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2 SHEETS--SHEET 1.

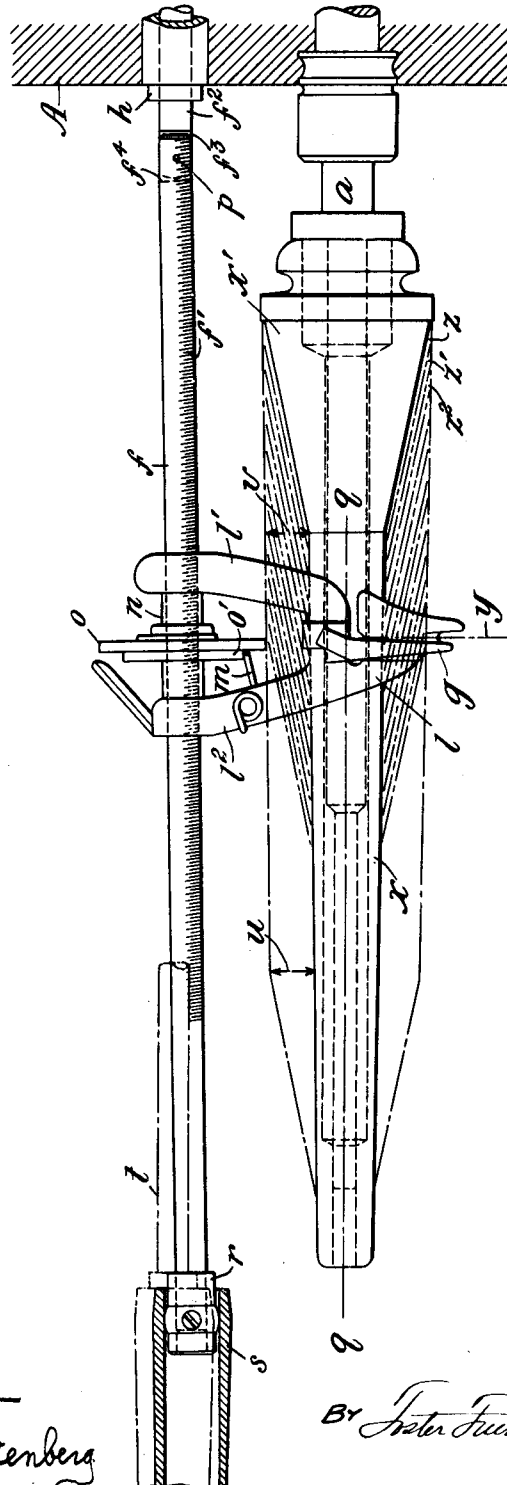


Fig. 1.

WITNESSES

to Hinkel

Milton Ottenberg

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C. RYDEN.
WINDING MACHINE.
APPLICATION FILED FEB. 23, 1910.

Patented May 20, 1913.

2 SHEETS—SHEET 2.

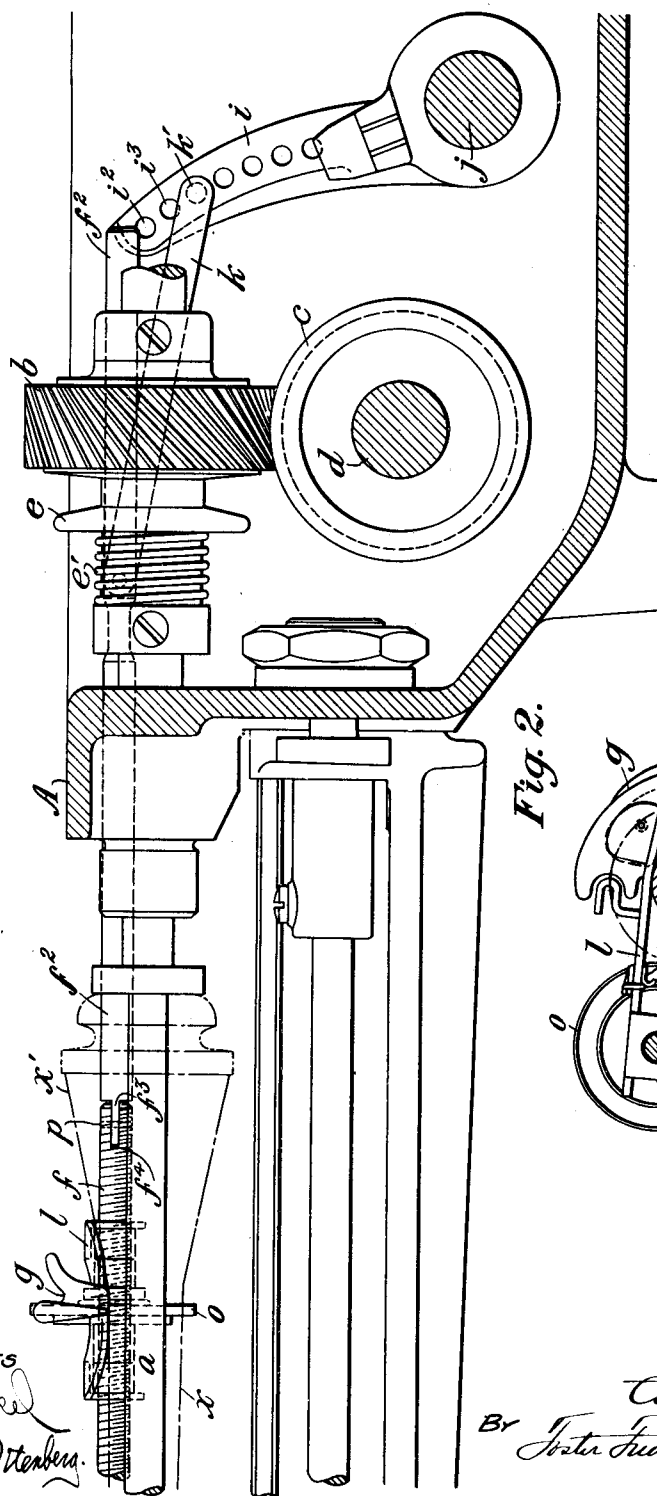


Fig. 2.

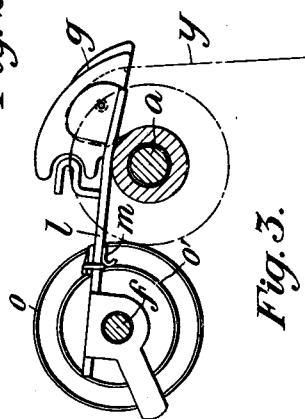


Fig. 3.

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UNITED STATES PATENT OFFICE.

CLAES RYDEN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO UNIVERSAL WINDING
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WINDING-MACHINE.

1,062,420.

Specification of Letters Patent.

Patented May 20, 1913.

Application filed February 23, 1910. Serial No. 545,434.

To all whom it may concern:

Be it known that I, CLAES RYDEN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Winding-Machines, of which the following is a specification.

My invention relates to winding machines for winding filling cops or bobbins used in loom shuttles and consists of improvements in the traverse mechanism which regulates the disposition of the layers of yarn in building the body of the cop.

The object of my improvement is to provide a mechanism which will operate to dispose the layers of winding with a more stable formation and produce a cop or bobbin having a firm nose or delivery point from which the yarn can be unwound without snarling or breaking and with a uniform tension of delivery.

The essential features of my invention are fully set forth in the following specification, illustrated by the accompanying drawings, in which:—

Figure 1 is a plan view of the traverse mechanism and winding spindle, with the form of the bobbin and the layers of winding illustrated by dot-and-dash lines; Fig. 2, a part sectional elevation of a portion of the main machine showing the mechanism for rotating the winding spindle and reciprocating the traverse-bar; Fig. 3, a detail view of the thread-guide and the friction contact wheel for advancing the guide along the traverse-bar.

My improved winding mechanism is similar in general respects to machines of that class in which the thread-guide is reciprocated opposite the winding spindle and caused to advance or feed along the spindle to dispose the yarn in superimposed, coniform layers which form the extended body portion of the cop terminating in the conical nose or delivery end. In some types of cop-winding machines the winding spindle itself is moved longitudinally with respect to the thread-guide, instead of feeding the guide; but with either of the above arrangements it is usual to provide that the relative movement of the thread-guide and winding spindle shall be in a straight line in the direction of the axis of the spindle. In

other words, the relative feeding movement of the thread-guide with respect to the winding spindle is in a line parallel with the axis of the spindle so that the body portion of the cop or bobbin is built with a cylindrical periphery concentric with its axis of rotation.

In winding filling for use in loom shuttles the yarn is usually wound either in cop form on a tube of paper or fiber, or in the form of a bobbin built up on a wooden tube or support. In either of the above cases, whether winding a cop or a bobbin, the tube used to support the body of the cop is generally tapered slightly throughout its whole length so that the yarn will deliver more freely in unwinding. It will therefore be seen that if the body of the cop or bobbin is built in cylindrical form there will be a greater mass of yarn at the outer end where the tube tapers down to a small diameter than at the base end where the diameter of the tube is relatively large. That is, the yarn mass will be thicker at the small end of the tube than at the large end. On account of this the layers of winding at the nose end of the cop or bobbin will have a greater constrictive force or pressure on the tube than at the base end of the bobbin. It is a well known fact that it is more difficult to maintain the formation of a cop at the outer small end of the tube than at the inner end, because the coils of winding are more easily displaced on a small diameter support than on one of larger diameter. For this reason, if the constrictive tendency of the windings is greater at the outer end of the bobbin it is liable to cause the cop to break down at the point of its nose and the coils of yarn will become loosened and slough off. This results in what is known as a "soft nosed" cop, and the yarn will not deliver freely from a cop or bobbin which is malformed in this way. In other words, where the coils of winding are disturbed and loosened at the point of the nose of the cop, these coils will unwind too freely in delivering and sometimes the yarn comes off several coils at a time, making tangles and snarls which obstruct the delivery eye of the shuttle. This causes unevenness of tension and breakages in the filling which make defects in the fabric and limit the production of the loom. To eliminate these defects in the cop or bobbin I have devised a method of winding the body

portion of the cop with a slight taper corresponding to the taper of the tube on which it is supported, as set forth in my application for U. S. Patent, Serial No. 543,152, filed February 10, 1910. By this method the cop is formed so that the amount of yarn surrounding the tube at its outer end is no greater than the amount at the inner end where the tube is larger, so that the constrictive action of the coils of winding is maintained practically uniform throughout the whole body of the cop. For building a cop or bobbin by this method I have devised the mechanism described below which differs from the usual winding machine, as hereinafter particularly pointed out. In general the machine is similar to that described in the U. S. Patent to Simon W. Wardwell, No. 946,831, granted January 18th, 1910.

In Figs. 1 and 2, a is the rotatable winding spindle projecting from bearings in the frame A and driven through a spiral or "skew" gear b meshing with a similar gear c on the drive-shaft d , see Fig. 2. The rotation of the spindle a is controlled by a clutch member e , of usual arrangement and not here shown in detail, operated by the coiled spring e' . The traverse-bar f which carries the thread-guide g slides in a bearing h in the frame A and is reciprocated by means of an oscillating arm i on the rock-shaft j . The bar f is connected to the arm i by a link k which carries a pin k' adapted to engage any one of the several holes i^1, i^2, i^3 , etc., in the arm. By changing the point of connection of the link with the arm the operative length of the latter can be varied to adjust the length of traverse of the thread-guide as desired.

The thread-guide g is supported on the traverse-bar f by an arm or holder l of bifurcated form having two legs l^1 and l^2 with bearings at their ends which surround the bar. Between the legs l^1 and l^2 is a bushing or nut n which carries a friction disk or contact wheel o adapted to engage the periphery of the bobbin being wound. The traverse-bar f is eccentrically threaded so that the threads f' extend substantially half way around its periphery and the nut n has a threaded bore. The bore of the nut n is of sufficient diameter to allow the nut to be slid along the bar without engagement of the threads, but normally the threads in the nut are engaged with those on the bar by means of a spring pressure element. This consists of a wire spring m fastened to the leg l^2 of the thread-guide holder l and bearing on the edge of a flange o' on the wheel o .

The spring m presses the nut n into engagement with the threads so that when the wheel o is rotated the thread-guide will be caused to feed along the traverse-bar. To release the nut it is simply necessary to press on the wheel in the opposite direction

and this allows the thread-guide to be moved back into its initial position to start the winding of a new cop or bobbin.

As shown particularly in Fig. 1, x is a wooden tube or support on which the usual form of bobbin is wound and is pushed on to the winding spindle a and held rotatively by any suitable means. The base of the tube x has a wooden butt x' with its forward end formed with a conical surface on which the first layer of winding is deposited. From this conical butt x' the main shank of the tube tapers down to a slightly smaller diameter at its outer end. The traverse of the thread-guide is adjusted to the length of the conical surface of the butt x' and as the guide moves backward and forward along this surface the guide rides up and down the incline to allow it to be kept constantly in contact with the winding. As shown in Fig. 3 the oscillating movement of the guide is provided for by the arrangement of the guide-holder l which is swiveled on the traverse-bar f by the legs l^1 and l^2 . The tension of the yarn y bearing on the guide g keeps its under side pressed against the surface on which the coils are deposited so that each coil is laid with precision and accuracy.

In Fig. 1 the guide g is shown at the rear end of its traverse, and in this position the contact-wheel o bears on the layer of winding at its point of greatest diameter. Starting at the base of the conical butt x' the first layer of yarn z will be laid on this surface and with each traverse of the thread-guide g , as the latter returns to its rearmost position, the periphery of the contact-wheel o will engage with the periphery of the bobbin. The rotation of the bobbin causes a slight rotation of wheel o , during the interval of contact, and this causes the nut n to turn on the bar f and feed outward a slight distance along the winding spindle. In this way the guide feeds progressively outward on the traverse-bar f and the successive layers of winding z^1, z^2 , etc., are built up in superimposed conical planes, so that the body of the bobbin grows by longitudinal extension instead of diametrically. As before stated, heretofore in all winding machines operating on this principle the traverse-bar which reciprocates the thread-guide is arranged parallel to the axis of the winding spindle. Where the spindle itself is reciprocated instead of the traverse-bar the arrangement has always been the same with the path of reciprocation parallel to the direction of feeding movement. This results in building the body of the bobbin with a cylindrical periphery.

With my present improved mechanism I build the body of the bobbin with a slight taper, and to provide for this it is necessary that the contact-wheel which engages the periphery of the bobbin shall travel in a

plane inclined to the axis $q-q$ of the winding spindle. Any suitable arrangement might be used for causing the contact wheel to move outward in a path inclined to the axis of the spindle and in Fig. 1 I have shown one form of such an arrangement.

In the present embodiment of my improved traverse mechanism I make the traverse-bar in two sections with the guide-carrying portion f arranged opposite the winding spindle and the other portion f^2 mounted in the bearing h and extending into the frame A to connect with the rocker arm i . The two sections f and f^2 are connected at their adjacent ends by a swivel joint preferably formed by a tongue f^3 on the bar f^2 entering a slot f^4 in the bar f and held by a pin p , see Fig. 2. This arrangement allows the outer end of the bar f to be swung in toward the winding spindle to adjust the bar at an angle to the axis $q-q$ of the latter. The outer end of the bar f is supported in a bearing which consists of a bushing r swiveled in the bracket s . The bar section f^2 is reciprocated in a line parallel to the axis of the spindle a and the dot-and-dash lines t , Fig. 1, indicate the position that the section f would assume if arranged in alinement therewith. As shown by the full lines, the bracket s is set in toward the axis of the winding spindle so that the bar f takes a position substantially parallel with the tapered surface of the tube on which the bobbin is wound and the swiveled bearing r provides for the angular movement of the bar.

It will be evident, of course, that as the inner end of the bar f moves out in a plane parallel to the axis of the spindle the inclination of the whole bar f will be increased slightly as the guide moves outward, but this is not material because the contact wheel o only contacts with the winding when the traverse-bar is at the rearward extent of its traverse. That is, the portion f of the traverse-bar will always be in a position parallel to the tapered surface of the tube on which the bobbin is wound when the friction wheel o is contacting with the winding, so that the points of contact of the wheel o with the cop are maintained in parallelism with the surface of the tube. As illustrated graphically in Fig. 1, the distance u will be the same as the distance v so that the thickness of yarn at the outer end of the bobbin where the diameter of the tube is smallest will be exactly the same as the thickness of the yarn at the inner end where the diameter of the tube is relatively large, and, as previously pointed out, the coils of winding will have no more constrictive force at the outer end of the bobbin than at the inner end.

Another advantage in building the bobbin with a tapered periphery corresponding to the taper of the tube is that the angle of inclination of the separate layers is main-

tained uniform throughout the whole bobbin. With a uniform traverse and a tapering tube if the body of the bobbin is built of cylindrical form the angle of the layers will gradually become steeper. The coils of winding will not hold their positions so well on a steep taper and therefore it is advantageous to maintain the angle of the layers uniform with the taper of the butt of the bobbin to insure the building of a stable cop.

The contact element o might be of other forms than that here shown and it might also be arranged to move in a path having a greater inclination to the axis of the spindle than as here illustrated. The present arrangement could also be adapted for use with machines designed for winding cops on paper tubes and operating to build up a foundation cone of yarn on which the subsequent layers are deposited to build the body of the cop. It will also be obvious that the traverse-bar might be arranged to remain stationary with the spindle adapted to reciprocate opposite thereto. The exact combination of the main elements of the machine is therefore not material; but the essential feature of my invention is the arrangement for causing the contact member to feed along the winding spindle in a path inclined toward the axis of the latter so that the bobbin or cop will be built with its body portion tapering from the base to the nose.

Without limiting myself to the exact form and construction shown and described, what I claim is:—

1. In a winding machine, the combination with a rotating winding spindle and a reciprocating thread-guide, of a friction wheel adapted to contact with the winding to feed the guide along the spindle, and means to guide said wheel to move gradually toward the axis of said spindle as it feeds outward.

2. In a winding machine, the combination of a rotating winding spindle, a reciprocating traverse-bar arranged opposite and inclined toward the outer end of the spindle, a thread-guide mounted on said bar, and a friction wheel adapted to contact with the winding to feed the guide along the bar.

3. In a winding machine, the combination of a rotating winding spindle, a bar arranged opposite said spindle and inclined toward the axis thereof at its outer end, a thread-guide mounted on said bar, means to cause a relative reciprocation between the guide and spindle, and means to feed the guide outward along the bar.

4. In a winding machine, the combination of a winding spindle, a thread-guide, means to cause a relative reciprocation between said spindle and guide, means to cause a relative advance between the spindle and guide, and contact means engaged by the cop to operate the guide-advancing means.

said contact means arranged to move in toward the axis of the spindle with each successive reciprocation to build the cop with a tapered periphery.

- 5 5. In a winding machine for winding cops or bobbins on tapered tubes, the combination with a rotating spindle, a reciprocating thread-guide, means to rotate the spindle, means to reciprocate the guide, contact means engaged by the cop to feed the
10 guide along the spindle, and means to cause said contact means to travel in a path substantially parallel to the tapered surface of the tube on which the cop is wound.
- 15 6. In a winding machine, the combination with a winding spindle, of a traverse-bar

comprising two sections f and f^2 , means to couple the adjacent ends of the sections, means to reciprocate the bar, a thread-guide
20 mounted on the bar, means to feed the guide along the bar, and a bearing for the outer end of the section f , said bearing set in from the plane of the bar-section f^2 to incline the
25 section f toward the axis of the winding spindle.

In testimony whereof I affix my signature in presence of two witnesses.

CLAES RYDEN.

Witnesses:

ARTHUR A. ARMINGTON,
ARTHUR I. HARVEY.