May 1, 1928. 1,668,495

O. ELSNER ET AL

COP WINDING MACHINE

Filed April 8, 1927 5 Sheets-Sheet 1

Fig. 1.

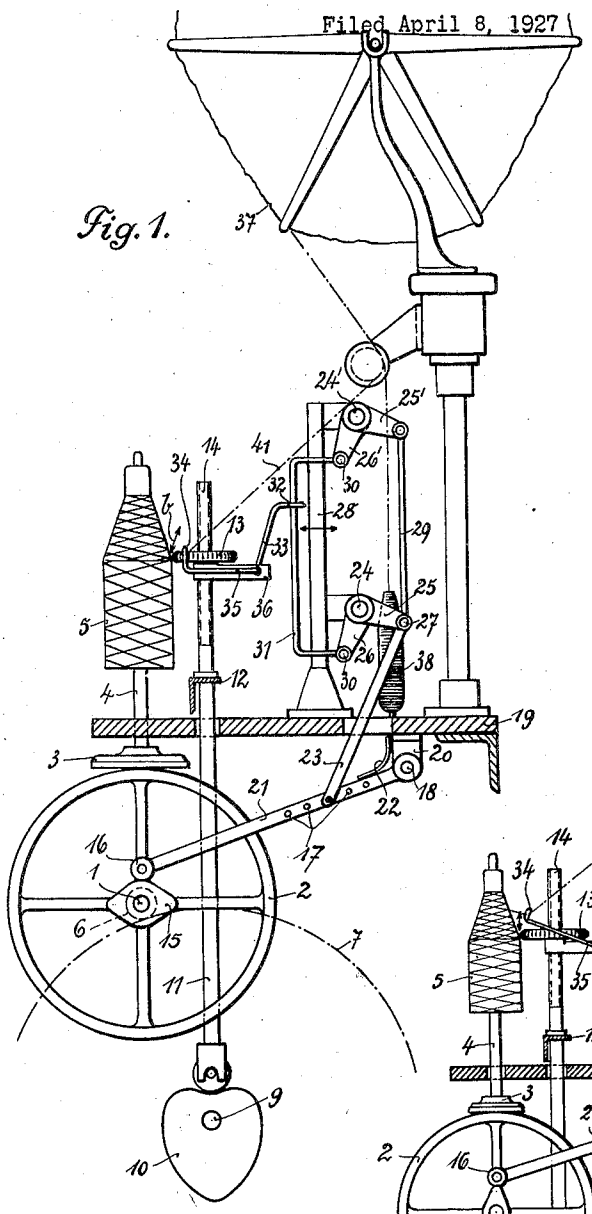


Fig. 2.

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May 1, 1928. 1,668,495

O. ELSNER ET AL

COP WINDING MACHINE

Filed April 8, 1927 5 Sheets-Sheet 2

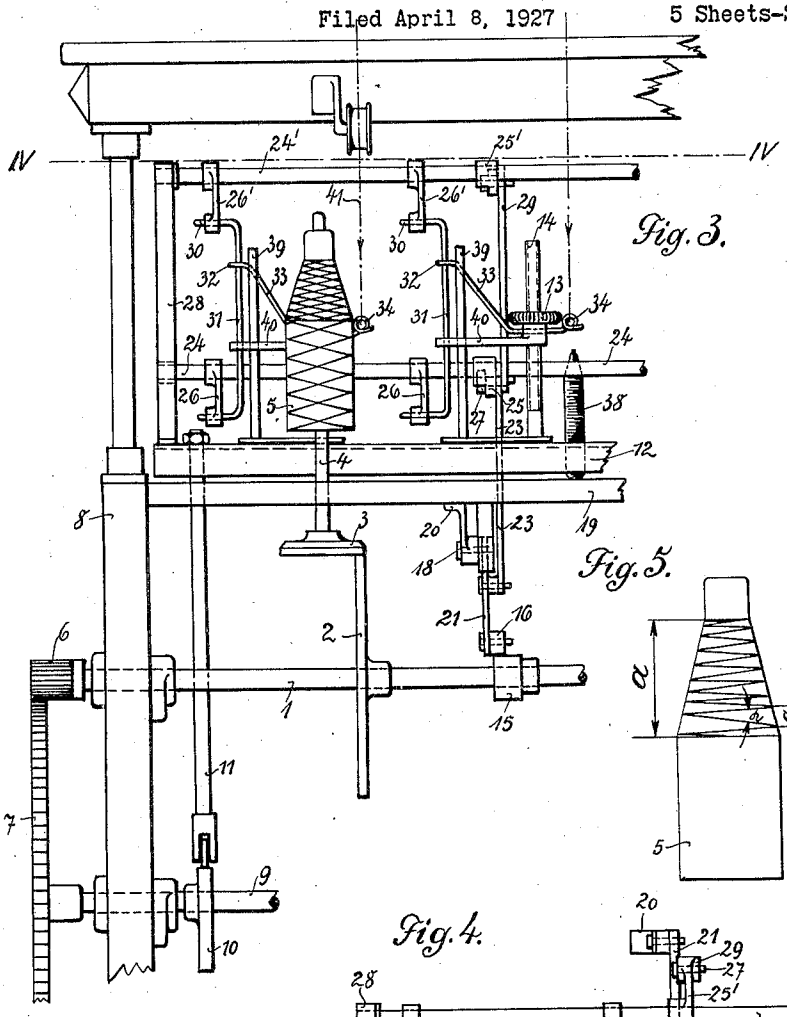


Fig. 3.

Fig. 5.

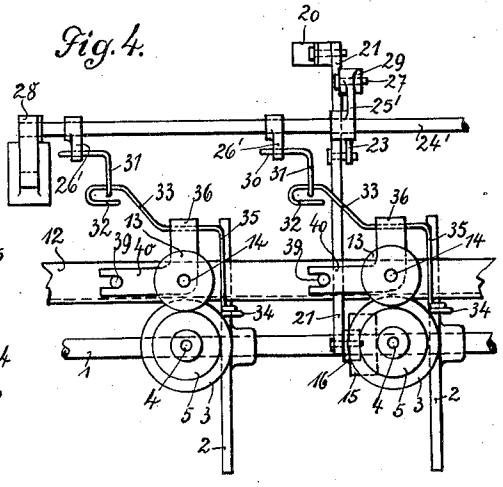


Fig. 4.

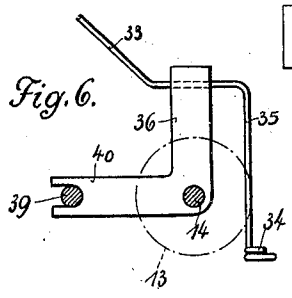


Fig. 6.

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May 1, 1928. 1,668,495

O. ELSNER ET AL

COP WINDING MACHINE

Filed April 8, 1927 5 Sheets-Sheet 3

Fig. 7.

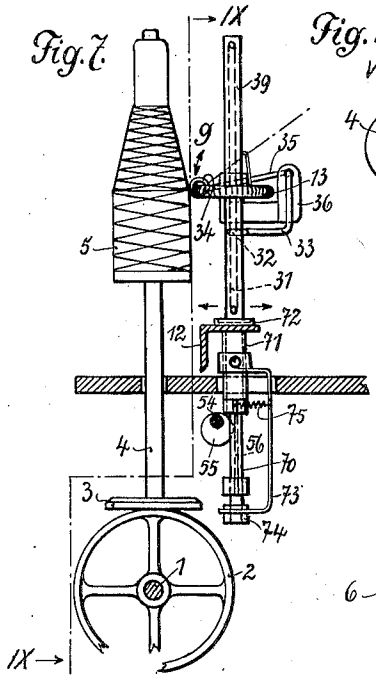


Fig. 10.

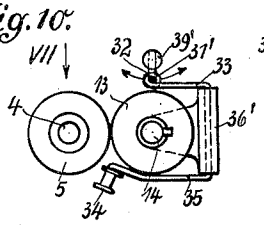


Fig. 9.

Fig. 8.

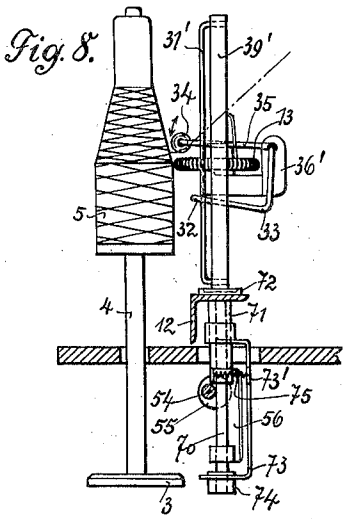
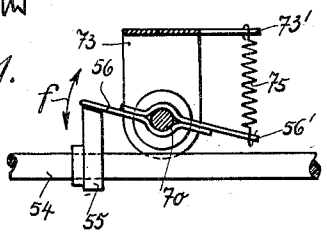


Fig. 11.



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May 1, 1928. 1,668,495

O. ELSNER ET AL

COP WINDING MACHINE

Filed April 8, 1927 5 Sheets-Sheet 4

Fig. 12.

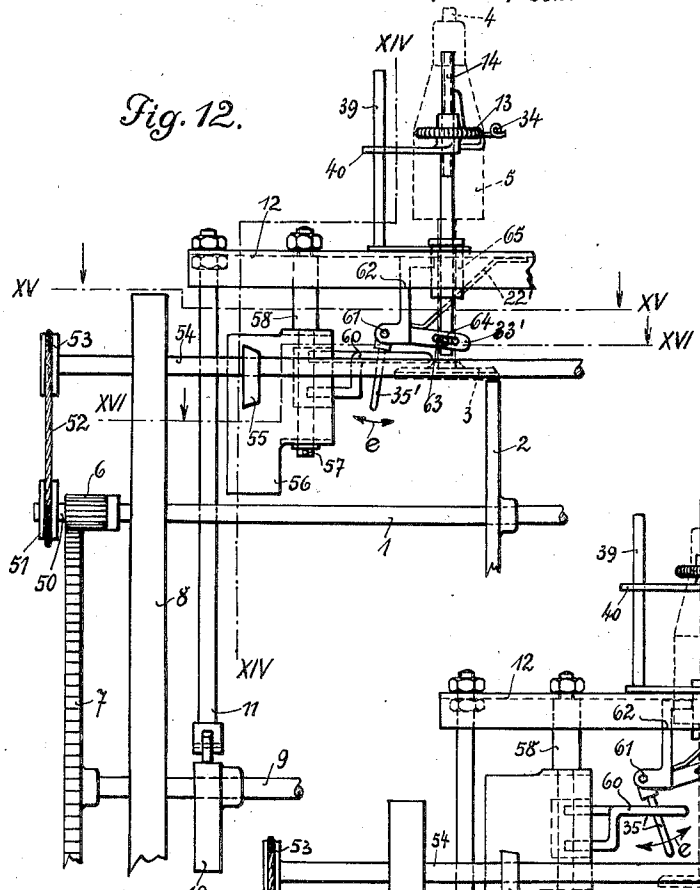
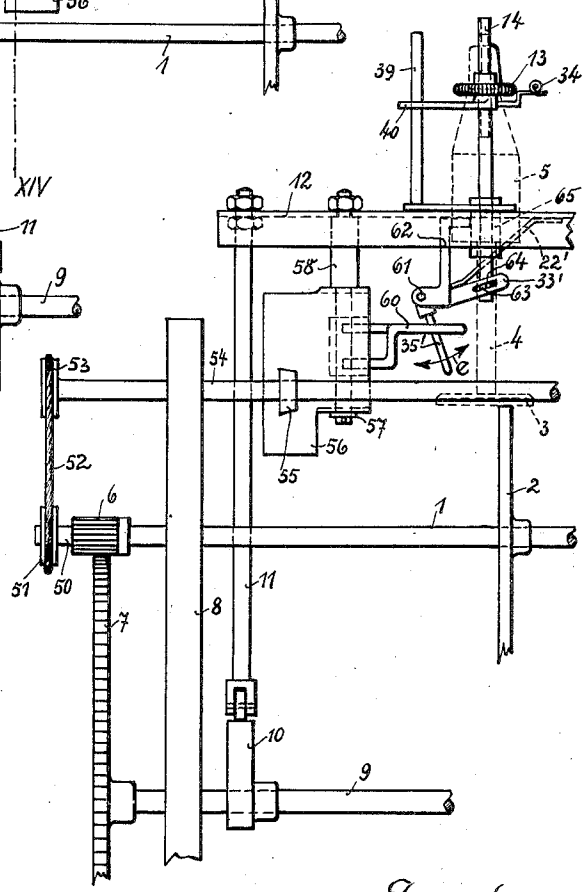


Fig. 13.



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May 1, 1928. 1,668,495

O. ELSNER ET AL

COP WINDING MACHINE

Filed April 8, 1927 5 Sheets-Sheet 5

Fig. 14.

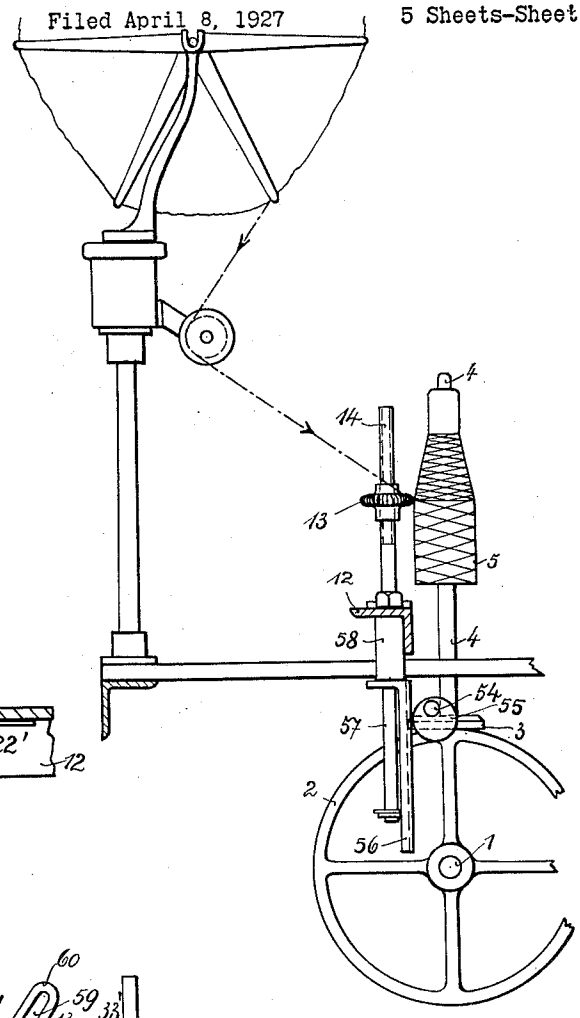


Fig. 17.

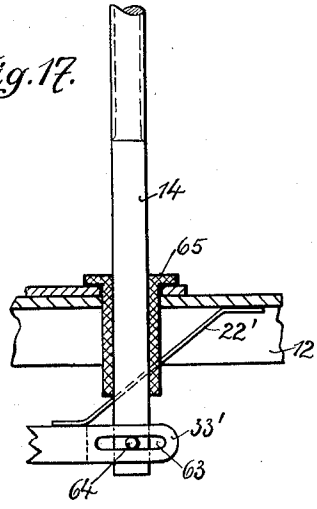


Fig. 15.

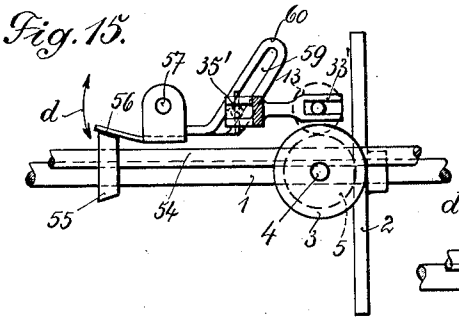
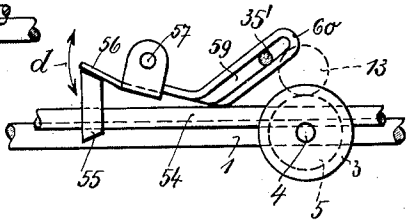


Fig. 16.



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Patented May 1, 1928. 1,668,495

UNITED STATES PATENT OFFICE.

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COP-WINDING MACHINE.

Application filed April 8, 1927, Serial No. 182,036, and in Germany October 27, 1925.

This invention relates to a cop winding machine of the kind wherein the thread guide is reciprocated by a cam-supported traverse bar and advanced on the latter by means of a progress wheel operated by contact with the cop at the end of the traverse, and the invention consists in the provision of means whereby additional reciprocating movement is imparted to the thread guide independently of the traverse mechanism and within shorter limits in order to lay the yarn in short, open, overlapping spirals on the conical nose of the cop. The additional reciprocating movement may be obtained either by connecting the thread guide to a crank element on the progress wheel device, or by adapting the traverse bar for independent movement relative to the traverse cam.

Fig. 1 of the accompanying drawings represents a side view of the mechanism,

Fig. 2, another side view of the same on a smaller scale showing the thread guide in a different position,

Fig. 3, a front view of the mechanism,

Fig. 4, a front view of the same in section on the line IV—IV of Fig. 3,

Fig. 5, a view of the cop,

Fig. 6, an enlarged view of the thread guide and the progress wheel device,

Fig. 7, a side view of a modified mechanism seen in the direction of the arrow VII of Fig. 10,

Fig. 8, another side view of the same showing the thread guide in a different position,

Fig. 9, a front view in section on the line IX—IX of Fig. 7,

Fig. 10, a top view of the thread guide and the progress wheel device as employed in this construction,

Fig. 11, a section on the line XI—XI of Fig. 9,

Fig. 12, a front view of a further modification of the mechanism,

Fig. 13, another front view of the same showing the elements in a different position,

Fig. 14, a section on the line XIV—XIV of Fig. 12,

Fig. 15, a section on the line XV—XV of Fig 12,

Fig. 16, a section on the line XVI—XVI of Fig. 12, and

Fig. 17, a sectional view on an enlarged scale of the traverse bar device employed in the modification according to Figs. 12 to 16.

The machine has a driving shaft 1 which operates a cam shaft 9 by means of a pinion 6 and a gear wheel 7. For each winding mechanism the shaft 1 carries a friction wheel 2 which supports and drives a winding spindle 4 through the medium of a friction disc 3. The shaft 9 is fitted with two distanced cams 10 on which a traverse rail 12 is supported by means of vertical rods 11 guided in the machine table 19. The rail 12 carries for each winding mechanism a screw-threaded traverse bar 14 which carries the thread guide 34 through the medium of a friction progress wheel 13. The yarn 41 is led from a swift 37 or from a spool 38 to the thread guide 34 whereby it is laid on the conical nose of the cop 5. The thread guide is reciprocated by the cams 10 and the rail 12 along the whole extent *a* (Fig. 5) of the nose, and it is advanced relative to the traverse bar 14 by the friction progress wheel 13 which for this purpose contacts with the body of the cop at the end of the traverse.

The mechanism and action so far described is well-known. According to the invention means are provided for reciprocating the thread guide independently of the traverse rail 12 a plurality of times during each traverse so as to lay the yarn on the nose in short, open, overlapping spirals. The mechanism employed for this purpose may be constructed in different ways. According to Figs. 1 to 6 the driving shaft 1 carries a cam 15 which rocks the lever arm 21 through the medium of a roller 16. The arm is pivoted at 18 to a bracket 20 on the table 19 and is controlled by a spring 22 which holds the roller 16 against the cam. A rod 23 connects the lever arm 21 with an arm 25 connected to a shaft 24, and a link 29 connects the arm 25 with an arm 25′ connected to a shaft 24′. The two shafts 24 and 24′ are mounted one above the other in brackets 28 surmounting the table 19. For each winding mechanism there is an upright

shackle 31 which is pivotally held by two arms 26 and 26′ mounted on the two shafts 24 and 24′ one on each. The rocking movements imparted by the cam 15 and the lever 21 to the shafts 24, 24′ causes the shackle 31 to be reciprocated horizontally in a plane at right angles to the traverse rail 12. The thread guide eye 34 is formed on a crank element which is rockingly mounted in an arm 36 of an angle piece carried by the friction progress wheel 33. One arm 35 of this crank element holds the eye 34, another arm 33 of the same being formed with a hook 32 which remains in engagement with the shackle 31 in all positions of the thread guide. The arms 35 and 33 are so arranged relative to each other that the movements of the shackle 31 causes the thread guide eye 34 to reciprocate in the direction of the arrow *b* (Fig. 1) and lay the yarn in short, open spirals on the nose of the cop. The stroke *c* (Fig. 5) of the guide and thus the angle α of the spiral coils may be varied by connecting the rod 23 to different points on the lever arm 21, the latter being provided with a plurality of apertures 17 for this purpose. The angle piece which carries the thread guide element is shown on a larger scale in Fig. 6. It has a forked arm 40 whereby it is guided on an upright rod 39. The latter allows the angle piece to follow the up and down movements of the wheel 13 but prevents it from rotating together with the same.

In order to obviate excessive accumulation of mechanisms on the machine table, the device may be modified, for instance as shown in Figs. 7 to 11. In this case the crank element 35, 33 which imparts the additional reciprocation to the thread guide 34 is held in an angle piece 36′ and operated by a shackle 31′ which is firmly secured to an upright rod 39′. The latter, which takes the place of the guide rod 39 of the previous construction, is formed with a downward extension 70 whereby it is rotatably held in a boss 71 secured to the traverse rail 12. A plate 72 on the rail holds the boss and also the traverse bar 14. A bracket 73 which is secured to the boss 71, carries a bearing 74 for the lower end of the rod extension 70. Between the boss 71 and the bearing 74, the rod extension 70 carries a vane 56 which cooperates with an eccentric or cam 55 mounted on a shaft 54 arranged under the machine table. The shaft 54, which has an eccentric for each winding mechanism, receives rotation from the shaft 1 through the medium of a round belt 52 and grooved pulleys 51 and 53. An arm 73′ on the bracket 73 and an arm 56′ on the vane 56, are connected by a spring 75 which maintains the vane in contact with the eccentric 55, the vane being therefore oscillated in the direction of the arrow *f* (Fig. 11). The oscillations of the vane are transmitted by the rod 39′ and the shackle 31′ to the crank element 35, 33 which thereby reciprocates the thread guide while following the up and down movements of the friction wheel 13.

If the yarn or the winding should be detrimentally affected by the angular movement of the thread guide, the device may be modified with a view to render the thread guide movement parallel with the winding spindle. For this purpose the arrangement shown in Figs. 12 to 17 may be resorted to. In this arrangement the shaft 54 and the vanes 56 are retained, but the latter are rotatably mounted on reduced ends 57 on bolts 58 which depend from the traverse rail 12. Connected to the vane 56 is a bifurcated arm 60 in the gap 59 of which one arm 35′ of a bell-crank is engaged. The bell-crank is pivoted at 61 to a bracket 62 depending from the traverse rail 12. The other arm 33′ of the bell-crank is bifurcated and provided with slots 63 for engagement with pins 64 at opposite sides of the traverse bar 14 which in this case is prolonged through the rail 12 and arranged to slide in a boss 65 in the latter. A spring 22′ bears against the arm 33′ and maintains the vane 56 in contact with the eccentric 55. Rocking movement in the direction of the arrow *e* will thus be imparted to the bell-crank 35′, 33′ which in its turn reciprocates the traverse bar 14 in longitudinal direction. The thread guide 34 is in this case held stationary relative to the friction wheel 13 in the usual manner.

We claim:

1. In a cop winding machine of the character described, the combination with a thread guide and with a traverse mechanism for said guide, of means for imparting additional reciprocation to the thread guide independently of the traverse mechanism and within shorter limits, substantially as and for the purpose set forth.

2. In a cop winding machine of the character described, the combination with a thread guide and with a traverse mechanism carrying said guide, of supporting means for said thread guide which are movable relative to the traverse mechanism, and a crank shaft for operating said supporting means so as to impart additional reciprocation to the thread guide independently of the traverse mechanism and within shorter limits, substantially as and for the purpose set forth.

3. In a cop winding machine of the character described, the combination with a thread guide and with a traverse mechanism including a traverse rail, of a spring-controlled bell-crank supported by said rail, a traverse bar carrying the thread guide, said traverse bar being supported by the bell-crank and guided in said rail, and means for operating said bell-crank so as to im-

part additional reciprocating movement to the traverse bar independently of the rail and within shorter limits, substantially as and for the purpose set forth.

4. The structure claimed in claim 3 wherein the operating means for the bell-crank consist of a cam shaft mounted in stationary supports, a vane pivoted to the traverse rail so as to remain in contact with a cam on said shaft and receive motion therefrom, and a forked arm connected to said vane and engaging the bell-crank for operating the latter.

5. In a cop winding machine of the character described, the combination with a traverse mechanism including a traverse bar and a friction progress wheel on said bar, of a crank element supported by said wheel, a thread guide connected to one arm of said crank element, and means for rocking said crank element so as to impart additional reciprocation to the thread guide independently of the traverse mechanism and within shorter limits.

6. In a cop winding machine of the character described, the combination with a traverse mechanism including a traverse bar and a friction progress wheel on said bar, of a crank element supported by said wheel, a thread guide connected to one arm of said crank element, a movable shackle adapted to remain in engagement with another arm of the crank element in all positions of the latter, and means for moving said shackle so as to impart additional reciprocation to the thread guide independently of the traverse mechanism and within shorter limits.

7. The structure claimed in claim 6 wherein the means for operating the shackle comprise a revolving cam, a lever arm supported on said cam so as to be rocked thereby, a pair of bell-cranks supporting the shackle, and links connecting said lever arm with the bell-cranks for transmitting motion to the shackle.

8. The structure claimed in claim 6 wherein the means for operating the shackle comprise a revolving cam, a lever arm supported on said cam so as to be rocked thereby, a pair of bell-cranks supporting the shackle, links connecting said lever arm with the bell-cranks for transmitting motion to the shackle, and means for varying the connecting point of the links to the lever arm so as to regulate the movement of the shackle.

9. The structure claimed in claim 6 wherein the means for operating the shackle comprise a rotatable rod arranged parallel with the traverse bar and supported by the traverse mechanism, the shackle being connected to said rod, a cam shaft supported independently of the traverse mechanism and a vane arranged on said rod so as to remain in contact with a cam on said shaft for moving the shackle.

10. The structure claimed in claim 6 wherein the means for operating the shackle comprise a rod holding the shackle, a boss supported by the traverse mechanism for holding said rod parallely with the traverse bar, a bracket connected to said boss, a bearing connected to said bracket and supporting the lower end of the rod, a vane connected to the rod, a revolving cam arranged so as to cooperate with said rod for rocking the same and the shackle, and a spring maintaining the vane in contact with the cam.

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