March 10, 1942. J. W. MILLER ET AL 2,275,544

APPARATUS FOR WINDING SKEINS OF YARN

Filed April 2, 1940 2 Sheets-Sheet 1

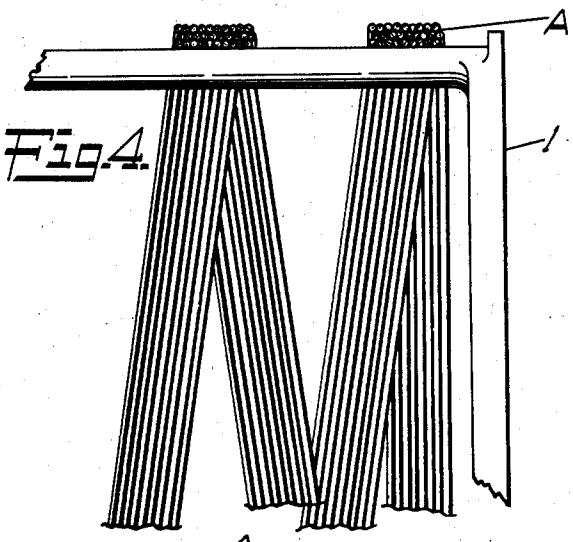


Fig. 4.

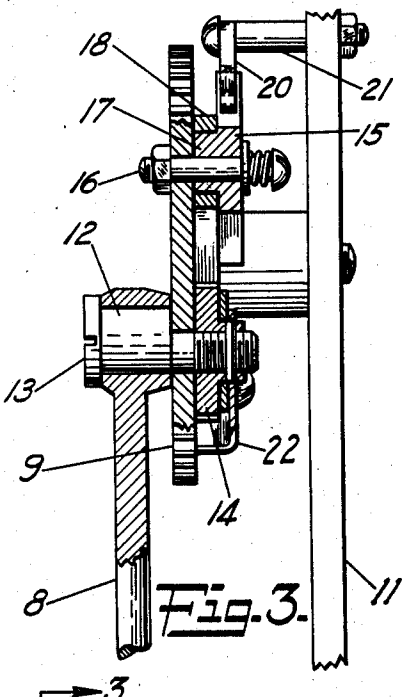


Fig. 3.

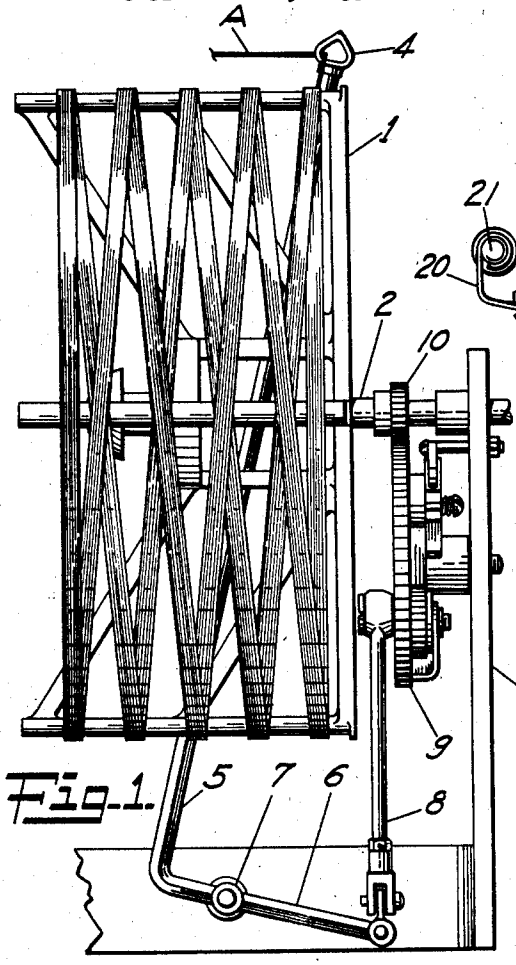


Fig. 1.

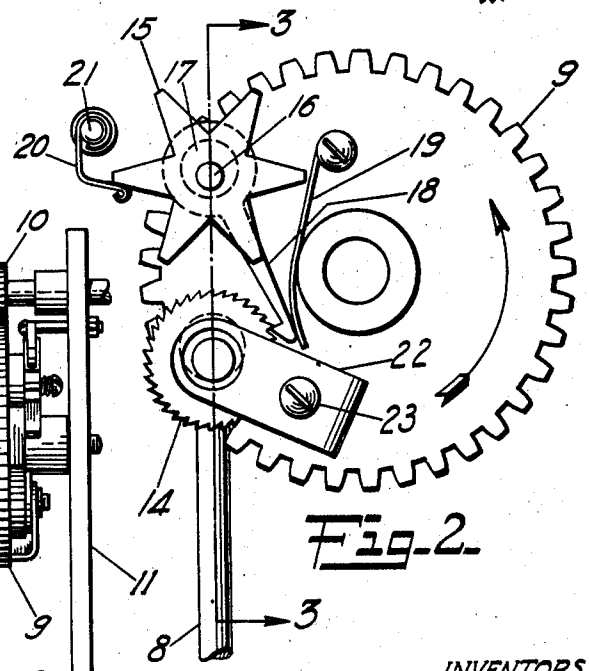


Fig. 2.

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APPARATUS FOR WINDING SKEINS OF YARN

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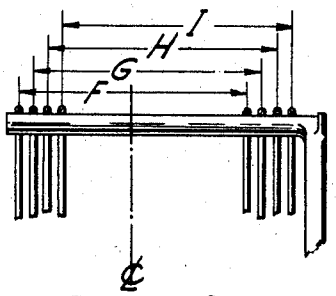


Fig. 8.

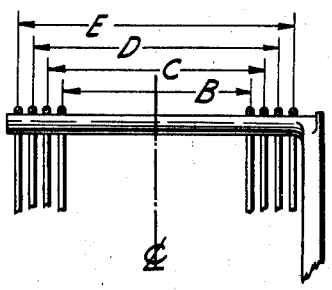


Fig. 7.

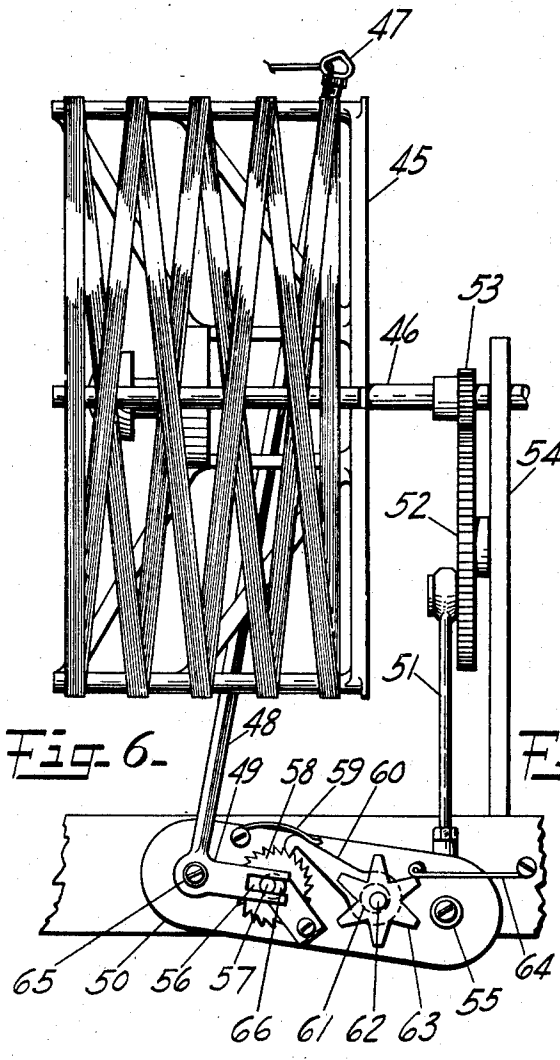


Fig. 6.

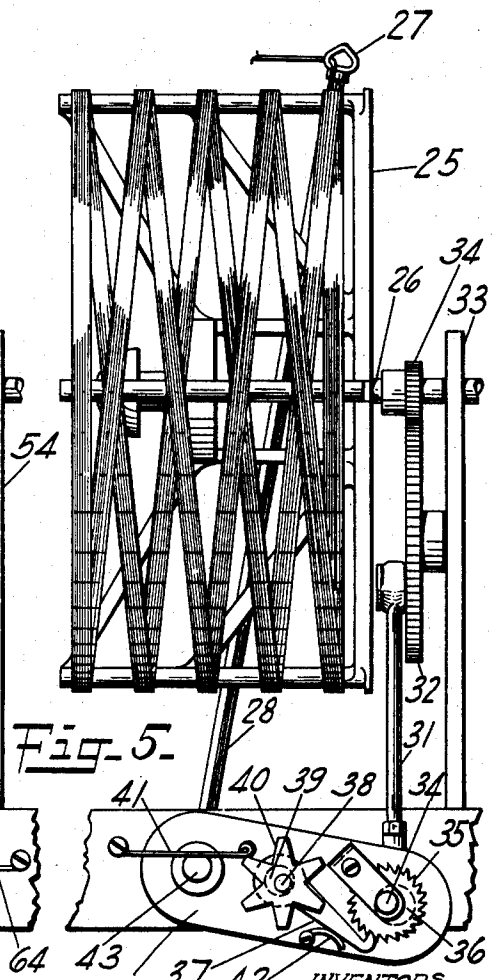


Fig. 5.

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UNITED STATES PATENT OFFICE

2,275,544

APPARATUS FOR WINDING SKEINS OF YARN

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Application April 2, 1940, Serial No. 327,414

9 Claims. (Cl. 242—53)

This invention relates to improvements in methods and apparatus for winding skeins of yarn.

The present invention has for its principal object to provide improved methods and apparatus for winding skeins of yarn.

Other objects and advantages of the invention will be apparent from the following description and accompanying drawings which show preferred embodiments of the invention.

Figure 1 is a plan view of a winding or reeling machine embodying a form of the invention.

Figure 2 is an elevation of the means for operating the traverse mechanism of the machine shown in Figure 1.

Figure 3 is a sectional view taken on the line 3—3 in Figure 2.

Figure 4 is a view of a portion of the reel or swift showing the arrangement of the strands of yarn in side by side relation.

Figure 5 is a plan view of a winding or reeling machine embodying another form of the invention.

Figure 6 is a plan view of a winding or reeling machine embodying a further form of the invention.

Figure 7 is a diagrammatic view showing the manner in which successive strands of yarn are arranged on the reel or swift by the form of the invention shown in Figure 1.

Figure 8 is a diagrammatic view showing the manner in which successive strands of yarn are arranged on the swift by the forms of the invention shown in Figures 5 and 6.

In accordance with the present invention yarn is wound with a number of strands positioned substantially side by side in ribbon-like arrangement in a diamond pattern on a reel or swift. Yarn wound in this manner has a limited build-up and the skein is less bulky and has less tendency to sag on the reel or swift. Also, the yarn is less tangled and the skeins show an improved windability.

The means for carrying out the invention as shown in Figure 1 comprises the reel or swift indicated by reference character 1 mounted on the central shaft 2 which is supported in the frame 11 and driven by suitable means which are not shown. The yarn A is directed to the reel or swift by the guide 4 carried by the traverse member comprising the bell crank having arms 5 and 6 and pivotally mounted on the frame at 7. The traverse member is actuated by the link 8 which is pivotally connected at one end to the arm 6 and at the other end to the gear 9. The gear 9 is driven by the gear 10 which is fixed to the central shaft 2. The gear 9, in rotating, reciprocates the link 8 and causes the traverse member to move the thread guide back and forth across the face of the reel or swift.

The connection of the link 8 with the gear 9 is shown more particularly in Figures 2 and 3. The link is journaled at one side of the gear on the eccentric portion 12 of the pin 13 which is journaled in the gear 9. The ratchet wheel 14 is fixed on the pin on the other side of the gear. The star wheel 15 is pivotally mounted on the pin 16 on the same side of the gear as the ratchet wheel. The star wheel has a hub portion 17 which is eccentric to the pin and on which is pivotally mounted the pawl 18. The spring member 19 urges the pawl into engagement with teeth on the ratchet wheel. In order to prevent undue rotation of the ratchet wheel, brake means are provided comprising the spring clip 22 fastened to the gear by the screw 23 and having one end pressed against the face of the ratchet wheel. The stop member 20 is supported on the pin 21 in position to contact the teeth on the star wheel and can be moved to inoperative position, when desired, by being swung around on the pin out of the path of the teeth.

In operation the gear 9 rotates in the direction shown by the arrow in Figure 2 and reciprocates the link 8 back and forth. The star wheel is carried around by the gear and the teeth engage the stop member. As the teeth of the star wheel are retarded by the stop member, the star wheel is in effect rotated intermittently a part of a revolution on the pin 16 relative to the gear for each revolution of the gear. The eccentric hub of the star wheel in rotating about the pin 16 actuates the pawl which rotates the ratchet wheel. The ratchet wheel rotates the pin 13 and shifts the axis of the eccentric portion relative to the axis of the gear on which it is mounted. The effect of shifting the axis of the eccentric portion is to vary the length of stroke of the link and the path of the thread guide back and forth across the face of the reel or swift and accordingly the path of the yarn being wound on the reel. This is shown in Figure 7 where reference characters B, C, D, and E indicate that the distances that succeeding strands of yarn are placed apart on the reel vary during the winding operation.

In the form of the invention shown in Figure 5 the length of the traverse of the thread guide across the face of the reel remains substantially

the same, while the portion of the face of the reel over which the thread guide traverses, changes continually during the winding operation. This form as shown comprises the reel or swift 25 mounted on the central shaft 26 which is supported in the frame 33 and driven by suitable means which are not shown. These parts are the same as the corresponding parts shown in Figure 1. The yarn is directed to the reel or swift by the guide member 27 which is carried by the traverse member 28. The traverse member and the link 29 are fixed to the rotatable shaft 43. The traverse member is actuated by the link 31 which is pivotally connected at one end to the gear 32 and at the other end to the link 29. The gear 32 is driven by the gear 34 which is fixed to the central shaft 26. The gear 32 in rotating reciprocates the link 31 and causes the traverse member to move the thread guide back and forth across the face of the reel or swift. The link 31 is pivotally connected to the link 29 through the eccentric portion 36 of the pin 34 which is pivotally mounted near the end of the link 29. The ratchet 35 is fixed to the pin 34. The star wheel 40 is fixed to the pin 38 which is pivotally mounted on the link 29. The star wheel has an eccentric hub portion 39 on which the pawl 37 is pivotally mounted. The pawl is held in engagement with the teeth on the ratchet wheel by means of the spring 42. The stop member 41 is pivotally supported on the frame in position to contact the teeth on the star wheel and may be moved to an inoperative position out of the path of the teeth.

In the operation of this form of the invention the gear 32 in rotating reciprocates the link 31 back and forth which in turn oscillates the link 29 and traverse member on the shaft 43. The star wheel is carried back and forth on the link 29 and the teeth engage the stop member. As the teeth of the star wheel are retarded by the stop member the star wheel is in effect rotated a part of a revolution during each oscillation of the link 29. The eccentric hub of the star wheel in rotating actuates the pawl which rotates the ratchet wheel. The ratchet wheel rotates the pin 34 and shifts the axis of the eccentric portion 36 relative to the link 29. The eccentric portion, in shifting its axis, moves the link 29 relative to the link 31. The stroke of the link 31 and of the thread guide on the traverse member back and forth across the face of the reel remains substantially the same during the winding operation, however, the link 29 in shifting relative to the link 31 causes the portion of the reel across which the thread guide traverses to change during the winding operation.

In the form of the invention shown in Figure 6, the length of the traverse of the thread guide across the face of the reel remains the same, while the portion of the reel over which the thread guide traverses, changes continuously during the winding operation. This embodiment comprises the reel or swift 45 mounted on the central shaft 46 which is supported in the frame 54 and driven by suitable means which are not shown. These parts are the same as the corresponding parts shown in Figures 1 and 5. The yarn is directed to the reel or swift by the guide member 47 which is carried by the traverse member comprising the bell crank having the arms 48 and 49 which is pivotally mounted to rotate about the shaft 65. The link 50 is mounted to pivot freely on the shaft 65. The traverse member is actuated by the link 51 which is pivotally connected at one end to the gear 52 and at its other end to the link 50. The gear 52 is driven by the gear 53 which is fixed to the shaft 46. The gear in rotating reciprocates the link 51 back and forth and oscillates the link 50 about the shaft 65. The ratchet wheel 58 is fixed to the pin 66 that is pivotally mounted in the link 50. The pin has an eccentric portion 57 which engages the sides of the slot 56 in bell crank arm 49. The star wheel 63 is fixed to the pin 62 which is pivotally mounted on the link 50. The star wheel has an eccentric hub portion 61 on which the pawl 60 is pivotally mounted. The pawl is held in engagement with the teeth on the ratchet by means of the spring 59. The stop member 64 is pivotally supported on the frame in position to contact the teeth on the star wheel and may be moved to an inoperative position out of the path of the teeth.

In the operation of this embodiment the gear 52 in rotating reciprocates the link 51 which oscillates the link 50 on the shaft 65. The eccentric portion 57 of the pin 66 carried by the link 50 oscillates the arms 48 and 49 of the bell crank about the shaft 65 and causes the thread guide to move back and forth across the face of the reel. The star wheel is carried back and forth as the link 50 is oscillated and the teeth engage the stop member. As the teeth of the star wheel are retarded by the stop member, the star wheel is in effect rotated a part of a revolution during each oscillation of the link. The eccentric hub of the star wheel in rotating actuates the pawl which rotates the ratchet wheel. The ratchet wheel in rotating shifts the axis of the eccentric portion 57 of the pin which shifts the arms of the bell crank relative to the link 50. In this embodiment the length of the traverse of the thread guide across the face of the reel and the distance between succeeding strands of yarn indicated by reference characters F, G, H and I in Figure 8 remains the same while the portion of the reel over which the guide traverses continually changes during the winding operation.

In accordance with this invention, the thread guide is shifted, in addition to the usual traverse movement, an amount sufficient that successive strands of yarn directed to the same portion of the reel are arranged side by side as shown in Figure 4.

While preferred embodiments of the invention have been shown, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

What I claim is:

1. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, and means for moving the guide means relatively back and forth across the face of the reel including a link operatively connected to the guide means, an eccentric means connecting the link to a driving means, and means for intermittently actuating the eccentric means to shift the link relative to the driving means.

2. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, and means for moving the guide means relatively back and forth across the face of the reel including a link operatively connected to the guide means and connected by an eccentric means to a driving means, and means carried by the driving means for intermittently actuating the eccentric means to shift the link relative to the driving means.

3. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, and means for moving the guide means relatively back and forth across the face of the reel including a link operatively connected to the guide means and connected by an eccentric means to a driving means, and means operable by the driving means for intermittently actuating the eccentric means to shift the link relative to the driving means.

4. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, and means for moving the guide means relatively back and forth across the face of the reel including a link connected by an eccentric means to a driving means, a star wheel carried by the driving means, means for rotating the star wheel relative to the driving means comprising a stop member positioned in the path of the teeth of the star wheel and means operable by the star wheel for actuating the eccentric means to shift the link relative to the driving means.

5. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, and means for moving the guide means relatively back and forth across the face of the reel comprising a link, means for reciprocating the link, a bell crank to one arm of which the guide means is attached and to the other arm the link is connected by an eccentric means, and means for actuating the eccentric means to shift the bell crank relative to the link.

6. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, and means for moving the guide means relatively back and forth across the face of the reel comprising a link, means for reciprocating the link, a bell crank provided with a slot, an eccentric means carried by the link and engaging the side walls of the slot in the bell crank, and means for actuating the eccentric means to shift the bell crank relative to the link.

7. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, means for moving the guide means relatively back and forth across the face of the reel including a link connected by an eccentric means to a driving means, a star wheel carried by the driving means and operatively connected to the eccentric means, and means for rotating the star wheel relative to the driving means to actuate the eccentric means to shift the link relative to the driving means.

8. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, means for moving the guide means relatively back and forth across the face of the reel including a link operatively connected to the guide means, means connecting the link to a driving means for reciprocating the link and means for intermittently varying the length of stroke of the link.

9. Means for winding skeins of yarn comprising a reel, guide means for directing the yarn onto the reel, means for moving the guide means relatively back and forth across the face of the reel including a link, an eccentric means connecting the link to a driving means for reciprocating the link and means for intermittently shifting the eccentric means to vary the length of stroke of the link.

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