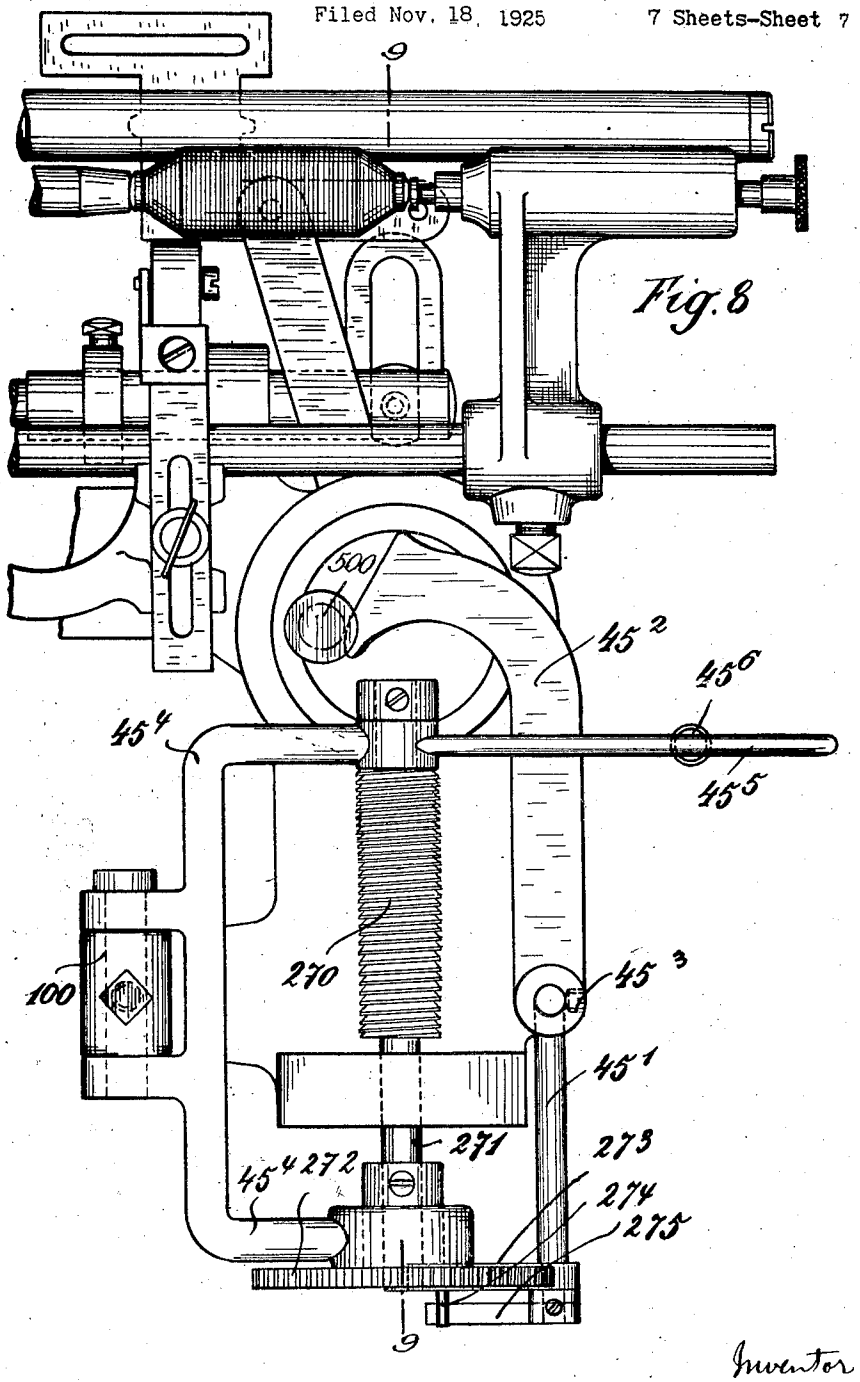

Fig. 8

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UNITED STATES PATENT OFFICE.

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CROSS WINDING MACHINE FOR TEXTILE THREADS AND YARNS.

Application filed November 18, 1925, Serial No. 69.845, and in Switzerland July 10, 1925.

The invention relates to cross-winding machines with an automatically variable traverse winding length of the type in which the spool and cam drum for driving the thread guide are driven at a constant speed.

In the known crosswinding machines of this type the shortening of the traverse of the thread guide is effected by the movement of feelers or rollers, due to the increase in the diameter of the bobbin during winding. This method has the disadvantage that the material being wound, especially if it is silk or artificial silk, suffers from the pressure of the feelers.

The object of the invention is to remove this and other disadvantages and to provide a device which causes the traverse to be automatically varied without the aid of the changing diameter of the bobbin.

For this purpose we arrange that the reciprocating movement produced in known manner by the cam drum causes a variable axial reciprocating movement to be imparted to the drum, so that during certain periods the traverse of the thread guide is uniformly shortened or lengthened, and bobbins are produced with tapering ends or of a bulging shape.

The accompanying drawings illustrate three examples of apparatus according to the invention, with two bobbin winding sets.

Fig. 1 shows one example in elevation, partly in section;

Fig. 2 is a plan view thereof,

Fig. 3 is a side view, and

Fig. 4 is a vertical section on the line 4—4 of Fig. 1;

Figs. 5 and 6 are respectively a side view and an elevation of the second example, and

Figs. 7, 8 and 9 are respectively a side view, an elevation and a vertical section of the third example, the section in Fig. 9 being on the line 9—9 of Fig. 8.

To the thread guide rod 1 (Fig. 1) there is attached a pin with a roller 2 which engages the cam groove 3 of the drum 4, by means of which a reciprocatory movement of the rod 1 is produced. The thread guide rod 1 is linked by means of a carrier bracket 5 passing diagonally through the rod to one end of a lever 8 which is fulcrumed on the axle 6, and the other end of which is in the form of a disc 7. The disc 7 is rotatably mounted in the machine frame 100 and has on its front side a diametrical slot 9 to guide a sliding block 10. This sliding block is mounted on a screw bolt 11 (Fig. 4) having a collar 11^1 with two flats to be adjustable in a slot 12 in a lever 14 fulcrumed on an axle 13 and adapted to be fixed in position by means of a nut 11^2. The upper portion of the lever 14 is provided with a second slot 15 and is engaged by the forked end of a rod 16, connected thereto by means of a screw bolt 17 and block 18 slidable in the said slot 15. In an axial bore of the rod 16 there is a rod 19 adjustably connected by a screw thread 22 to a sleeve 21, which is rotatable but not axially movable on the shaft 20 of the cam barrel 4.

In a concentric recess on the rear side of the disc 7 there is mounted a disc 23 in such a manner as to be adjustable and capable of being fixed therein, and in this disc a pawl 24 is mounted on a screw 25. By turning the screw 25 so that it presses against the disc 7 a clamping action is exerted on the central screw 23^1, and in this way the disc 7 is locked. The pawl 24 engages the ratchet teeth 28 of a disc 27^1 rotatably and axially movable on the pivot 27 in the frame 100, and imparts to the disc 27^1 stepwise rotary motion. The disc 27^1 has a spiral crown thread 26, which engages in a rack 29 movable in a vertical slot of the frame 100 and carrying a soft buffer disc 30. The rack 29 carries a pivot 31 for the actuating lever 14 and a bent arm 32 to which one end of a spring 33 is secured while the other end thereof is suspended on the frame at 34. The object of the spring 33 is to lift the rack 29 together with the lever 14 into their original position when the rack 29 is disengaged from the spiral crown thread 26 after having been in engagement therewith. On the pivot 27 is mounted a spring 35, which keeps the crown thread disc 27^1 in engagement with the rack 29. For disengaging the two parts a pin 36 is used, which abuts against the disc 27^1 and is adapted to be moved by means of a two-armed disengaging lever 37 mounted on the frame. The lever 37 can be operated by hand or automatically. For this purpose, there is mounted on the counterhold 40, which retains the bobbin 38 and is movable on the rod 39, (Figs. 1 and 3) a bolt 41 that is offset at right angles so that on withdrawal of the counterhold 40 in the direction of the arrow P (Figs. 1 and 2), which is effected by the handle 42 fixed to the upper end of the bolt 41, said counterhold

is pressed against the disengaging lever 37 and imparts the disengaging movement thereto.

The mode of operation of the apparatus is as follows:

The cam groove 3 of the cam barrel 4 imparts to the thread guide rod the axially reciprocating motion required for constant traverse. The lever 8 and disc 7 are caused to oscillate about the axle 6. Before the winding of a bobbin is started the sliding piece 10 must be adjusted and fixed in the slot 12 of the lever 14 by means of the bolt 11, and the rack 29 together with the lever 14 must be moved to their highest position by means of the spring 33. In Figs. 1 and 4 the sliding piece 10 is shown in its zero position, i. e., in the position concentric with the axle 6, in which no rotary motion is transmitted from the disc 7 to the lever 14. If, however, the sliding piece 10 is in a position eccentric to the said axle the lever 14 is on the swinging of the disc 7, likewise swung by means of the sliding piece 10, and the bolt 11 and cam barrel 4 are given an axial to and fro movement which reduces or increases the displacement effected by the cam groove 3, according to whether the displacement by the cam groove and that of the cam barrel 4 are in opposite or in the same directions. In this way the traverse is reduced or increased.

When the disc 7 swings, the crown thread disc 27^1 is rotated stepwise in one direction by the pawl 24, and moves the rack 29, downwardly together with the lever 14, so that the sliding block 10 descends in the slot 12 of the disc 7 and consequently causes a gradual increase in the stroke of the lever 14 and thus a shortening of the traverse, as the displacement due to the cam groove is reduced by displacement of the cam barrel in the opposite direction.

When the winding is completed the counterhold 40 is withdrawn in the direction of the arrow P and the disc 27^1 is moved out of engagement with the rack 29 by the action of the bolt 41 on the disengaging lever 37 whereupon the spring 33 returns the rack 29 together with the lever 14 to the initial position.

If, however, the bolt 11 together with the sliding block 10 are, before the beginning of the operation, adjusted in the upper end of the slot 12, whereby the sliding block 10 travels in the upper portion of the slot 9 of the disc 7, a displacement of the cam barrel takes place which increases the displacement due to the cam groove, so that the traverse is increased and a bulged bobbin is produced.

In the example shown in Figs. 5 and 6 the crown thread disc 27^a has an annular V shaped groove 42^1 in which engages an actuating eccentric 43 with a wedge-shaped edge. This eccentric is carried by the arm 44 of a bell-crank lever 44, 45 which is loosely mounted on the hub of the disc 27^a and the other arm 45 of which has a surface 46 concentric with the disc 7^a and an oblique surface 47 contiguous to the concentric surface. An adjustable disc 48 concentrically sunk in the disc 7^a and having a scale of angular degrees marked thereon carries a pin with a roller 50 which is adapted to act upon the arm 45 of the bell crank lever 44, 45.

Oscillation of the lever 8^a and the discs 7^a and 48 causes the roller 50 to engage the oblique surface 47 of the bell-crank lever 44, 45 and to turn it in the direction of the arrow T (Fig. 6) so that the crown thread disc 27^a is rotated by means of the eccentric 43. The reverse rotation of the bell-crank lever has no effect. By a corresponding adjustment of the disc 48 relatively to the bell-crank lever 44, 45 there can be produced an earlier or later action of the roller 50 upon the oblique surface 47 of the arm 45 and consequently a greater or smaller stroke of the lever 44, 45 or a greater or smaller angular displacement of the disc 27^a. The remainder of the machine is like that described with reference to Figs. 1 to 4.

In the case of the example according to Figs. 7 to 9 there is used instead of the crown thread disc 27^1 a screw 270 which engages in the rack 29. On the unthreaded shaft 271 of the screw 270 there is rigidly mounted a ratchet wheel 272 with the teeth of which a pawl 273 is held in engagement under the action of a spring 275 upon a pin 274 carried by said pawl. The pawl 273 is loosely mounted on and the spring 275 is fixed to an arm 45^1 of a two-armed lever 45^1, 45^2 which is mounted on the frame 1,000 and the arm 45^2 of which is actuated by the roller 500 in the same manner, as is the arm 45 of the bell-crank lever 44, 45 is operated by roller 50 in the case of the example illustrated by Figs. 5 and 6. The arms 45^1, 45^2 are connected together by a set screw 45^3. It may be readily seen that the screw 270 receives a step by step rotation from the roller 500 and thus acts in the same way as the crown thread disc 27^1. The screw 270 is mounted in a yoke 45^4 pivotally mounted on the machine frame 1,000 and can be disengaged from the rack 29 by rotating the yoke by means of the handle 45^5. A spring 45^6 maintains the screw 270 in engagement with the rack 29. In other respects the machine of this example is like that of the examples hereinbefore described.

What I claim is:

1. In a cross winding machine having a spindle and a cam barrel driven at a constant speed, a thread guide reciprocated by said cam barrel and means actuated by said thread guide for imparting a variable axial

ly reciprocating movement to said cam barrel, whereby, during predetermined periods the traverse of the thread guide is uniformly varied.

2. A cross winding machine according to claim 1 in which the means for imparting a reciprocating movement to the cam barrel comprises a pivoted lever having its free end pivoted to the thread guide, a second pivoted lever, means for connecting the free end of said second lever to said cam barrel, a slot in said first mentioned lever, and an adjustable pin on said second mentioned lever engaging said slot.

3. A cross winding machine according to claim 1 in which the means for imparting a reciprocating movement to the cam barrel comprises a lever having one end formed as a disk mounted for free rotation on the frame of the machine, and its other end pivoted to the thread guide, a second pivoted lever having its free end connected to the cam barrel, a diametrical slot in said disk, and an adjustable block on said second mentioned lever engaging in said diametrical slot.

4. In a cross winding machine having a spindle and a cam barrel driven at constant speed, a thread guide reciprocated by said cam barrel, a pivoted lever having its free end pivoted to said thread guide, a second pivoted lever having its free end connected to said cam barrel, a slot in said first mentioned lever, a block adjustably mounted on said second mentioned lever and engaging in said slot, and means for uniformly moving the pivot of said second mentioned lever during the winding of a spool, whereby the traverse of the thread guide is automatically varied during the operation of the machine.

5. A cross winding machine according to claim 4 in which the means for moving the pivot of the second mentioned lever comprises a rotatable member, a cam groove on said member, means actuated by a reciprocating member of the machine for imparting step by step rotation to said rotatable member, and a follower for said cam groove, said second mentioned lever being pivoted on said follower.

6. A cross winding machine according to claim 4 in which the means for moving the pivot of the second mentioned lever comprises a rotatable member, a cam groove on said member, means actuated by a reciprocating member of the machine for imparting step by step rotation to said rotatable member, and a follower for said cam groove, said second mentioned lever being pivoted on said follower, and means for disengaging said cam follower from said cam groove.

7. A cross winding machine according to claim 4 in which the means for moving the pivot of the second mentioned lever comprises a rotatable member, a cam groove on said member, means actuated by a reciprocating member of the machine for imparting step by step rotation to said rotatable member, and a follower for said cam groove, said second mentioned lever being pivoted on said follower, and means actuatable upon removal of a spool from the machine for disengaging said cam follower from said cam groove.

8. A cross winding machine according to claim 4 in which the means for moving the pivot of the second mentioned lever comprises a rotatable member, a cam groove on said member, means actuated by reciprocating member of the machine for imparting step by step rotation of said rotatable member, and a follower for said cam groove, said second mentioned lever being pivoted on said follower, resilient means for holding said rotatable member in engagement with said follower, and means for moving said rotatable member from engagement with said follower against the action of said resilient means.

9. A cross winding machine according to claim 4 in which the means for moving the pivot of the second mentioned lever comprises a rotatable member, a cam groove on said member, means actuated by a reciprocating member of the machine for imparting step by step rotation to said rotatable member, and a follower for said cam groove, said second mentioned lever being pivoted on said follower, and means for disengaging said cam follower from said cam groove, comprising a bell crank lever, a crank engaging one arm of said bell crank lever, a counterhold adapted to hold a spool in position in the machine, an arm for oscillating said crank engaging said counterhold, and means operable by the other arm of said bell crank lever for disengaging said rotatable member from said follower, whereby, upon movement of said crank oscillating arm to remove a spool from the machine, said rotatable member will be simultaneously disengaged from said follower.

10. A cross winding machine according to claim 4 in which the means for moving the pivot of the second mentioned lever comprises a rotatable member, a cam groove on said member, means actuated by a reciprocating member of the machine for imparting step by step rotation to said rotatable member, and a follower for said cam groove, said second mentioned lever being pivoted on said follower, means for disengaging said cam follower from said cam groove, and resilient means tending to hold said cam follower in normal position.

11. A cross winding machine according to claim 4 in which the means for moving the pivot of said second mentioned lever comprises a rotatable member, a two armed lever, a pin on said first mentioned lever

adapted to engage one arm of said two armed lever, means on the other arm of said two-armed lever for engaging said rotatable member to rotate the same with a step by step movement, a cam groove on said rotatable member, and a cam follower for said cam groove, said second mentioned lever being pivoted on said cam follower.

12. A cross winding machine according to claim 4 in which the means for moving the pivot of said second mentioned lever comprises a rotatable member, a two armed lever, a pin adjustably mounted on said first mentioned lever adapted to engage one arm of said two armed lever, means on the other arm of said two armed lever for engaging said rotatable member to rotate the same with a step by step movement, a cam groove on said rotatable member, and a cam follower for said cam groove, said second mentioned lever being pivoted on said cam follower.

13. A cross winding machine according to claim 4 in which the means for moving the pivot of said second mentioned lever comprises a rotatable disk, an adjustable friction gear for rotating said disk with a step by step movement, a spiral crown thread on said disk, and a follower engaging said crown thread, said second mentioned lever being pivoted on said follower.

14. A cross winding machine according to claim 4 in which the means for moving the pivot of said second mentioned lever comprises a rotatable disk, a two armed lever rotatably mounted on a pivot concentric with respect to said disk, a peripheral groove on said disk, a member pivoted eccentrically on one arm of said two armed lever and engaging in said peripheral groove, means for rocking said two armed lever to rotate said disk with a step by step movement, a cam groove on said disk, and a follower for said cam groove, said second mentioned lever being pivoted on said follower.

15. A cross winding machine according to claim 4 in which the means for moving the pivot of said second mentioned lever comprises a rotatable disk, a two armed lever rotatably mounted on a pivot concentric with respect to said disk, a peripheral groove on said disk, a member pivoted eccentrically on one arm of said two armed lever and engaging in said peripheral groove, means for rocking said two armed lever to rotate said disk with a step by step movement, comprising a disk mounted for adjustable rotation on said first mentioned lever, and a pin eccentrically mounted on said second mentioned disk and engaging the other arm of said two armed lever, a cam groove on said first mentioned disk, and a follower for said cam groove, said second mentioned lever being pivoted on said follower.

16. A cross winding machine according to claim 4 in which the means for moving the pivot of said second mentioned lever comprises a rotatable disk, a two armed lever rotatably mounted on a pivot concentric with respect to said disk, a peripheral groove on said disk, a member pivoted eccentrically on one arm of said two armed lever and engaging in said peripheral groove, means for rocking said two armed lever to rotate said disk with a step by step movement, comprising a disk mounted for adjustable rotation on said first mentioned lever, and a pin eccentrically mounted on said second mentioned disk and engaging the other arm of said two armed lever, the surface of said other arm which is engaged by said pin having a portion concentric to the pivot of said first mentioned lever, and a portion tangential to said concentric portion.

17. A cross winding machine in accordance with claim 4 in which the means for moving the pivot of said second mentioned lever comprises a rotatably mounted screw, a rack engaging said screw, and means for imparting step by step rotation to said screw, said second mentioned lever being pivoted on said rack.

In testimony whereof the foregoing specification is signed.

HANS SCHWEITER.