

F. A. GÜLICHER.
SPOOLING MACHINE.
APPLICATION FILED APR. 4, 1910.

1,020,414.

Patented Mar. 19, 1912.

3 SHEETS—SHEET 1.

Fig: 1

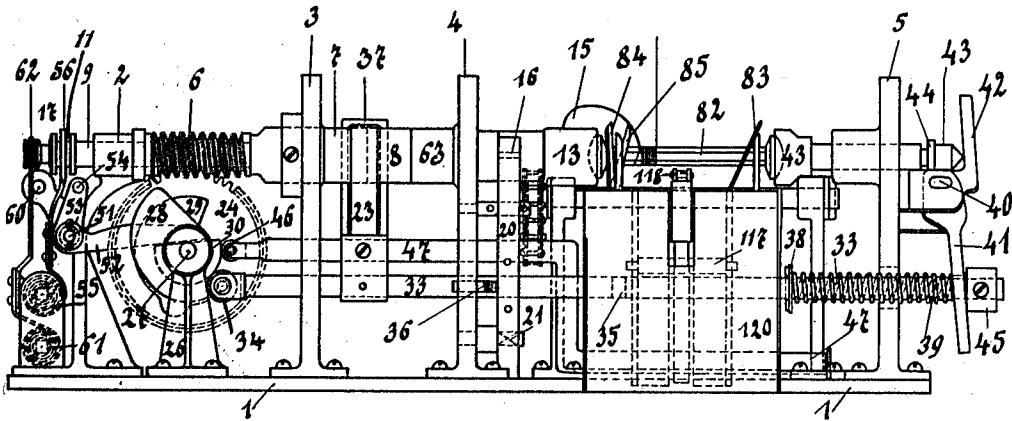


Fig: 2

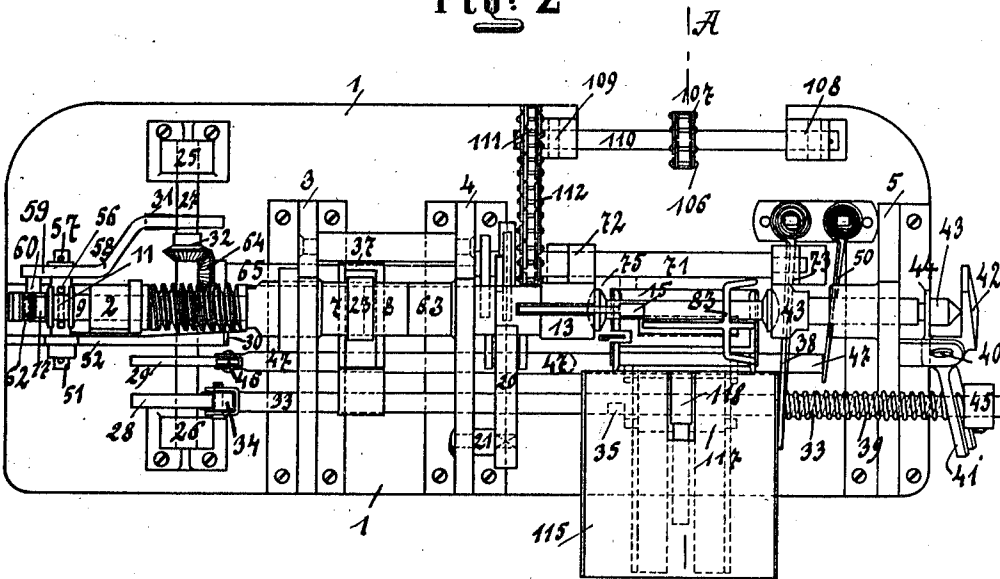
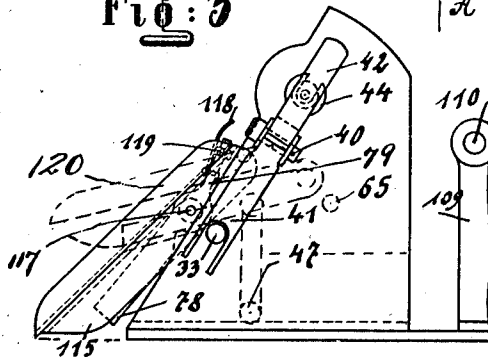


Fig: 3



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3 SHEETS—SHEET 2.

Fig. 4

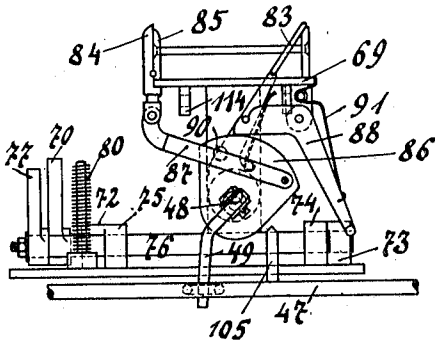


Fig. 5

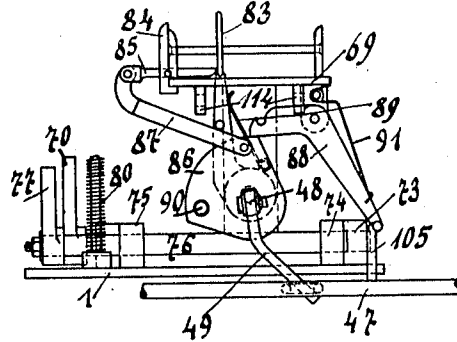


Fig. 6



Fig. 7

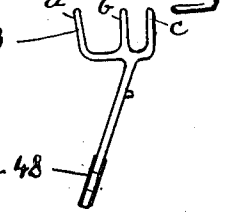
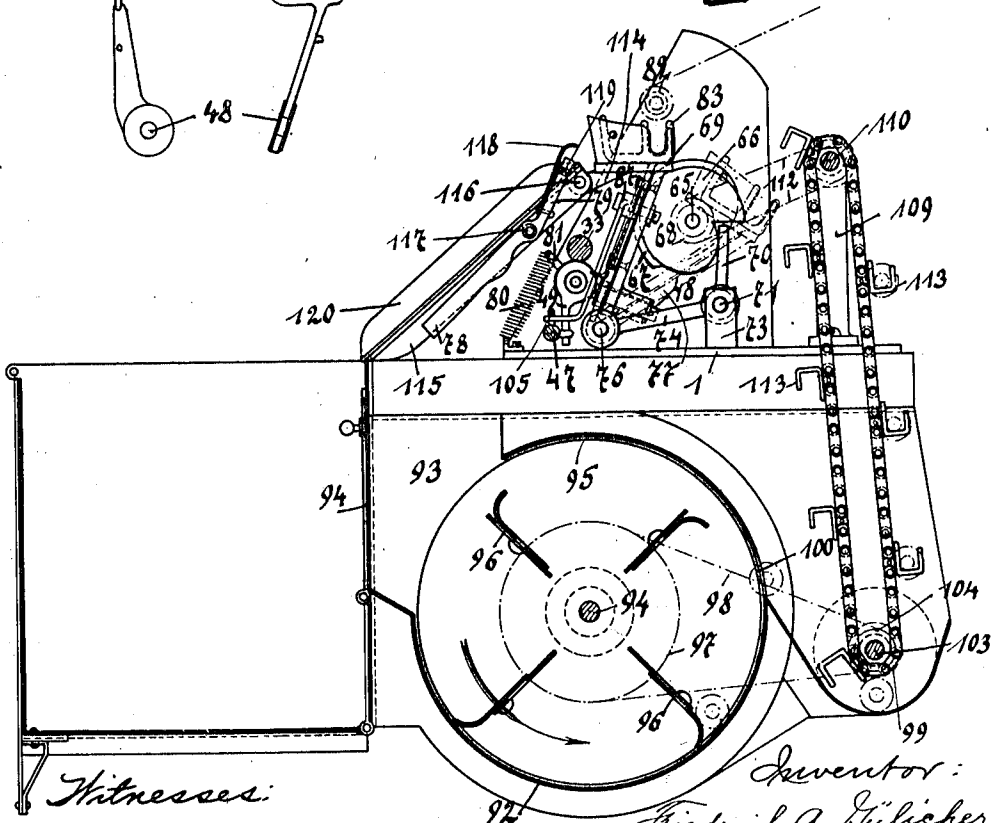


Fig. 8



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3 SHEETS—SHEET 3.

Fig. 9

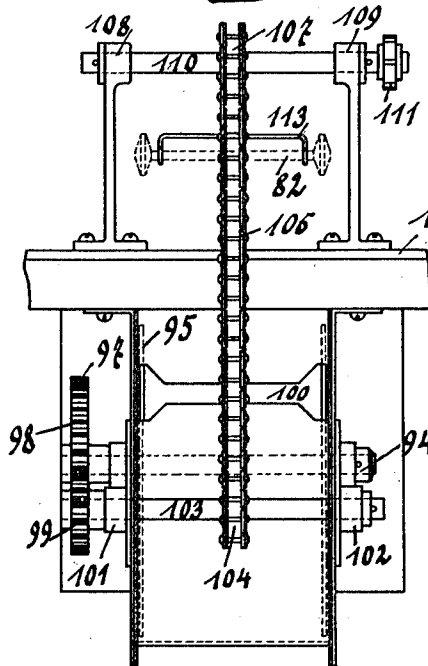


Fig. 10

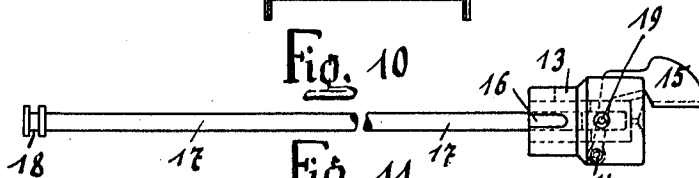


Fig. 11

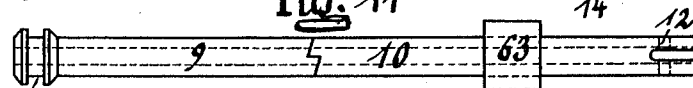


Fig. 12

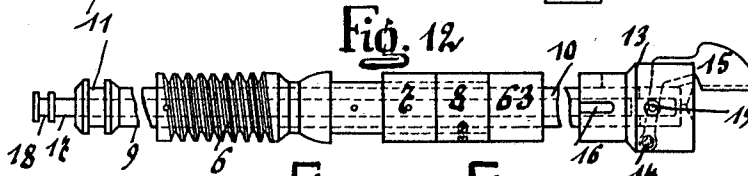
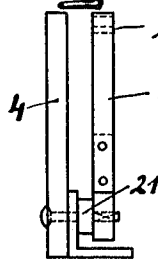


Fig. 13

Fig. 14



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UNITED STATES PATENT OFFICE.

FRIEDRICH ABRAHAM GÜLICHER, OF BARMEN-RITTERSHAUSEN, GERMANY.

SPOOLING-MACHINE.

1,020,414.

Specification of Letters Patent.

Patented Mar. 19, 1912.

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To all whom it may concern:

Be it known that I, FRIEDRICH ABRAHAM GÜLICHER, a subject of the Emperor of Germany, residing at Barmen-Rittershausen, in the Empire of Germany, have invented certain new and useful Improvements in Spooling-Machines, of which the following is a specification.

This invention relates to an automatic spooling machine for single or multiple spooling of silk, artificial silk, cotton, more particularly for ribbon weaving looms and plaiting machines.

The accompanying drawings show a construction of a machine in accordance with the invention.

In the said drawings, Figure 1 is a front elevation of that portion of the machine which is above the bed-plate, Fig. 2 a plan of Fig. 1, Fig. 3 an end elevation, seen from the right hand side of Fig. 1, showing in dotted lines the mechanism for discharging a fully wound spool, Figs. 4 and 5 show the spool feeding mechanism in front elevation in two positions, Figs. 6 and 7 show the forks for guiding the thread, Fig. 8 is a cross-section of the machine on the line A—A of Fig. 2 seen from the right hand side, Fig. 9 is a back view of the spool conveying device and Figs. 10–14 are detail views.

The spooling machine is mounted on a bed-plate 1 to which are rigidly secured brackets 2, 3, 4 and 5 which carry or support the spindles, rods, levers and the like hereinafter described.

The plate 1 further carries several small bearings for the spool conveying apparatus. Between the brackets 2 and 3 is rotatably mounted in bearings, a worm 6, on an extension of which to the right is mounted a loose pulley 7, as well as a fast pulley 8, (Fig. 12). The worm 6 is hollow and within it is disposed a hollow spindle 9 and made in two sections and provided with coupling teeth Figs. 11 and 12. At the left hand end, the spindle 9 is provided with a pair of collars forming a groove 11 with which the fork 56 engages for a purpose hereinafter more fully described.

To the spindle 10 is rigidly secured a pulley 63. The right hand end of the spindle 10 is slotted and also provided with a bolt

hole 12. To the same portion of the spindle 10 is rigidly secured a head 13 which is provided with a slot receiving the thread holder 15 rotatable about a pin 14, a groove 16 is also provided on the head 13. The head 13 is turned at its front face to form a spool holder. Within the spindle 9, 10 is arranged a spindle 17 provided at its left hand end with collars forming a groove 18, and on the right hand end adjustably connected, by means of a pin 19, to the thread holder 15 secured to the head 13 and formed as a bell crank lever. To the bracket 4 is secured on a bolt 21 Figs. 1, 2, 13 and 14, a flat spiral spring 20 provided with a projection 22 shaped to engage intermittently with the groove 16 of the head 13 and stop its rotation in such manner that the thread holder 15 takes up a definite position.

The worm 6 driven by a main driving belt 23 which passes over the pulley 8, drives in its turn a worm wheel 24 rigidly secured to a spindle 27 mounted in bearings 25 and 26. To the spindle 27 are further secured eccentric disks or cams 28, 29, 30 and 31, as well as a bevel wheel 32. The cam disk 28 is, in its turn, connected to the rod 33 carrying at the left hand end a roller 34. The rod 33 is provided with a groove 35 and a spline or key 36, and the belt shifter 37 is secured to it. Springs 38 and 39 are used for moving the rod 33. A lever 41 42 rotatable about a pin 40 is moved simultaneously with the rod 33 and engaging by means of its bifurcated end 41 therewith while another arm 42 forms a support for the spool holder 43 mounted in the bracket 5, and a third arm 44 is also bifurcated and engages with a groove provided at the rear end of the spool holder 43. To the rod 33 is also secured a collar 45 which engages the lever 41. The key or spline 36 is adapted to move as shown in Fig. 1, in front of the spring 20 or away from the same.

The cam disk 29, is adapted to strike a connecting rod 47 provided with a roller 46 and connecting the lever 49 pivoted about a pin 48 (Figs. 4–6) to the thread cutting apparatus. The spring 50 presses the connecting rod 47 in any position firmly against the cam 29. The cam 30 engages a branch of a bell-crank lever 52, 53, pivoted about a pin 51, the other arm 53 being provided with

a pin 54, adapted to engage a fork 56 secured to a helical spring 55 and engaging, in its turn, with the annular groove 11 of the spindle 9 and adapted to uncouple it from or to couple it to the spindle 10. The cam 31 drives a bell-crank lever 58, 59 pivoted about a pin 57, the arm 58 of which lever is engaged by the cam 31, while the arm 59 presses with its pin 60 against a fork 62 secured to a helical spring 61 and engaging in its turn with the annular groove 18 of the spindle 17 to press the thread holder 15 against the spool or to lift it off from the same.

The bevel wheel 32 engages with a corresponding toothed wheel 64 secured to the head of the spindle 65 supported in the brackets 3 and 4. On the spindle 65 are further mounted cam disks 66 and 67, as well as a chain wheel 68.

Owing to the movement of the two cams 66 and 67 (Fig. 8) in coöperation with rods and the like, the spool feeding apparatus 69 is raised and lowered by the cam 66, while the cam 67 imparts to it an oscillating movement for bringing in the empty spools. Under the cam disk 66 slides the lever 70 rigidly secured to the spindle 71 and adapted to raise and lower the spool feeder. The spindle 17 is supported in the two brackets 72 and 73, and to it are rigidly connected levers 74 and 75 carrying the spindle 76 of the spool feeder 69 (Figs. 4 and 5).

The connecting rod 33 when moved into its right hand end position allows the lever 78, 79 (Fig. 3) to engage with its portion 78, the groove 35.

The spring 38 is secured to a bolt or pin fixed on the bed plate 1 and pushes the rod 33 toward the left onto the eccentric 28 when the arm 78 of the lever 78, 79 is disengaged from the groove 35 of the rod 33 after the spool is fully wound. The spring 39 is secured to the rod 33, that is to say between the spring 38 and the fork-shaped lever 41. The double lever 41, 42 is loaded more or less by the spring 38, in accordance with the position of the rod 33, in order to limit the movement of the spool holder 43.

The spring 80 (Fig. 8) and the lever 81 prevent a jerky movement as the lever 77 which engages the cam 67, moves the spool feed device forward.

A lever 49 is slidably connected to the rod 47, the said lever being connected to the segment 86 which is attached to the shears 84, 85, by a lever 87.

The rod 47 has a pin 105 thereon and the fork 83 is locked by a device 88 released by the said pin, a spring 89 then moving the fork 83. A spring 91 acts on the locking hook 88. The fork is returned by the pin 90.

The conveyer device for the empty spools consists of a casing 92 with a front structure 93 through the opening 94 of which,

which can be closed, the empty spools are introduced. In the interior of the casing 92, to the spindle 94 is secured a wheel 95 with blades 96 adjustable in the radial direction of the wheel. The direction of rotation of the wheel 95 is shown by the arrow in the drawing and is effected by the chain wheel 97 mounted on the spindle 94, connected by the chain 98 to the chain wheel 99, the ratio between the two wheels in question being calculated in accordance with the working of the mechanism, the conveyer device being arranged in front of an opening. 100.

The position of the opening 100 on the casing 92 is such that during the rotation of the wheel 95, the blades 96 of which always assume such a position that, owing to their shape only one spool can fall from the opening 100 into the catching and conveying device, for the reason that the rear portion of each blade 96, when in front of the opening 100, forms an oblique plane and causes the other spools resting on the same, to roll backward to the center (Fig. 8).

The catching and conveying device consists of several spindles, chain wheels and corresponding chains. On the spindle 103 mounted in bearings 101 and 102, are mounted the chain wheels 99 for the movement of the wheel 95, and 104 for the conveyer device connected by a chain 106 to the chain wheel 107. The chain wheel 107 is mounted on the spindle 110 supported in bearings 108 and 109 and carrying more over the chain wheel 111 which in its turn is connected by means of the chain 112 to the chain wheel 68. The chain wheel 68 is mounted on the spindle 65. On the said chain 106 are mounted the collecting and conveying hooks 113 which eject the spool 82 taken up, into the spool feeder 69.

The thickness of winding of the spools is regulated by a device arranged on two supports 114 of the spool feeder 69 at the front portion. The bottom portion 115 is rotatably connected, by means of a bolt 116, to the spool feeder 69 and slides with its free end over the bed-plate 1 (Figs. 1-3 and 8).

On the part 115 is rotatably mounted about a pin 117 the lever 78, 79, the arm 79 of which is provided with a spring 118 which can be shifted by means of a screw 119. The lower lever arm 78 fits into the groove 35 of the connecting rod 33. Over the bottom portion 115 which comprises a pair of ribs is arranged a sliding track 120 on which the wound spools roll into the receiver. The lever 78, 79, is arranged between the two ribs 115, which act as runners, bearing on the rod 33 during the sliding motion of the part 120, 115.

The arrangement of the above-described mechanism will be clearly seen from Fig. 3.

The operation of the automatic spooling

machine is as follows:—The machine is driven by the main belt 23 leading from the pulley of the source of power through the table and the bed-plate 1 to the machine.

5 The empty spools are thrown into the drum-like receiver 92, the width of which is made to suit the length of the spools, and guided by the wheel 95 rotatably mounted therein. Owing to the construction of the single

10 buckets, only one spool at a time is brought in front of the opening 100 of the receiver whence it falls into the box provided with the catching and conveying device 106 by means of which the said spool is supplied

15 to the spool feeder 69. The spool feeder 69 brings the spool into the spool holder 43. After the spool feeder, owing to a corresponding movement of the cam 67 and the lever 77 on the spindle 76 has made an oscillation to the right (Fig. 8) for receiving an empty spool and thereupon returned to its original position, the driving belt 23 is pushed over by the cam 28, rod 33 and belt shifter 37, to the fast pulley 63. In

20 the meantime, the connecting rod 33 has been pushed by the cam 28 to the right into the end position, in which a lever 78, 79 engages with its lower arm 78 with the groove 35, the key or spline 36 mounted on the rod 33, being simultaneously withdrawn from the spring 20 resting on it, the projection 22 of which spring engages then with the groove 16 and stops the head 13 in such manner that the thread holder 15 is

25 above the spool. When the spool feeder moves forward, the cam disk 28 releases the rod 33, which enables the spool holder 43 to move back, so that the completely wound spool can be ejected, and a new empty spool

30 82 fixed. The cam disk 29 and spring 50 move the connecting rod 47 forward and backward, and in that way, after the insertion of the empty spool 82, the fork 83 brings the thread under the thread holder 15 between the branches or blades 84 and 85 Figs. 4 and 5 of the shears, and the thread is cut off at the next moment. The fork 83 is provided with three fingers, *a*, *b*, *c*, (see Fig. 7 from left to right) which effect

35 in common the conveying of the thread between the shears blades 84, 85 and under the thread holder 15, in such a manner that the said thread cannot take any other course. The fingers *a* and *b* have for their purpose to

40 bring the thread between the blades 84, 85 whereas the fingers *b* and *c* are intended to bring the thread under the thread holder 15. This operation takes place immediately after the wound spool has been discharged

45 and after the empty spool has been set in place by the spool feeder 69. As soon as a spool 82 has been wound to a sufficient extent, it disengages the locking lever 78 79 from the notch 35 of the rod 33, whereby

50 the latter is pushed to the left.

The movable spring 118 comes into contact with the wound spool 82, the spring 118 being fixed to the lever arm 79 and its movement is transmitted to the lever 78, 79 or disengages the lever arm 78 from the

55 groove 35 of the rod 33 when the spool 82 is fully wound, this being regulated by the set screw 119 according to the winding thickness to be obtained. In that way, first of all the belt 23 is shifted to the pulley 8 driving the

60 exchange device, and consequently the spool holders 13 and 43 are released. In that way, the spool feeder 69 is brought with an empty spool between the spool holders, and ejects the wound spool. The ejected wound

65 spool remains until the connecting thread is cut off in front of the spool feeder, on the oblique discharge groove 120. The wound spool then rolls down the track 120 into the receiver. The spool feeder 69 is lowered

70 and moved back empty. A new empty spool is placed into it by the conveyer chain 106. The cam 28 then moves the rod 33 to the right, to such an extent that the locking lever 78 79 springs into its groove 35

75 and holds it fast. In that way, the belt 23 is pushed onto the pulley 63, and the thread is wound on the empty spool. The thread holder 15 holds fast the thread until the latter is able to keep automatically on the

80 spool. As soon as the belt 23 has been brought completely on the pulley 63, the exchange device is again in its position of rest. The exchanging is effected during one

85 revolution of the worm wheel 24. The lever 100 49 adapted to be moved by the rod 47 rotates in its movement a disk segment 86 connected by means of a lever 87 to the rotatable blade 85 of shears 84 and 85. When the rod 47 is moved to the right, the shears

90 will be opened. A pin 105 is provided on the rod 47 for releasing a spring locking device 88 of the fork 83 which will then be oscillated to the left by a spring 89 and bring the thread under the thread holder

95 15, or between the blades of the shears 84 85. During the return of the rod 47, the parts 84 85 of the shears are first closed, and the thread is cut. The fork 83 is thereupon forced back by a pin 90, until owing to the

100 action of the spring 91, it engages with the locking hook 88. The shears 84 85 will not however cut the thread, until the stopped thread holder 15 is holding the thread fast on the new empty spool. When the belt

105 23 is resting on one-half of the pulley 8, it no longer has the power to keep the whole device working, and the bell crank lever 52, 53 is released by the cam 30, and the spindle 9 (mounted in the worm 6 and

110 coupled to the latter by a groove and spline in such manner that it must participate in the rotation, but is adjustable in the longitudinal direction to such an extent that the coupling teeth can be brought out of

115 130

engagement), will be coupled by the spring 61 and the fork 62 to the spindle 10. The coupling teeth remain in engagement until the driving belt 23 has passed from the pulley 8 to the pulley 63.

For stopping the whole machine, the loose pulley 7 is used.

For guiding the thread onto the spool any known traverse device can be used. 10 For the sake of simplicity and cheapness it is preferable that the traverse mechanism for a certain number of spool apparatus should be actuated in common by the main driving shaft.

15 The thread for supplying the spool is obtained from the well-known wound spools or the like, as delivered from the spinning mills.

What I claim as my invention and desire 20 to secure by Letters Patent is:—

1. A spooling machine comprising, a receiver for empty spools, means for arranging said spools in order therein, spool holders, means for rotating the latter, a device 25 for feeding said spools to said holders, a conveyer for supplying spools to said device, comprising an endless chain provided with spool-receiving hooks adapted to discharge empty spools in succession into the spool-feeding devices, means for imparting up 30 and down and forward and backward movements to the said spool-feeding device, means for releasing each spool from said holders when it is fully wound, means for 35 discharging said fully wound spool and a receiver into which the latter is discharged.

2. A spooling machine comprising, a receiver for empty spools, means for arranging said spools in order therein, spool holders, a device for feeding said spools to said holders, a conveyer for moving said spools to said device, comprising an endless chain 40 provided with spool-receiving hooks adapted to discharge empty spools in succession 45 into the spool-feeding device, means for imparting up and down and forward and backward movements to the said spool-feeding device, means for rotating said holders, means for stopping said holders and for releasing each spool when it is fully wound, 50 means for re-starting said holders when a fresh spool is inserted, means for removing

the fully wound spool and a receiver into which the latter is removed.

3. A spooling machine comprising, a receiver for empty spools, means for arranging said spools in order therein, spool holders, a device for feeding said spools to said holders, a conveyer for moving said spools to said device, comprising an endless chain 60 provided with spool-receiving hooks adapted to discharge empty spools in succession into the spool-feeding device, means for imparting up and down and forward and backward movements to the said spool-feeding 65 ing device, means for rotating said holders, a device for holding the thread on the empty spool, means for stopping said holders, means for cutting the thread and for releasing each spool when it is fully wound, 70 means for re-starting said holders when a fresh spool is inserted, means for removing the fully wound spool and a receiver into which the latter is removed.

4. A spooling machine comprising, a receiver for empty spools, means for arranging said spools in order therein, spool holders, means for rotating said holders to wind a spool, mechanism operating to stop said holders when said spool is fully wound, an 80 exchanging device operated when said holders are stopped and comprising a spool feed device to eject a wound spool from said holders and to place an empty spool therein, a thread holder, means for cutting the 85 thread of the wound spool, means for re-starting the spool holders, means for conveying the spools from the receiver to the exchanging device, comprising an endless chain provided with spool-receiving hooks 90 adapted to discharge empty spools in succession into the spool-feeding device, means for imparting up and down and forward and backward movements to the said spool-feeding device, a receiver for the fully 95 wound spools and means for conveying the latter thereto.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

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Witnesses:

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OTTO KÖNIG.