Nov. 19, 1940. W. REINERS ET AL 2,221,999

DEVICE FOR PRODUCING COPS

Filed June 1, 1939 2 Sheets-Sheet 1

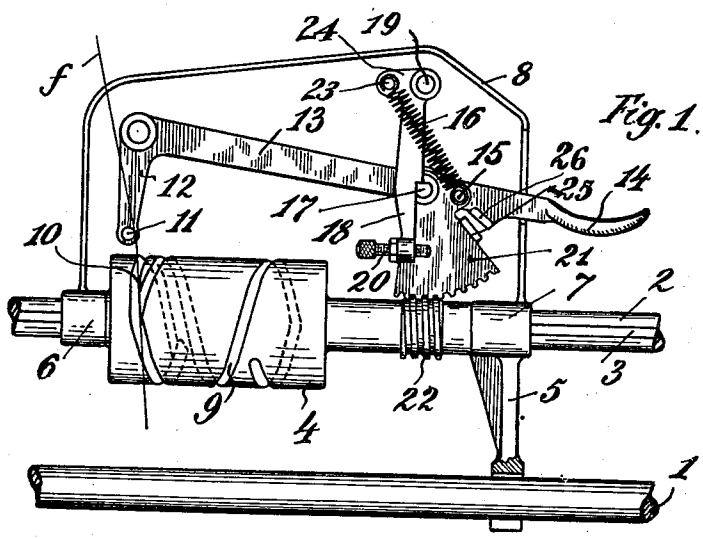


Fig. 1.

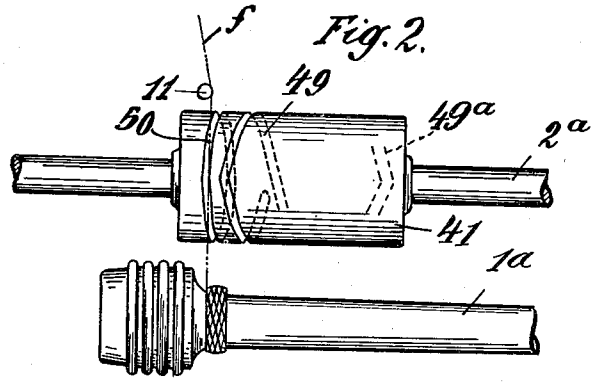


Fig. 2.

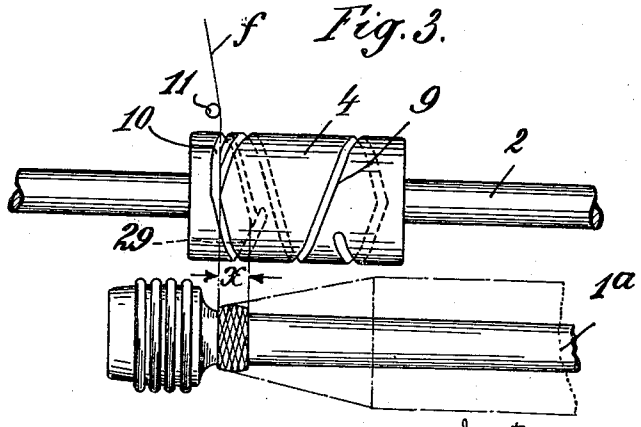


Fig. 3.

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Filed June 1, 1939 2 Sheets-Sheet 2

Fig. 4

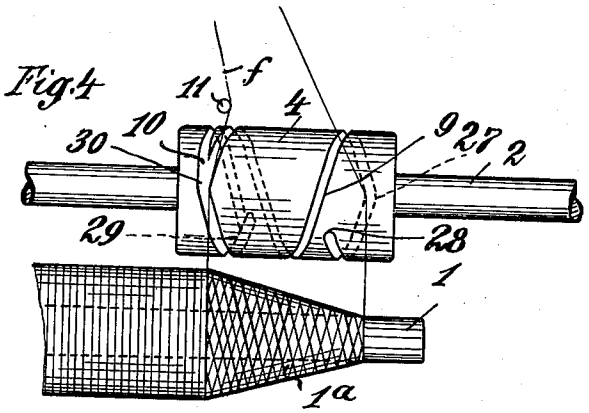


Fig. 5.

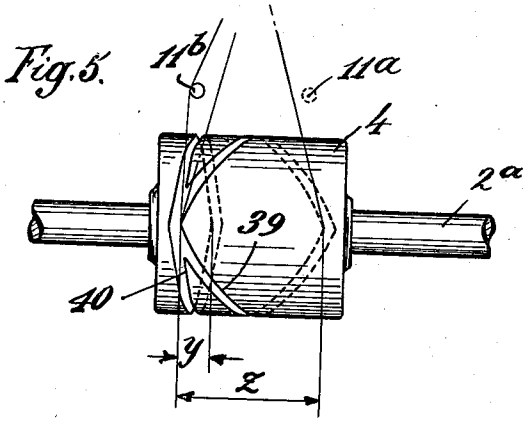
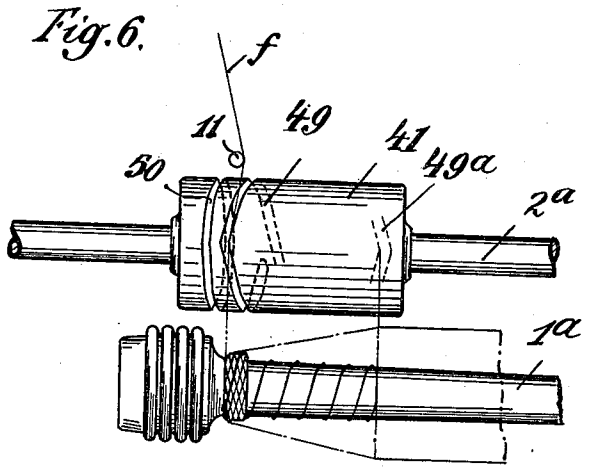


Fig. 6.



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UNITED STATES PATENT OFFICE

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DEVICE FOR PRODUCING COPS

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Application June 1, 1939, Serial No. 276,778
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3 Claims. (Cl. 242—43)

For building up cops in layers it is known that two relative movements are necessary between the wound body in the course of formation and the thread guide, that is, firstly, the continually changing traverse of the thread guide for the purpose of producing the thread layers in the form of superposed cones and, secondly, the feed or builder movement between the traverse imparting element and the winding spindle or tube, by which the base of every cone produced in this manner is limited according to the diameter of the cop to be produced.

The invention uses as thread guide, or traverse imparting element, a cylinder, in the wall of which there is cut a guide groove of one of the known forms for the normal traverse movement, and, in accordance with the invention, an additional helical groove at the rear end of the cam cylinder. This additional groove has a pitch adapted to produce a limited traverse, corresponding to the width of the usual reserve ring on the foot of the tube.

In numerous instances it has been found that the formation of the cop nose from successive layers of thread is carried out in a particularly favorable manner, when the guiding, at least in one direction of traverse, does not take place with the constant pitch of the helical line on the cam cylinder, but progressively, as results in the case of thread return feed by the known diagonal feed method. This method, however, has not hitherto been used for the formation of cops by means of cam cylinders.

Several embodiments of the invention are illustrated by way of example in the accompanying drawings.

Fig. 1 is a side elevation of part of a cop winding unit constructed in accordance with the invention;

Fig. 2 is a side elevation of a cop tube and slightly modified thread guide drum;

Fig. 3 is a side elevation of a cop tube and thread guide drum according to Fig. 1, showing the start of the winding operation;

Fig. 4 is a view of the parts shown in Fig. 3 at a later stage in the winding;

Fig. 5 is a side elevation of another modification of the thread guide drum; and

Fig. 6 is a view of the parts shown in Fig. 2, just after shifting to the position for winding the main body of the cop.

In Fig. 1 the thread guide (cam cylinder) carries out both the traverse and builder movements, as is usual for thread guides of this type. The bobbin or winding tube is rotated by the shaft 1, and the cam cylinder by the shaft 2. The shaft 2 has a longitudinal groove 3 in which engages a key (not shown) of the cam cylinder 4, which causes the cam cylinder to rotate with the shaft, while allowing it to slide on the shaft. The shaft of the cylinder 4 is journalled in bearings 6, 7 of a housing 8 which is secured against rotation by an arm 5 embracing the shaft 1.

The cylinder 4 has a helical groove 9, which is interrupted in its return portion and which merges at its rear end into a groove 10 of smaller pitch. The thread is guided by the latter groove for winding a bunch of reserve thread to start the cop and is then shifted to the groove 9 to continue the winding. Means are provided to carry out the transfer of the thread to the groove 9 automatically when a bunch of reserve thread of proper size has been wound. For this purpose there is pivotally mounted in the housing 8 a bell crank lever 12, 13, on the arm 12 of which is a pin 11. The arm 13 terminates in a handle 14 and carries a bolt 17 on which is rockably suspended a worm segment 21. The segment 21 meshes with a worm 22 on the hub of drum 4. Upon a stud 19 on the housing 8 is pivotally suspended a dog 18 having a shoulder which engages the angularly shaped end of bolt 17 to hold the segment 21 in mesh with the worm 22. A spring 16 stretched between a pin 15 on segment 21 and a pin 23 on arm 24 of the dog 18 tends to rock both the bell crank 12, 13, and the segment 21, counterclockwise. At the beginning of winding, the parts are about in the position shown in Fig. 1. As the drum 4 revolves and the winding of the reserve thread progresses, the worm 22 gradually rocks the segment 21 until a lug 25 thereof engages a set screw 20 on dog 18 and moves the latter to the left far enough to release locking bolt 17. Thereupon lever 13 snaps up and throws the pin 11 forward to the right, while the segment swings back until its stop 25 meets a stop 26 on the arm 13. The effect of the movement of pin 11 will be seen by comparing Figs. 3 and 4. Fig. 3 shows the position of pin 11 when the winding starts and it will be observed that the thread will follow the groove 10 and will thereby be guided to lay down the narrow bunch of reserve thread having the width x. After a certain number of revolutions of the cam drum 4 the locking dog 18 releases the lever 13 and the pin 11 is thrown to the right, to the position shown in Fig. 4. This causes the thread to be guided into the groove 9 for the main traverse. The thread is guided by the groove 9 out to the reversing bend 27 and then part way

back to where the groove runs out to the surface of the drum at 28. Here the thread lies freely on the surface of the drum and is drawn to the left or rear end of the drum by its tension, due to the diagonal feed. It is eventually picked up by the portion 29 of groove 9 and guided to the rear reversing bend 30. The pin 11, as shown in Fig. 4, causes the thread to enter the groove 9 after passing the reversing bend 30.

Experiments have shown that it is advisable to guide the thread back for a short distance after reaching the position 27, before the return feed is assumed by the diagonal pull; hence the extension of the groove 9 to the point 28. The cylinder 4 must be so adjusted to the cop 1a (Fig. 3) that the thread *f* is not caught by the rear engaging portion 28 of groove 9, if the pitch of the groove from its beginning to the rear reversal point does not approximately correspond to the pitch of the track of the thread on the surface of the drum in running back under the diagonal pull.

Fig. 5 shows a shaft 2a carrying a guiding cylinder 38 with a groove 39 for guiding the thread positively throughout the outward and return traverses, and extending therefrom a groove 40 for producing the thread reserve. In this instance the whole traverse *z* can be utilized for the production of the conical wall, because the thread *f* only runs in the groove 40 when it is compelled to do so by the position of the abutment pin 11b. The reversal at the front end is ensured and assisted by the abutment pin 11a. The traverse of the thread reserve is designated by *y*.

Finally, Figs. 2 and 6 show a form of construction in which the main portion of the thread traverse is left not to the cam cylinder 41 but to the winding tube 1a which carries out a corresponding traverse movement produced by any suitable reciprocating mechanism (not shown). In this case the groove 50 for the reserve thread traverse is separate from the groove for the main traverse. The latter groove is not complete, but comprises merely two fragments 49 and 49a to assist the reversal of the thread traverse.

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

1. In a cop winding machine, a spindle, a thread guide in the form of a grooved drum mounted adjacent said spindle in position to receive the thread and guide it to the spindle, said drum having a groove of relatively high pitch for guiding the thread in a wide traverse, and a groove of relatively low pitch for traversing the thread within a narrow band, and means for guiding the thread to one or the other of said grooves.

2. A cop winding machine as described in claim 1, wherein means are provided to feed the thread to said drum from a point spaced in a direction parallel to the axis of said drum beyond one of the limits of said first groove, said first groove being interrupted to allow the thread to move along a part of its traverse in one direction by the force resulting from the tension of the thread and the slanting direction of its feed to said drum.

3. In a cop winding machine, a spindle, a thread guide in the form of a grooved drum mounted adjacent said spindle in position to receive the thread and guide it to the spindle, said drum having a groove of relatively high pitch for guiding the thread in a wide traverse, and a groove of relatively low pitch for traversing the thread within a narrow band, and means operable as the winding progresses to shift the thread from one of said grooves to the other.

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