

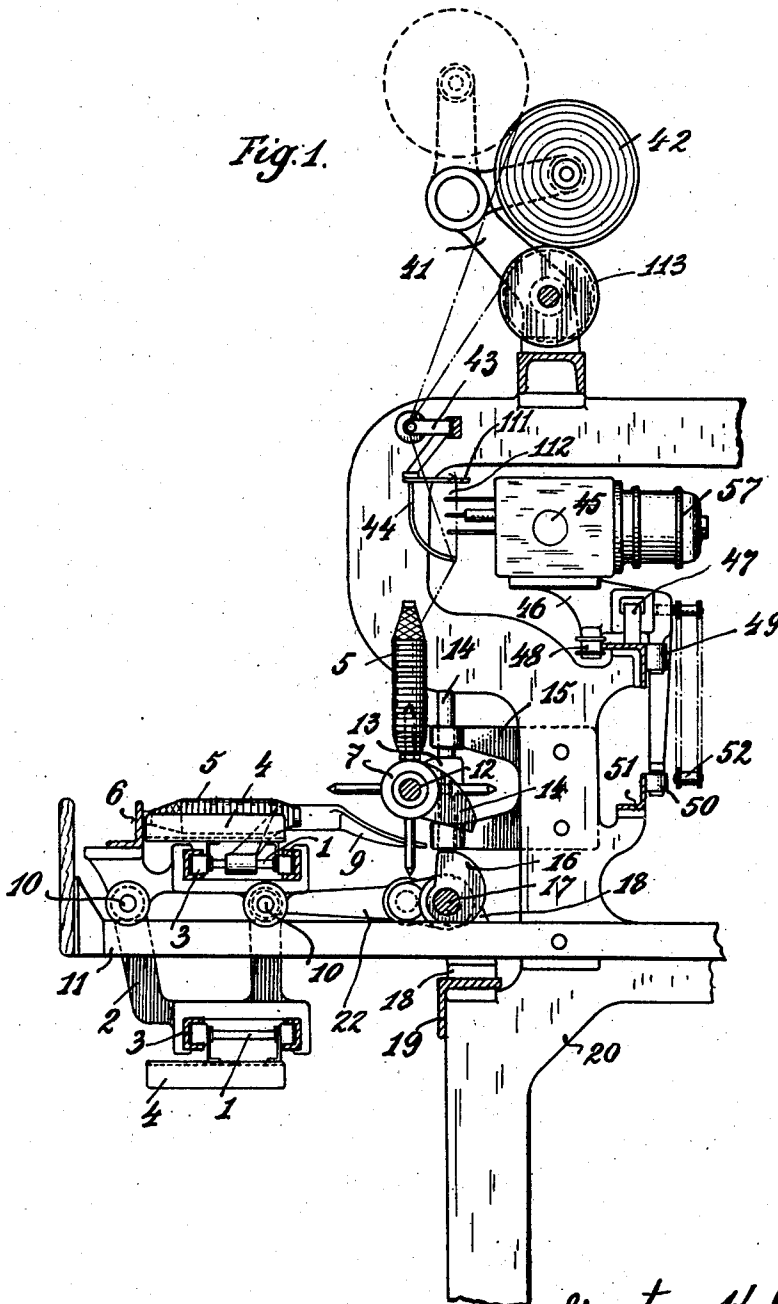
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G. KAHLISCH
WINDING MACHINE

2,208,930

Filed June 12, 1937

5 Sheets-Sheet 1



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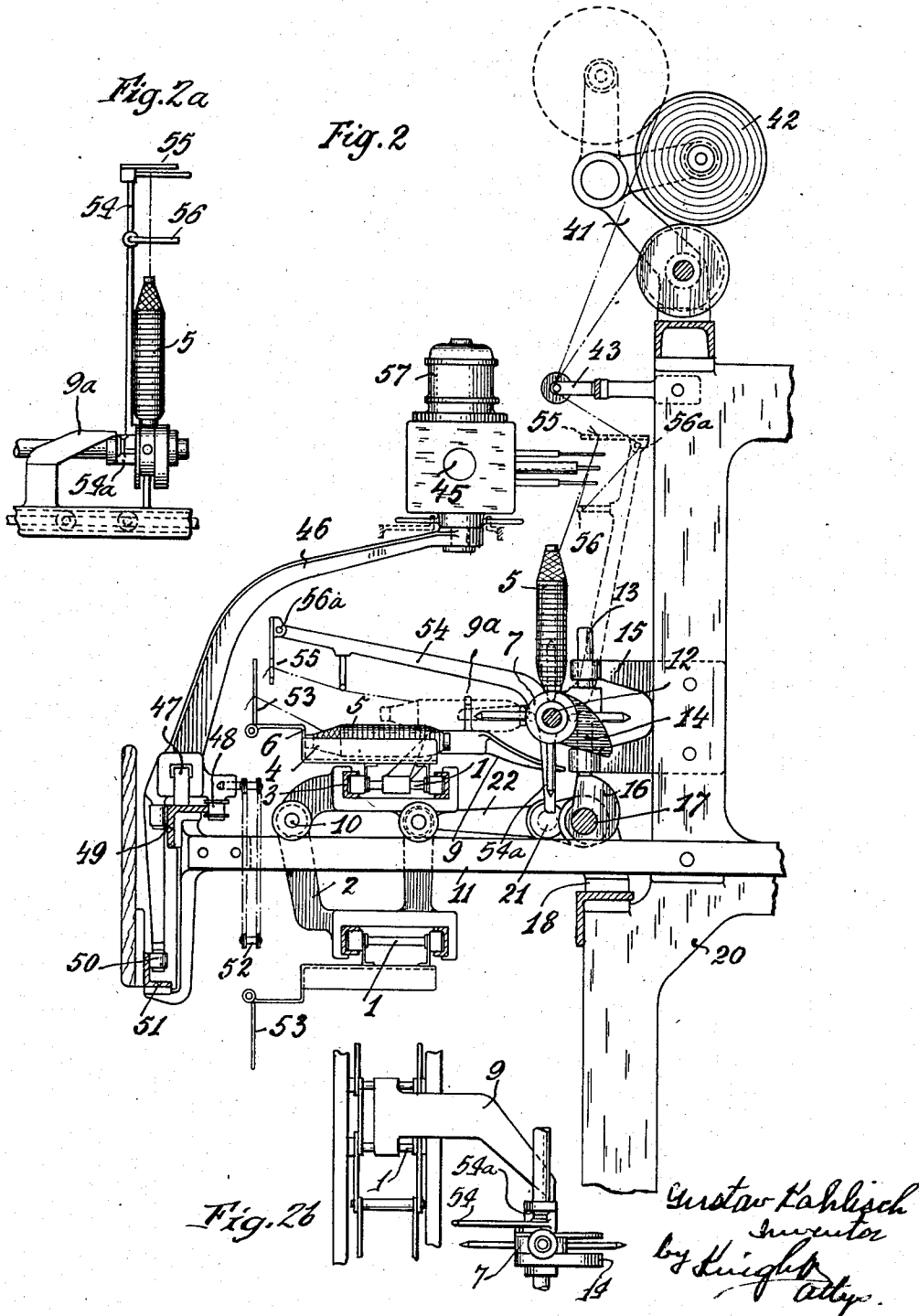
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WINDING MACHINE

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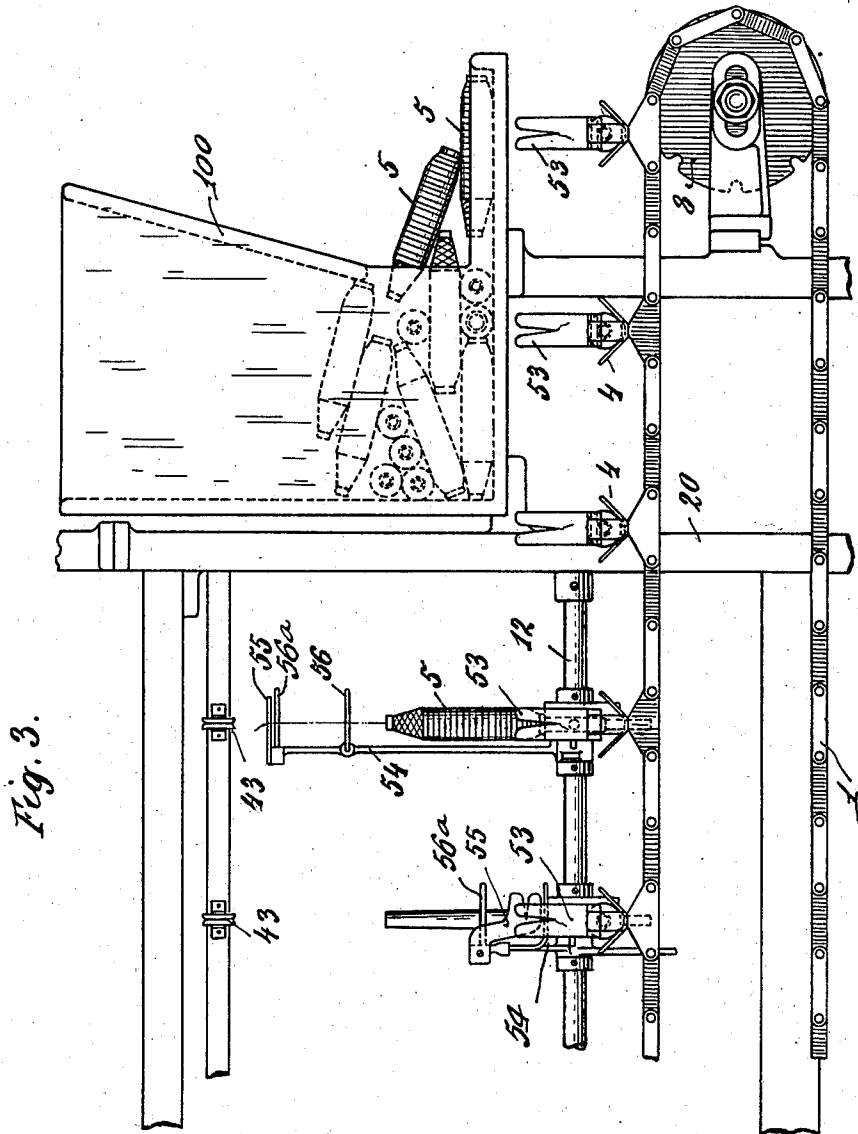
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WINDING MACHINE

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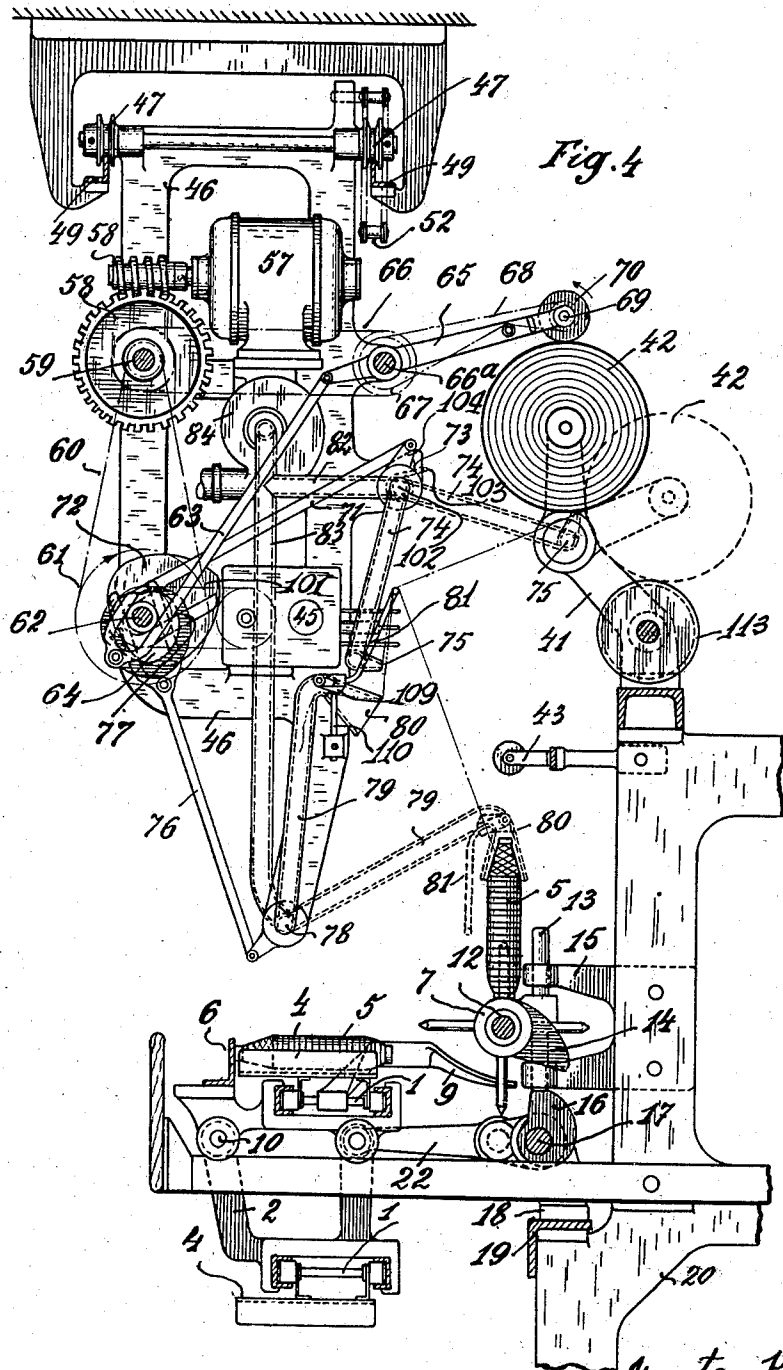
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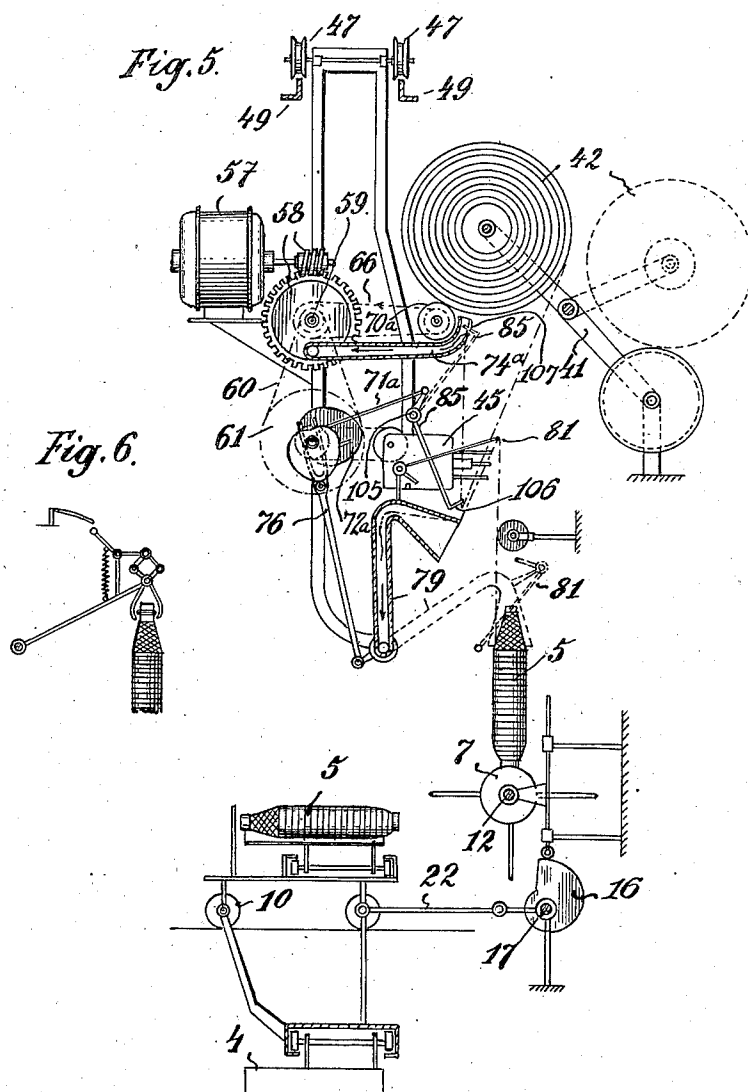
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WINDING MACHINE

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,208,930

WINDING MACHINE

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4 Claims. (Cl. 242—35.6)

The patent specifications 2,010,465 and 2,052,895 describe and claim winding machines with stationary winding stations having mechanism for feeding the skewers or holders with full creel or paying-off bobbins, the full creel bobbins being conveyed, by means of an endless conveyor or the like, opposite the holders or skewers, which are positioned in a plane above the conveyor belt and parallel thereto, and the creel bobbins being skewed in groups. According to the said specifications the conveyor belt and the holders are made shiftable so as to be brought in alignment for transferring the bobbins, moreover the conveyor is made displaceable towards the holders and the shifting and displacing mechanism is so formed that the conveyor belt and the holders are automatically mutually aligned and the bobbins are then transferred to the holders by displacing the conveyor belt. The design and operation of such devices has been considerably simplified thereby and the manufacturing costs have been reduced, achieving at the same time a very careful handling of the bobbins.

It is the object of my present invention to simplify the operation and attendance of such winding machines. To this end I use a travelling thread tying mechanism, known per se, and I place the leading end of the yarn of each creel bobbin, at the conveyor charging stations, in such a position at the front end of the bobbin lying on the conveyor, that at the winding station these ends can be easily moved into the path of the travelling thread tying mechanism, i. e. by hand or automatically. Hereby it is further rendered possible to simplify the tying of the yarn ends of creel bobbins automatically conveyed to the winding stations, with the tail-ends of the spools wound before, by associating with the conveying means additional receiving means into which the said yarn end can be placed at the conveyor charging station. In addition, a lever arm may be provided, at the front end of which a thread catching device is so disposed that the leading yarn end can be automatically swung into the path of the travelling thread tying mechanism when changing the bobbins. Hereby it is also possible to so form the transfer device for the yarn ends which moves these ends into the preparatory position for the thread tying mechanism, that the leading ends of the creel bobbins are seized directly, while the tail-ends of the wound bobbins are seized by suction, after preliminary finding, then moved into the path of the thread tying mechanism, either directly by means of the suction tubes or by means of thread

catchers associated therewith. The transfer device for the leading yarn end of the creel bobbin may be a suction tube with an enlarged end in the form of a bell, so that it can be put over the end of the bobbin the thread of which is to be seized. The suction tubes may have associated with them thread catchers provided with an eyelet which can be moved into a position such that the thread will be sucked through the eyelet.

The invention will be better understood by reference to the following detailed description in connection with the accompanying drawings, showing by way of example, and schematically, some embodiments of my novel device. Identical reference numerals have been used for parts having the same function as the corresponding parts of patent specification 2,052,895. In the drawings

Fig. 1 is a vertical section of a winding machine as shown in Patent 2,052,895, including, however, a travelling knotter;

Fig. 2 is a vertical section of a winding machine similar to Fig. 1, showing a differently mounted knotter and additional means for automatically swinging the leading yarn end of the creel bobbin into the path of the knotter;

Fig. 2a is a detail view in front elevation of cam 9a and associated parts;

Fig. 2b is a detail view in plan of cam 9 and associated parts;

Fig. 3 is a front elevation of the machine shown in Fig. 2 with parts omitted;

Fig. 4 is a vertical section of a winding machine showing suction transfer devices for automatically finding the thread ends and for automatically feeding these ends to the knotter;

Fig. 5 is a vertical section of a machine similar to Fig. 4, but in a schematic view and with a modified construction of the automatic thread finding and transfer device for the tail-end of the winding bobbin.

Fig. 6 is a diagrammatic view of a modified form of transfer device.

Referring now to Figs. 1 to 3 of the drawings, an endless conveyor, such as chain 1, a belt or the like, is mounted in a movable frame in the same manner as described in Patent 2,052,895. This frame may consist of brackets 2 and U-shaped iron bars 3. The bars 3 serve at the same time for guiding lengthwise the endless chain 1 and are rigidly connected with the brackets 2. Cradles 4 carrying the creel bobbins 5 are mounted on the endless chain for each winding station. Moreover, angle irons 6 are mounted on the brackets of the frame 2, 3 which angle irons are adjustable on the frame 2, 3

according to the length of the creel bobbins. The angle iron 6 acts as a counter-support or pressure member when placing the creel bobbins 5 on the spindles of the bobbin holder 7. The endless chain 1 may be driven by chain wheels 8 (Fig. 3), in the manner known per se. The brackets 2 of the movable conveyor frame or carriage are guided by means of rollers 10 running on rails 11 which are mounted on the machine frame. The holders 7 for the creel bobbins are disposed for a plurality of winding stations on a common rod 12 which is rotatably mounted in bearings 13. These bearings 13 in turn are fixed on rods 14 which are displaceable lengthwise in holders 15 secured to the machine frame. The rods 14 rest with their lower end faces on cam discs 16 which are mounted for the corresponding number of winding stations on a common shaft 17 and are rotatable with this shaft, which is journaled in bearings 18. The bearings 18 are mounted on angle irons 19 of the machine frame 20. Mounted on the shaft 17 of the cam discs 16 are cranks 21 which are in an articulated connection with the movable frame or carriage 2, 3 by means of links or connecting bars 22. The shaft 17 is preferably automatically driven and controlled, and the rods 14, the bearings 13 mounted thereon, and the rod 12 with the creel bobbin holders 7, carried by the bearings 13, are thus raised and lowered in the same manner as described in the patent specification 2,052,895. Hence, when the mechanism is in the position shown in Fig. 1 the endless conveyor 1 with its cradles 4 can be displaced lengthwise below the bobbins 5 placed on the holder 7 and moreover, due to the movable arrangement of the conveyor 1 and its frame 2, 3 the bobbins can be transferred to the spindles or skewers of the holder 7, with the aid of the bar 6, the bobbins being guided over their whole length in their cradles 4. Carriers 41 for the winding bobbins 42 (which are not shown in the drawings of the above mentioned earlier specification 2,052,895) together with the appertaining yarn tensioners 43 have been shown in the drawings of the present specification, the tensioners being illustrated in the manner required for the operation according to my present invention.

Referring to Fig. 1, one of the usual thread guiding devices 44 positioned in the path of the travelling knotter 45, formed integral with its motor 57, is associated with the thread tensioners 43. The knotter support 46 is guided on the machine frame 20 by means of rollers 47, 48, 50 bearing against rails 49 and 51 and is automatically displaceable by means of the chain 52. The knotter can be guided in various relations to the bank of skewers, for example according to Fig. 1 behind the bank, according to Fig. 2 in front of the bank, and according to Figs. 4 and 5 above the bank. Figs. 2 and 3 show notched holders 53 which are hingedly connected to the bar 6, and thread catchers 55, 56, 56a operated by means of arms 54. The arm 54 may be in the form of two-armed levers rockably mounted on rod 12 and having downwardly extending arms 54a engageable by the slanting face of a cam 9 fixed to the conveyor, to swing the thread catchers from the full line position of Fig. 2 to the dotted line position. This is the same cam which engages the downwardly directed peg of the bobbin holder 7 to turn the bobbin holder a quarter revolution and thus bring the new bobbin into paying off position. The thread catchers 75 drop back to the full line position as soon as the

cam 9 has passed, being started by a second cam 9a fixed to the support of cam 9. Instead of the cam 9 an axially displaceable cam on the bobbin carrier may engage the lever 54 to swing it up, then release it. A hopper 100 at the conveyor 5 charging station holds a supply of full bobbins in readiness to be laid in the cradles 4 of the conveyor by the attendant.

The machines shown in Figs. 1 to 3 are operated in the following manner: When a new supply of creel bobbins is to be prepared for mounting in the bobbin holders, the conveyor, standing in the position shown in Fig. 1, is operated to carry the bobbin cradles 4 successively past the charging point, which is shown at the right in Fig. 3. The attendant lays a bobbin in each cradle as it goes by, at the same time laying the leading end of the bobbin yarn in position to be readily transferred to the knotter at a later stage in the operation. In the machine shown in Figs. 2 and 3 the leading end is laid in the notched holder 53, stretched taut so as to be in position to be grasped by the automatic transfer device comprising the thread catchers 55, 56, 56a. When a full complement of bobbins stands opposite the row of bobbin holders the shaft 17 is rotated and the bobbins are automatically skewed. That is to say, the rods 14 drop off the high part of cams 16 and the forwardly directed pegs of the bobbin holders come into alignment with the bobbins on cradles 4. Continued rotation of the shaft 17 draws the conveyor frame to the right and skewers the bobbins. In Fig. 1 there is a cam 9 which engages the downwardly directed pegs of the bobbin holders as the conveyor travels and turns the bobbin holders a quarter revolution, swinging the newly skewed bobbins up to paying off position and discharging the old bobbin tubes in the manner described in Patent No. 2,052,895. The trailing end of the winding bobbin 42, which has been swung up to the lotted line inoperative position, and the leading end of the new bobbin are grasped together and drawn around the guide finger 44 and engaged in catch 111, the intermediate span 112 standing across the path of knotter 45. As the knotter travels along the bank of winding stations it ties the ends of yarn and the winding proceeds by throwing the winding package 42 into contact with the driving roll 113.

In Fig. 2 the step of bringing up the leading end of the new bobbin to the knotter is performed automatically by the thread catchers 55, 56, 56a. The cam 9, in this case, has the additional function of swinging up the arms 54 when the thread catchers have engaged the span of thread extending from the bobbin to the holder 53. It is then only necessary for the attendant to grasp the trailing end of the winding package and pull it around fingers 56a and 56, catching it in the thread catcher 55 beside the leading end of the yarn of the new bobbin. The span of threads extending between finger 56 and catch 55 lies across the path of the knotter 45. After the knotter has passed each winding station the cam 9a engages the arm 54a of the lever 54 appertaining to that station and tilts the lever sufficiently so that it drops into the full line position of Fig. 2.

In the embodiments shown in Figs. 4 and 5 automatically operating thread finders are connected with the travelling knotter 45, in the manner known per se. These thread finders are energized from the motor 57 which is disposed in the movable support 46 separately from the 75

knotter, by means of a worm drive 58 acting on a shaft 59. The knotter is driven from shaft 59 through chain 60, sprocket wheel 61 on shaft 62, and chain 101.

5 For finding the yarn end of the winding bobbin a roller 70 is used to rotate the winding bobbin 42 backward after it has been disengaged from its driving means. The roller 70 is driven directly (Fig. 5) by means of the chain 66, or with
10 the aid of a further chain 68 (Fig. 4) and is mounted on a shaft 69, at one end of the two-armed lever 65. The lever 65 is rockably mounted on a shaft 66a and is operated from a cam 64 on shaft 62 by means of a rod 63 jointed to its opposite end. In Fig. 4 a suction tube 74 is
15 pivotally mounted at 102 on the frame 46 and communicates with a tube 82 which is exhausted by a pump 84. The tube 74 is normally held in the full line position by a coil spring 103, but
20 can be swung up to the dotted line position by a link 71 articulated to an arm 104 on the tube and actuated by a cam 72 on shaft 62. In the dotted line position the mouth of the tube 74 is pressed against the raised winding package 42,
25 while in the full line position it has transferred the trailing end of yarn from the winding package to position to be acted upon by the knotter 45. In Fig. 5 the suction tube 74a is fixed in such a position that its mouth stands in proximity to the winding package when the latter is turned over against the reversing roller 70a. The roller 70a is driven by a chain 66 from shaft
30 59, which is rotated through a worm drive 58 by motor 57. A thread catcher 85 is pivoted at 105 and carries at its extremity an eyelet 106 adapted to pass into a slot 107 in tube 74a when the thread catcher moves into its dotted line position. The eyelet is thus in position for the thread to be sucked through it by the suction tube 74a. The thread catcher 85 is operated by
35 a cam 72a acting through a link 71a articulated to an arm 104a of the thread catcher.

The transfer device for the leading yarn end of the creel bobbin, in both Figs. 4 and 5, differs from the known devices of this kind in that
45 the suction tube 79 is enlarged to the form of a funnel at its front end, which is put over the conical portion of the creel bobbin 5 and thus over the leading yarn end of the creel bobbin 5. The suction tube 79 is pivoted at 78 to the end of a tube 83 which is exhausted by motor 84. By a link 76 articulated to an arm 108 on tube 79 and actuated by a cam 77 on shaft 62, the tube
50 79 can be swung from its full line position to its dotted line position to seize the leading yarn end of the bobbin 5. Pivoted near the end of tube 79 is a yarn catcher 81. A cam arm 109 fixed to the pivot shaft of the yarn catcher 81 is adapted to engage a fixed rod 110 when the tube
55 79 swings up to the knotter, to tilt the yarn catcher 81 up into the position shown in Fig. 4, where the yarn is stretched across the path of the knotter.

Instead of the suction funnel it is also possible
65 to provide a mechanical gripper, according to Fig. 6, without exceeding the scope of my present invention by such a modification, or to apply any other known means which are equivalent as to their function or effect to those described in
70 this specification.

In the operation of the machines shown in Figs. 4 and 5 the charging of the conveyor and skewering of the bobbins is the same as in Fig. 1.

When the bobbin holders have been turned a
75 quarter revolution by cam 9 to bring the new

bobbins into upright position, the knotter travels along the bank of winding stations, stopping at each station in position to swing the mouth 80 of tube 79 over the end of the bobbin 5. The leading end of the bobbin is sucked into the tube 5 and the tube is then swung by cam 77 from its dotted line position to its full line position, the thread catcher 81 being thrown up by engagement of cam 109 with rod 110 to throw the yarn
10 into the range of the knotter 45. Prior to the upward swing of tube 79 the roller 70 and the tube 74 have been brought into engagement with the raised winding package 42 and this package revolved backward sufficiently to allow the trailing end of yarn to be sucked into the mouth 15 of tube 74. The tube 74 has also been swung down to its full line position, drawing the trailing end of yarn after it in position to be engaged by the finger 81 when the tube 79 is thrown up. When the knotter has tied the ends together
20 and the roller 70 has been raised from the package 42, the knotter passes on to the next winding station and the package 42 is brought into contact with its winding roller 113. In all instances the creel bobbins 5 are conveyed to
25 the winding stations with their projecting yarn end cleared and brought into position in the charging station of the feeding or conveyor device. The thread end of the winding bobbins 42 is put into the path of the travelling thread tying
30 mechanism 45 by hand (Figs. 1-3) or automatically (Figs. 4-6).

In the same manner the yarn end projecting from the creel bobbin 5 is put into the path of the tying mechanism either by hand (Fig. 1) or
35 automatically (Figs. 2-6), i. e. either during the bobbin changing operation (Figs. 2 and 3) or following this operation (Figs. 4-6).

Having thus described my invention what I
40 claim is:

1. A winding machine comprising a plurality of supply bobbin holders, a conveyor for bringing full bobbins to said holders, a travelling knotter adapted to be moved to each winding
45 station in turn to knot together the trailing yarn end of the winding bobbin and the leading end of the full bobbin, means on said conveyor to hold the leading end of each full bobbin in position to be readily grasped, and a transfer device comprising a swinging arm adapted to pick
50 up the leading end from said holding means and transfer it to a position to be acted upon by said knotter.

2. A winding machine comprising a plurality of supply bobbin holders, a conveyor for bringing full bobbins to said holders, a travelling knotter adapted to be moved to each winding
55 station in turn to knot together the trailing yarn end of the winding bobbin and the leading end of the full bobbin, and transfer means for moving the leading end of a full bobbin to position to be acted upon by said knotter comprising a suction tube having a bell shaped mouth to fit
60 over the end of a full bobbin to seize the leading end of yarn thereon, said tube being pivoted to swing said leading end to position to be acted upon by said knotter.

3. A winding machine comprising a plurality of supply bobbin holders, a conveyor for bringing full bobbins to said holders, a travelling knotter
70 adapted to be moved to each winding station in turn to knot together the trailing yarn end of the winding bobbin and the leading end of the full bobbin, and transfer means comprising two pivotally mounted suction tubes, one adapted to 75

find the trailing end of yarn on the winding bobbin and the other adapted to seize the leading end of yarn of a full bobbin, both tubes being adapted to swing their ends to position to be acted upon by said knotter.

4. In a device for finding a yarn end on a wound package and transferring the same to a

knotter, a suction tube adapted to suck the yarn end from the wound package, a transfer arm having an eyelet, and means juxtaposing said suction tube and transfer arm to bring the tube and eyelet into axial alignment.

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