March 11, 1941. W. REINERS ET AL 2,234,356

COP WINDING MACHINE

Filed June 1, 1939 3 Sheets-Sheet 1

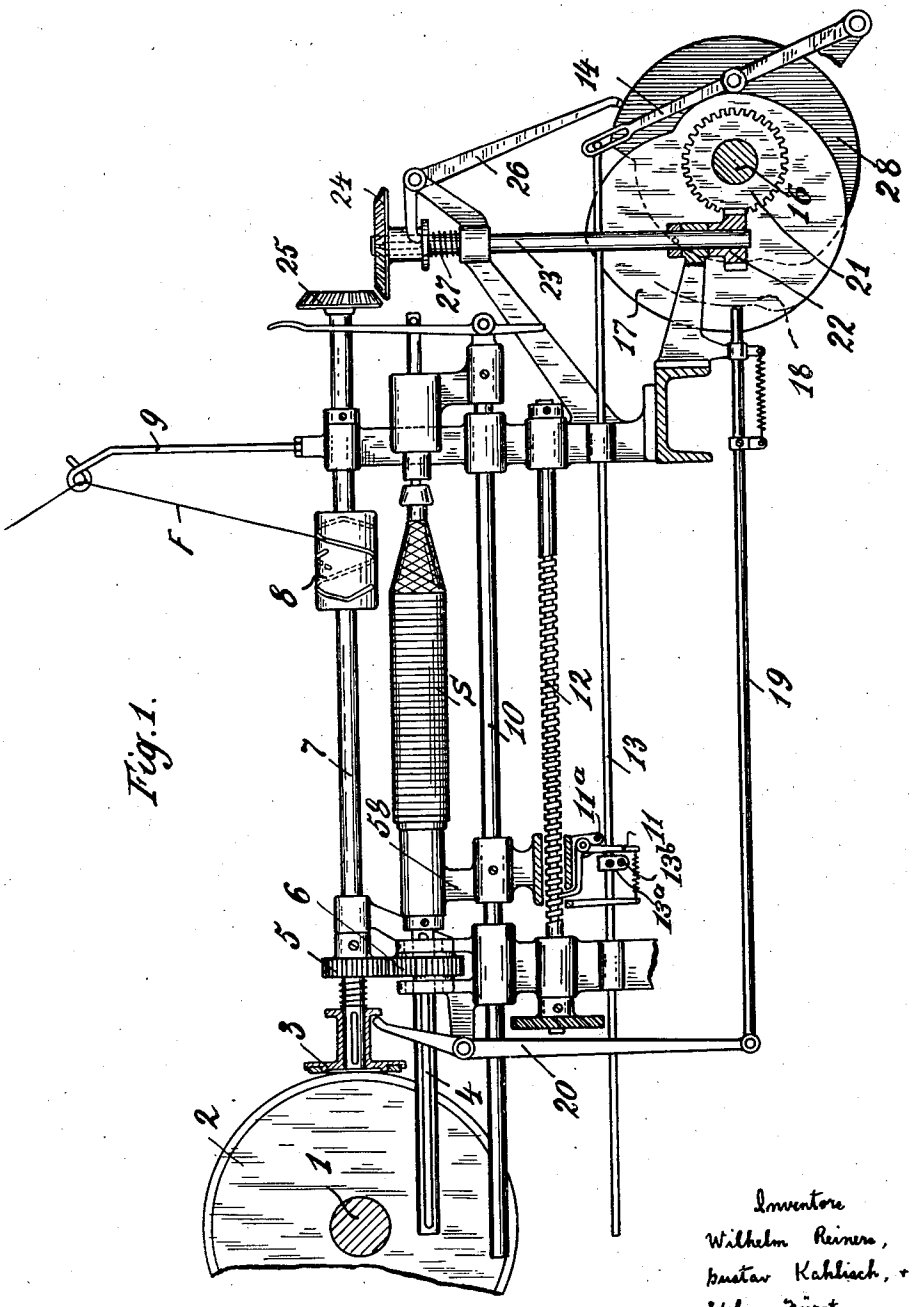

Fig. 1.

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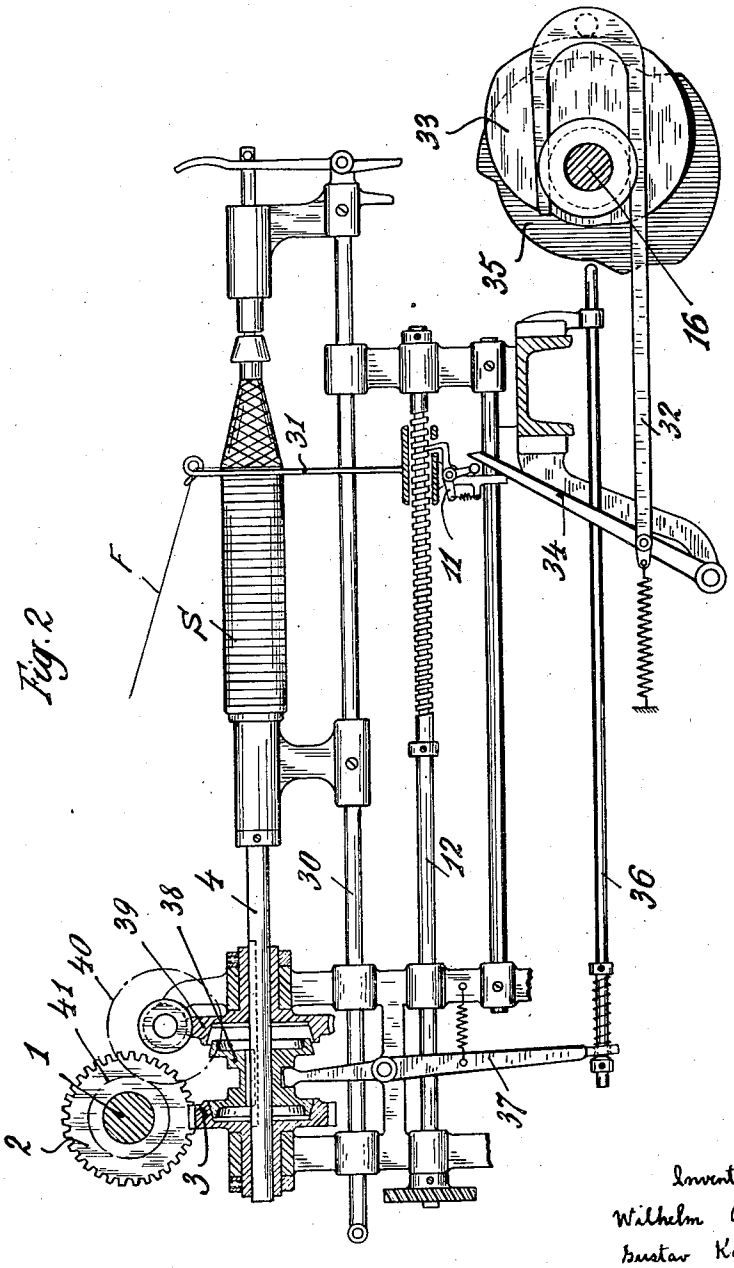

Fig. 2

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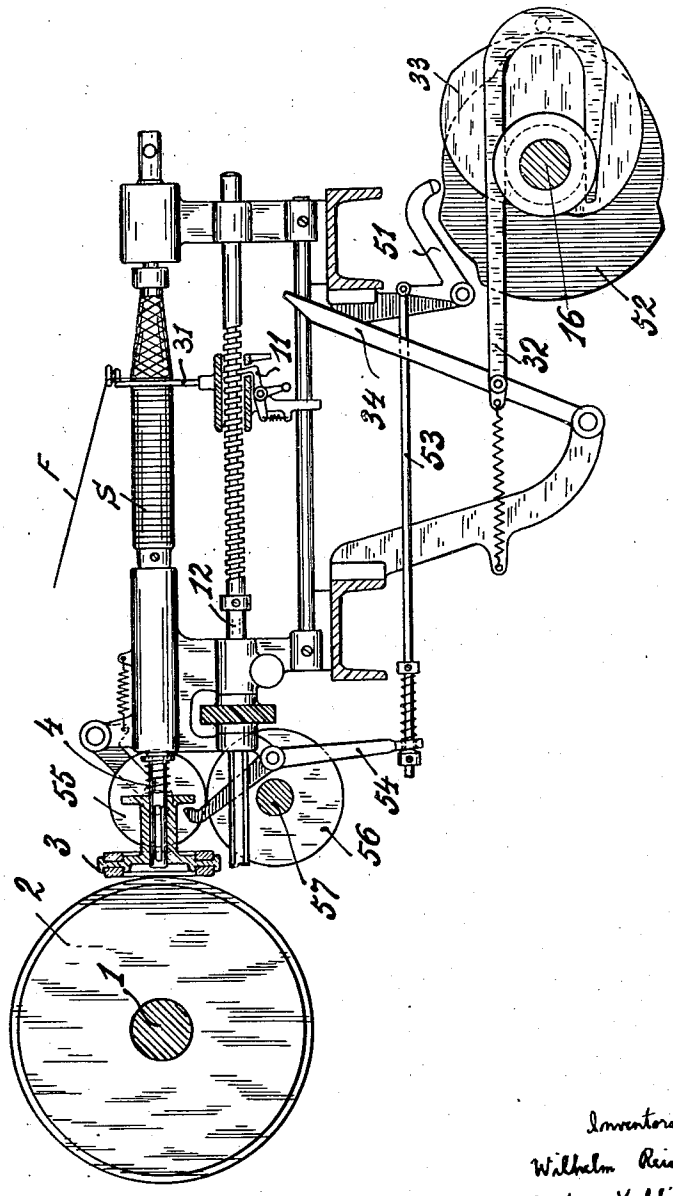
Fig. 3.



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UNITED STATES PATENT OFFICE

2,234,356

COP WINDING MACHINE

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Application June 1, 1939, Serial No. 276,780
In Germany July 28, 1938

1 Claim. (Cl. 242—27)

This invention relates to a full automatic cop winding machine with separate spindles, that is a cop winding machine in which the winding operation progresses automatically and independently from cop to cop. In view of the high spindle speed of such machines and of the multiplicity of the controlling means it is advisable not to accelerate unnecessarily the succession or changing over operations. In this connection it has already been proposed to make the duration of the individual changing over operations adjustable with respect to one another so that the cams controlling the changing over operations are made mutually rotatable.

The present invention also relates to this problem. It has been found that, as the speed of rotation of the spindles and that of the cam cylinder for the thread guide increase, the number of finishing off windings of the finished cop increases unnecessarily, as a few windings are sufficient for guiding back the thread for the purpose of securing it at the base of the bobbin. Every additional winding is therefore unnecessary and in many instances may also mean a regular loss in that, when preparing the cop for its subsequent use, the portion of the thread serving for finishing off is cut off. It is evident that this is also the case when the thread is merely returned to the winding point so that it is in the correct position for recommencing the winding operation.

According to the invention an additional controlling arrangement is provided which acts on an intermediate gear or if desired also on an additional spindle drive. Thus, during the thread return the speed is uniformly changed to such an extent that in every instance only a few windings are produced even if the speed is increased to any desired degree during the winding operation proper.

It has already been proposed, to allow the winding spindles to continue to run, by their inertia, for the purpose of back winding the thread, but by this means too much yarn is used for back winding especially at higher speeds, because only a gradual slowing down of the spindle speed occurs, that is at the beginning no appreciable effect takes place during the guiding back of the thread guides, with the result that the back wound thread end becomes much too long so that waste results.

Several embodiments of the invention are illustrated by way of example in Figs. 1 to 3 of the accompanying drawings, the three figures being vertical sectional views showing three different forms of winding units.

Each of the examples shows the invention applied to one of the different known or already previously proposed constructions of full automatically operating winding units, so as to clearly illustrate that the inventive idea can be applied to any desired winding unit.

The known movements between thread guide and spindle for the production of the cop are attained in the example illustrated in Fig. 1, which has a stationary cam cylinder 8 for the short traverse, by carrying out the other movements with the spindle 4, whereas in the example illustrated in Fig. 2 the spindle 4 carries out the short traverse for building the conical nose, while the thread guide 31 carries out the other movements; and finally in Fig. 3 all the movements are left to the thread guide 31.

In the construction according to Fig. 1 the winding spindle 4 is driven by the main driving shaft 1 through the intermediary of friction wheels 2, 3 and toothed wheels 5, 6. The toothed wheel 5 and the friction wheel 3 are keyed on the shaft 7 of the cam cylinder 8. The thread F runs from the stationary thread guide 9 to the cam cylinder 8 so that it is guided by the groove in this cylinder from the point to the base of the cone of the front end of the cop, whereas it reaches the point of the cop owing to the diagonal pull of the thread. The feed of the spindle 4 is effected in this example in progressive building motion of the spindle 4, in this example, is derived from a screw spindle 12 through a pawl 11 pivotally mounted on a bearing arm 58, which is fixed upon a slidable shaft 10. The screw spindle 12 is rotated by drive means not shown to feed the cop spindle progressively to the left, until, upon initiation of a changeover operation a rod 13 is drawn to the right by a lever 14 actuated by a rotary cam 17 on shaft 16. The rod 13 has fixed to it an actuating lug 13a, provided with a pin 13b adapted to engage the downwardly extending arm of pawl 11, when the rod 13 is drawn to the right. The pawl is thereby rocked until its downwardly extending arm abuts upon a pin 11a rigidly projecting from a part of the bearing arm 58, at which time the tooth of the pawl is disengaged from the screw spindle 12. Further movement of the rod to the right carries the bearing arm 58 back to starting position, thereby moving the wound cop S with respect to the thread guide 8, so that the thread is wound upon the cop in a rapid spiral. To enable the speed to be changed during the returning of the thread F,

another cam 18 is keyed on the shaft 16 and disengages the friction wheel 3 from its connection with the friction wheel 2 through the intermediary of a lever system 19—20. For driving the shaft 7 after the disengagement from the main drive a worm wheel 21 is keyed on the shaft 16 and imparts rotating movement to the shaft 23 through the intermediary of a worm 22, the shaft 23 being capable of rotating the shaft 7 through the intermediary of bevel wheels 24, 25, as soon as the two-armed lever 26 comes onto that portion of the cam 28 which has the smaller radius.

In the example illustrated in Fig. 2, a known mechanism for the disengagement of the pawl 11 is used, which comprises lever system 32, 34 actuated by a cam 33 on the shaft 16. This mechanism at the same time returns the thread guide 31 into its initial position, and back-winds the thread over the cop. The changing over from the main drive to the auxiliary drive is effected in this form of construction by a cam 35 through the intermediary of a rod system 36, 37, in such a manner that the sleeve 38 having friction cones, one at each end, is pushed out of engagement with the toothed wheel 3 and into engagement with the toothed wheel 39 from the nose to the base of the cop, by the movement of the cop to the right in the manner just described, whose speed of rotation is determined by the gear wheels 40, 41.

In the third embodiment shown in Fig. 3 the lever system 32, 34 for the disengagement of the pawl 11 and for the return of the thread guide is constructed like another known construction. The change over from the main drive to the auxiliary drive is effected by the bell crank lever 51, as soon as this bell crank lever is swung in counterclockwise direction by the cam 52 and thus acts on the lever system 53, 54. The friction disc 3 has two friction faces and after disengagement from the friction disc 2 comes into contact with the friction disc 55 which is driven from a separate shaft 57 through the intermediary of a friction disc 56.

What we claim as our invention and desire to secure by Letters Patent of the United States is:

In a cop winding machine, a winding spindle device, a thread guide device, means for moving one of said devices progressively with respect to the other to build the length of the cop, means for restoring the progressively moved device to starting position to back-wind the thread on the cop, a main drive for said winding spindle device effective during the building of the cop, an auxiliary drive for said winding spindle device, and means operating in conjunction with said restoring means for shifting from said main drive to said auxiliary drive, said auxiliary drive being adapted to drive said winding spindle device at a speed slower than said main drive and suited to the back-winding of a minimum amount of thread to finish off the cop.

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