Nov. 8, 1927. 1,648,439

G. S. BECKMAN

THREAD GUIDE FOR WINDING MACHINES

Filed Dec. 12, 1925 2 Sheets-Sheet 1

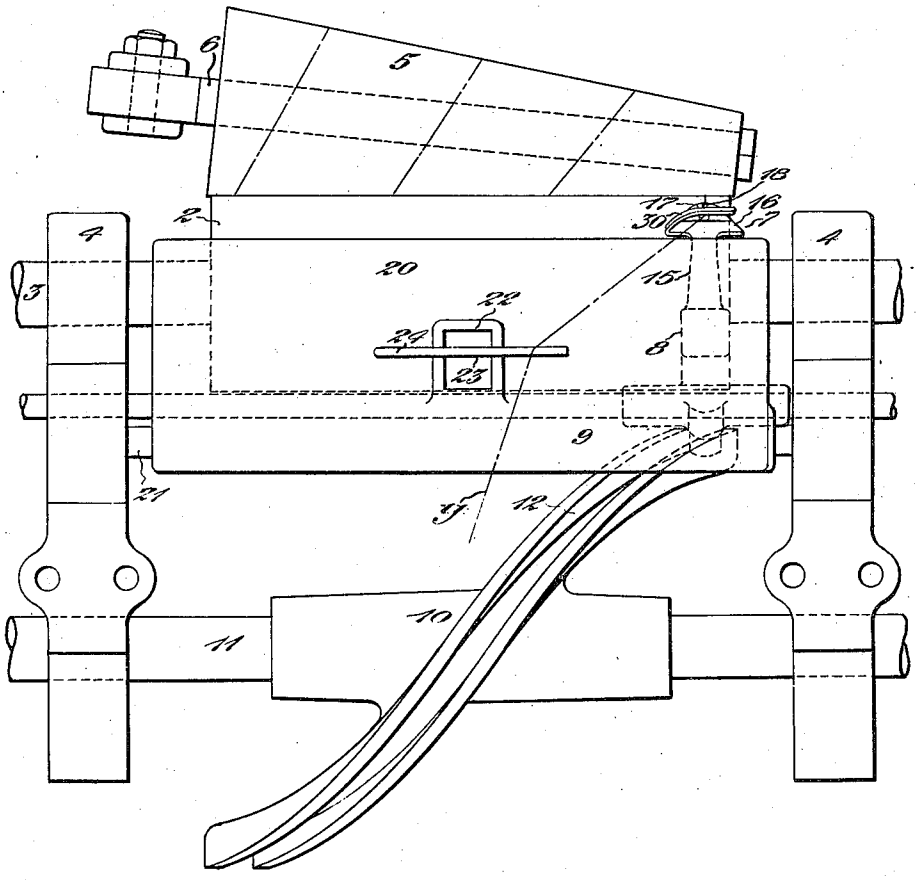


Fig. 1.

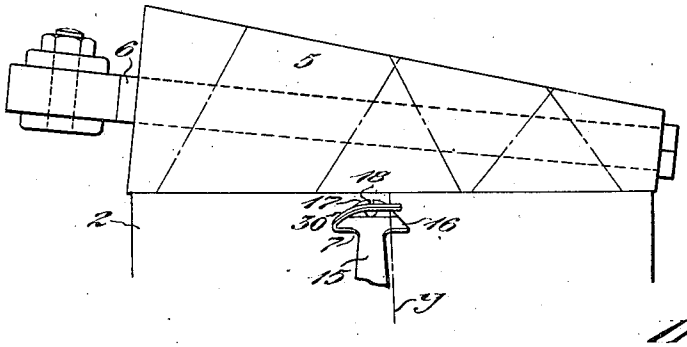


Fig. 2.

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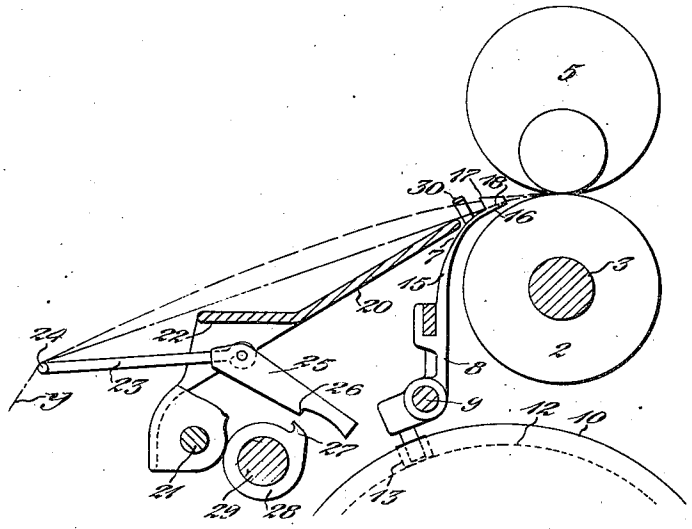


Fig. 3.

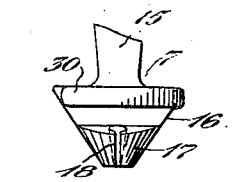


Fig. 5.

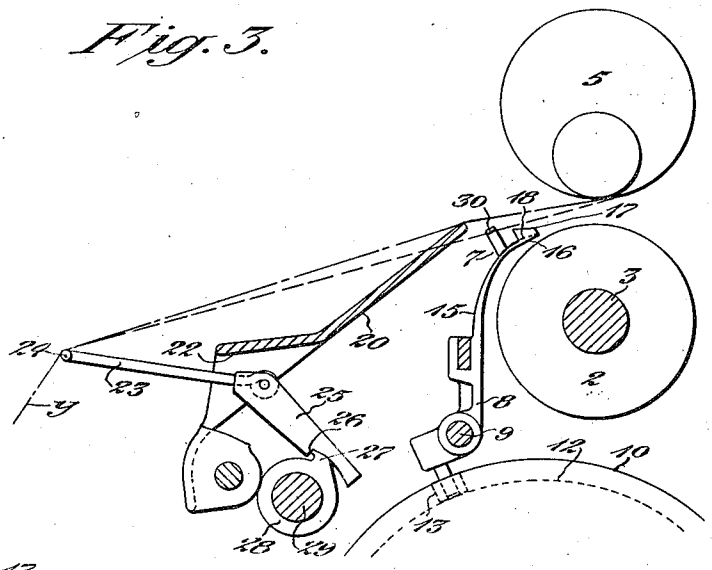


Fig. 4.

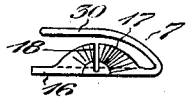


Fig. 6.

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UNITED STATES PATENT OFFICE.

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THREAD GUIDE FOR WINDING MACHINES.

Application filed December 12, 1925. Serial No. 75,060.

This invention relates to improvements in winding machines for winding packages of yarn, thread or other attenuated materials. The present improvement is directed particularly to the thread-guide which traverses the yarn or other material longitudinally of the axis of the winding-spindle to deposit it on the cop or package in helical coils.

A particular object of the invention is to provide a guard or retainer on the thread-guide for preventing the yarn from jumping or whipping out of the groove through which it feeds.

Another object of the invention is to provide a guard or yarn-retainer for the thread-guide which will permit the release of the yarn from the guide upon the arrest of the winding operation.

Another object of the invention is to provide a guard or yarn-retainer for the guide which will function to engage the yarn to enter it into the groove in the guide when the winding operation is started.

Another object of the invention is to provide a device of the type specified which is extremely simple in construction, efficient in operation and adapted for use with practically all types of winding machines.

Further objects of the improvement are set forth in the following specification which describes a preferred embodiment of the invention as illustrated in the accompanying drawings. In the drawings:

Fig. 1 is a front elevation of a portion of a drum-winding machine illustrating the essential elements of the winding-mechanism;

Fig. 2 is a detailed view of the improved thread-guide shown in connection with the winding-spindle, and illustrating the manner in which the improved guard on the guide acts to pick up the yarn or thread to cause it to automatically enter the groove in the guide;

Fig. 3 is an end view of the winding-mechanism showing the thread-guide and its associated elements;

Fig. 4 is a similar view showing the method of operation of the mechanism which releases the yarn from the thread-guide;

Fig. 5 is an enlarged plan view of the thread-guide showing the yarn-guard as applied thereto; and

Fig. 6 is an end view of the guide.

In the present drawings I have preferred to illustrate the improved yarn-guard or retainer for the thread-guide as applied to use on a drum-winder embodying a friction-drive for the cop, cone or package of yarn to be wound; but it is to be understood that this illustration is by way of example only as the present improvement is adapted for other types of winding machines. Referring to Fig. 1 of the drawings, 2 designates the rotating drive-roll or friction-drum which is mounted on a shaft 3 journaled in suitable bearings 4 to adapt the drum to be rotated to drive the cone, cop or package through frictional contact with the periphery thereof. The cop or package may be wound on any suitable tube or core and, as herein shown, a conical holder or mandrel 5 is rotatably mounted on a spindle 6 which is arranged to recede from the driving-drum 2 as the yarn is built up on the holder.

The thread-guide 7 which is reciprocated to traverse the yarn longitudinally of the holder 5 is herein illustrated as carried by a slide or crosshead 8 which slides on a horizontal rod or bar 9. A helical cam 10, mounted on a shaft 11 journaled in bearings in the uprights 4, is driven rotatively through means connecting it with the driving-mechanism of the machine, not herein shown. The cam 10 has a helical groove 12 which is engaged by a stud or roller 13 on the slide or crosshead 8, whereby to impart the reciprocative motion to the thread-guide 7.

As shown more particularly in Figs. 3 and 4, the thread-guide 7 is constructed in the form of a curved or arcuate arm 15 having its upper end directed toward the top of the drive-roll or drum 2 at the point where the winding-mandrel 5 contacts therewith. The upper end of the arm 15 is formed with a spear-shaped head 16 constituting the guide proper. This spear-shaped head of the guide has a rounded protuberance 17, preferably of frusto-conical shape, on its upper side in which is formed a slot or groove 18 for receiving the yarn or thread y to be traversed by the guide. As illustrated in Figs. 5 and 6, the bottom portion and that portion of the guide at the rear of the protuberance 17 are relatively flat and curve downwardly into the main arm 15.

In machines of the type as herein illustrated the thread-guide is usually reciprocated constantly, and to arrest the winding operation the winding-spindle or mandrel 5

is lifted away from the driving-drum 2 to discontinue the driving contact of the package with the drum. As the winding-spindle or mandrel is elevated to remove the package from contact with the driving-drum to arrest its rotation, it is the preferred practice to lift the thread or yarn *y* out of its groove in the thread-guide so that the yarn will not be carried back and forth when the winding operation is stopped. Various mechanisms have been used in the art for this purpose and Figs. 3 and 4 illustrate a conventional form of the thread-lifting device. As herein shown, as inclined plate 20 is pivoted on a rod 21, being normally held in a position as shown in Fig. 3 with its upper edge at the rear of and depressed below the head of the thread-guide 7. The plate 20 has an opening 22 at its center, see also Fig. 1, and projecting therethrough is a wire arm or lever 22 having a cross-bar 24 at its outer end across which the yarn *y* leads, and on which it rides during its traverse by the thread-guide 7. As shown in Fig. 3, the yarn *y* leads up from its source of supply across the cross-bar 24 and thence draws across the upper edge of the plate 20 through the groove 18 in the thread-guide 7, whence it feeds between the driving-drum 2 and the mandrel 5 to be wound onto the package built up on the mandrel.

The lever 23 serves as a detector to cause the operation of the stopping-mechanism of the machine when the yarn breaks or becomes exhausted. Connected with the lever 23 is a pawl or kicker-arm 25 reaching downwardly and provided with a notched shoulder 26 adapted to be engaged by a hook or lug 27 on a collar 28 carried by a continuously rotating shaft 29. When the detector lever 23 is released from the tension of the yarn *y* the kicker arm 25 will drop to engage its shoulder 26 with the hook 27 as shown in Fig. 4, whereupon the shaft 29 will act to push the kicker upwardly to tilt the plate 20 into the position shown in Fig. 4. This action causes the upper edge of the plate 20 to lift the yarn *y* out of the groove or slot 18 in the thread-guide 7, the parts remaining in this position under the control of a detent until the winding operation is again started.

As before indicated, the present improvement is directed to the thread-guide of the winding machine and the invention consists in a guard or retainer for normally holding the yarn or thread in the groove 18 of the thread-guide 7, while permitting its release therefrom when operated upon by the yarn-lifter 20.

Referring particularly to Figs. 5 and 6, the flat spear-head portion 16 of the thread-guide 7 is extended at one side in a strip or finger 30 which is bent back across the top in a curve merging into a straight portion raised above the top of the swelling or protuberance 17. Referring to Fig. 3, the hooked guard or yarn-retainer 30 projects above the upper edge of the lifter-plate 20 when the latter is in its normal position and as the yarn *y* rides across the edge of the plate it is free from contact with the guard. When, however, there is a tendency for the yarn to whip or balloon upwardly, as indicated by the dash lines in Fig. 3, the guard 30 effectually prevents it from jumping out of the groove 18 in the thread-guide.

As the yarn-lifter 20 is raised into the position shown in Fig. 4 to lift the yarn out of the groove 18 in the thread-guide 7 the guard will release the yarn when the guide traverses toward the left as viewed in Fig. 1. The release of the yarn from the thread-guide 7 takes place when the cop or package is raised off from the driving-drum 2 to arrest the winding operation. When the mandrel 5 is first lifted into the position shown in Fig. 4 it will have a tendency to raise the yarn *y* out of the groove 18 in the guide 7 as indicated by the dash lines in Fig. 4. Now when the lifter-plate 20 is raised it will exert an upward pressure on the yarn, and as the thread-guide 7 moves to the left, as viewed in Fig. 1, the yarn will slide out from under the free end of the guard 30 and will be held in the position illustrated by the dot-and-dash lines in Fig. 4. In this way the yarn is held raised above the head of the guide 7 and also above the guard 30 so that the thread-guide is free to reciprocate back and forth therebeneath without contacting with the yarn.

In threading up the machine to start the winding operation the yarn is attached to the mandrel or holder 5 and drawn taut across the upper edge of the lifter-plate 20 as it leads up from the cross-bar 24 on the detector-lever 23. As the mandrel 2 is lowered into position to make contact with the surface of the driving-drum 2, and the lifter-plate 20 depressed into normal position as shown in Fig. 3, the yarn will be brought down into alinement with the open end of the hooked guard 30. Therefore, as the winding spindle starts to rotate the to-and-fro movement of the guide 7 will cause the latter to pick up the yarn in the following manner: assuming that the guide is in the position illustrated in Fig. 1, but disengaged from the yarn *y*, when the guide moves toward the left the curved portion of its guard 30 will slide in under the yarn. Then when the thread-guide slides back in the opposite direction the yarn will ride up over its head portion while being engaged beneath the guard 30 as shown in Fig. 2. The rounded protuberance or enlargement 17 on the top of the guide will thus slide in under the yarn *y* as it is held by the guard 30 until finally the yarn seats itself in the groove 18.

Now during the continuous operation of the machine the yarn *y* is traversed back and forth by the to-and-fro movement of the guide 7 and is prevented from whipping or jumping out of the thread-groove 18 in the manner as before explained.

It will be observed that my improvement provides an extremely simple and efficient device for the purpose explained, the yarn guard not only functioning to retain the yarn in the guide during the normal operation of the machine, but also acting to lead the yarn into the groove in the guide when the latter passes under it to pick the yarn up; while further being adapted to permit release of the yarn from the guide upon the action of the automatic yarn-lifting device which operates upon the arrest of the winding.

While I have herein described and illustrated the invention as applied to a particular form of thread-guide, and as used on a particular type of winding machine, it is obvious that various modifications may be made in the form and structure of the thread-guide and its thread-guard or retainer and that the device may be applied to other winding mechanisms than that herein shown.

Therefore, without limiting myself in this respect, I claim:

1. A thread-guide of the type specified having a spear-shaped head with a rounded protuberance of substantially frusto-conical shape projecting from its rearward side and a thread groove formed therein, and a hooked finger projecting upwardly from the side of the head and extending laterally thereacross at the rear of the protuberance to adapt it to engage the yarn or thread to prevent it from whipping or jumping out of the groove in the guide.

2. In a winding machine, the combination of a rotatable holder on which the cop or package is wound, a reciprocable thread-guide for traversing the yarn on the holder, said thread-guide provided with a groove through which the yarn feeds, means for lifting the yarn out from the groove in the guide when the winding operation is arrested, and a hooked guard extending above and across the back of the guide to normally retain the yarn in the guiding-groove while adapting the yarn to slide out from under the guard when it is lifted out of the groove, said guard also adapted to slide in under the yarn as it is held by the lifting-means to cause it to engage therewith to direct the yarn into the groove in the guide.

3. In a winding machine, the combination of a rotatable holder on which the cop or package is wound, a reciprocable thread-guide for traversing the yarn on the holder, said guide provided with a rounded head having a groove through which the yarn feeds, a thread-lifter for lifting the yarn out of the groove in the guide to arrest the winding operation and a hook-like finger extending across the back of the guide to adapt it to normally retain the yarn in the guiding-groove and also adapted to slide in under the yarn resting on the thread-lifter as the guide moves in one direction and to engage the yarn to direct it into the guiding-groove as the guide moves in the opposite direction.

4. In a winding machine, the combination of a rotatable holder on which the cop or package is wound, a thread-guide having a groove through which the yarn normally feeds to the winding, means to reciprocate the thread-guide to traverse the yarn longitudinally of the cop or package being wound, a thread-lifter extending in the direction of reciprocation of the thread-guide and adapted to be operated to lift the yarn out of the groove in the guide, and a hook-like finger extending across the back of the guide to normally retain the yarn in the groove thereof, said finger being adapted to slide in under the yarn as it is held by the thread-lifter while the guide is moving in one direction to cause it to thereafter hook over the yarn to direct it into the groove in the guide as the latter moves in the opposite direction.

5. In a winding machine, the combination of a rotatable holder on which the cop or package is wound, a thread-guide provided with a groove through which the yarn leads to the cop or package, means for reciprocating the thread-guide to traverse the yarn longitudinally of the cop or package, a thread-lifter arranged at the back of the thread-guide extending parallel with the path of reciprocation of the latter and across which the yarn leads in passing through the groove in the guide, means for operating said thread-lifter to cause it to raise the yarn out of the groove in the thread-guide whereby to arrest its traverse, means to return the thread-lifter to normal position to bring the yarn into the path of the thread-guide, and a hooked guard extending across the rearward side of the guide and adapted to slide in under the yarn as it rests on the thread-lifter when the guide moves in one direction and to thereafter engage the yarn to direct it into the groove of the guide when the latter moves in the opposite direction.

In testimony whereof I hereunto affix my signature.

GUSTAF S. BECKMAN.