C. RYDEN.

COP OR BOBBIN.

APPLICATION FILED FEB. 10, 1910.

1,038,971.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

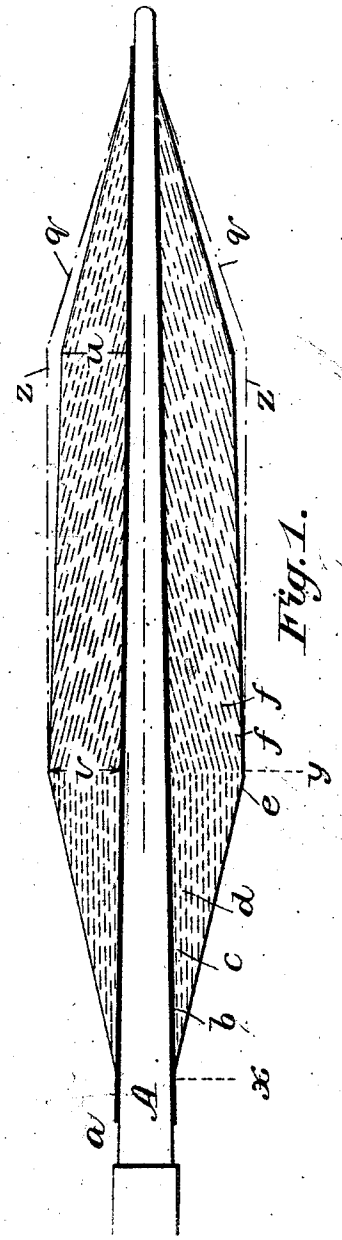

Fig. 1.

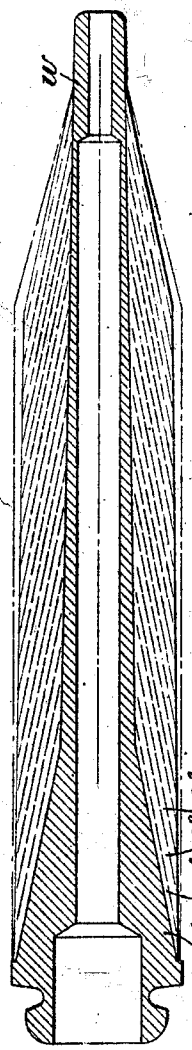

Fig. 2.

WITNESSES

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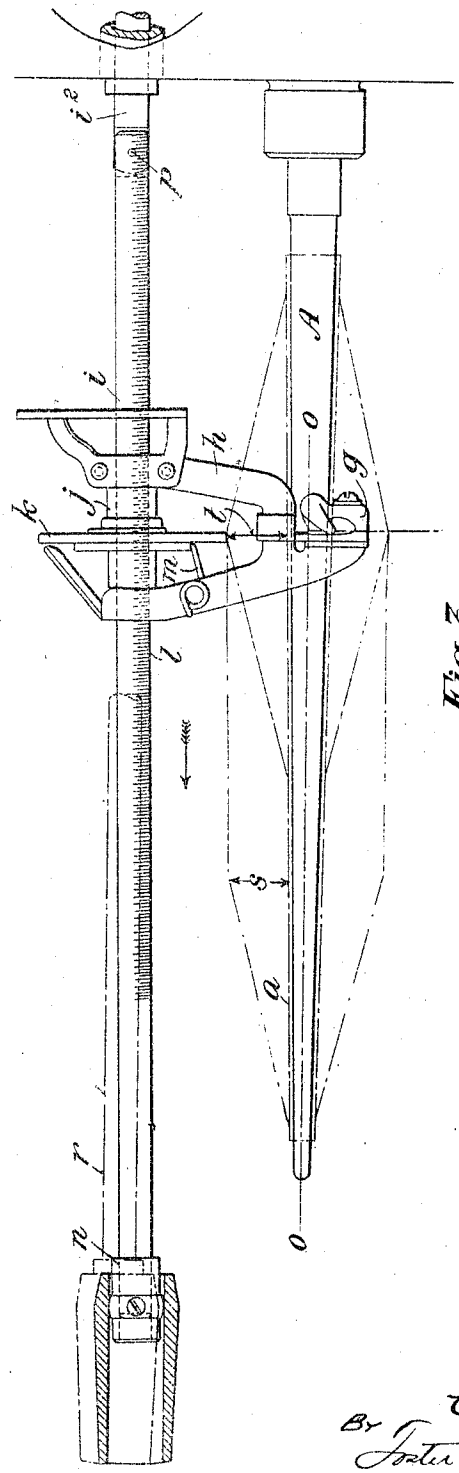

Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

CLAES RYDEN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO UNIVERSAL WINDING COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

COP OR BOBBIN.

1,038,971. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed February 10, 1910. Serial No. 543,152.

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 Cops or Bobbins, of which the following is a specification.

My invention relates to filling cops or bobbins for use in the shuttles of broad looms, and consists of improvements in the method of winding the same to provide for a more stable formation of the layers of winding and for greater uniformity in tension of delivery of the yarn from the shuttle.

The essential feature of my improvement is a cop or bobbin having a conical nose or delivery end and a tapering body portion in contradistinction to the usual cylindrical body portion of such cops or bobbins.

The invention is fully set forth in the following specification, illustrated by the accompanying drawings, in which:

Figure 1 is a longitudinal sectional view of my improved cop showing the arrangement of the layers of winding, and illustrating the taper of the body portion of the cop. Fig. 2, a longitudinal sectional view of a bobbin wound on a wooden tube with the body portion tapered to correspond to the taper of the tube; Fig. 3, a plan view of the traverse mechanism for winding cops with tapered body portions, illustrating the inclination of the traverse-bar, which reciprocates the thread-guide, to the axis of the winding spindle.

In winding filling for use in loom shuttles the yarn is usually wound either in cop form on a tapered tube of paper or fiber, or in the form of a bobbin wound on a wooden tube or support. When a paper tube is used the cop is built up with the first layers of yarn forming what is termed a "heel" having a conical surface upon which the subsequent layers are deposited to build the body of the cop. The heel or foundation is formed by stopping the first layers of yarn progressively forward so that they overlap each other at their outer ends and build up with a conical surface. To effect this, the thread-guide which deposits the yarn on the tube is caused to feed forward slightly in longitudinal relation to the winding spindle at each traverse. This results in the heel of the cop being built with a tapered base, with the forward ends of the layers forming a conical nose which determines the taper at the delivery end of the cop.

For bobbins wound on wooden tubes the tube itself is usually formed with a conical heel or butt, so that it is not necessary to build up a foundation cone of yarn. With this form of tube or support the first layers of winding are deposited on the surface of the conical, wooden butt and as the guide feeds outward along the winding spindle the concentric layers progress along the tube to form the body of the cop.

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 made cylindrical 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. 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 yarn at the point of the nose to slough off and become loosened. 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 on 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 product of the loom. To eliminate these defects in the cop or bobbin I have devised a method of winding the cop with

the body portion having a taper slightly greater than the taper of the surface of the tube or spindle on which it is wound. By this method the cop is formed so that the amount of yarn surrounding the tube at its outer small end is slightly less than the amount at the base end where the tube is larger. This provides that the constrictive action of the coils of winding at the outer end of the bobbin will not be so great as that of the coils at the base end. As before stated, it is more difficult to maintain the formation of the layers of winding on a small diameter support than on one of relatively large diameter, and by lessening the constriction of the mass at the point where there is the greatest tendency for the coils to slip and be displaced I provide a more stable formation and the cop is less liable to be distorted or damaged.

In Fig. 1, A represents the winding spindle and *a* is the tube of paper or fiber on which the cop is wound. The first layer of winding *b* is laid with a traverse extending from *x* to *y*, and this traverse is maintained uniform in length throughout the whole building of the cop. The next layer of winding *c* is wound with the traverse stepped slightly forward so that its end overlaps the outer end of the layer *b*, and the layer *d* overlaps the end of the layer *c* in the same manner. As the yarn builds up with each layer overlapping the one previously wound, the heel of the cop will assume a conical form on its forward end, and after the point *e* is reached all of the layers *f*, *f*, etc. will be wound in concentric, conical planes.

The advance of the thread-guide to cause the traverse to feed progressively along the winding spindle is usually accomplished by the use of mechanism actuated through contact with the yarn wound on the spindle and operating to feed the thread-guide along the traverse-bar through which it is reciprocated. A common form of such a device consists of a contact wheel or friction disk having its periphery adapted to bear on the winding and arranged to rotate a nut which engages threads on the traverse-bar. For building the heel of the cop various devices have been used in the art, some of which operate in connection with the contact wheel above mentioned, and others operating independently thereof. One of such means is shown and described in the United States Patent No. 940,489, granted to Simon W. Wardwell November 16th, 1909. The arrangement of this part of the mechanism is not essential to the present invention, however, and need not be described in detail.

The present invention contemplates only the building of the body portion of the cop, and the essential mechanism for this part of the winding is shown in Fig. 3. This consists of a thread-guide *g* carried on a holder or arm *h* mounted on the traverse-bar *i* which reciprocates longitudinally of the winding spindle A. The holder *h* is of bifurcated form and between its two extensions or legs is a nut *j* on which is mounted the contact-wheel or friction disk *k*. The traverse-bar *i* is formed with eccentric threads *l* and the nut *j* is internally threaded to engage the threads *l*. A wire spring *m* engages a flange on the wheel *k* to press the nut *j* into engagement with the threads *l*. By pressing the wheel *k* in the opposite direction the threads are released so that the wheel and the thread-guide holder can be adjusted along the traverse-bar to set the thread-guide in position to start the winding of a new cop. In Fig. 3 the thread-guide *g* is shown at the rear end of its traverse, and in this position the contact wheel *k* bears on the base of the cone on which the body of the cop is to be built. Each time the thread-guide returns to its rearmost position, when traversed by the bar *i*, the wheel *k* will contact with the outside diameter of the cop and the rotation of the latter will cause a slight rotation of the wheel. The rotation of the wheel *k* causes the nut *j* to feed along the bar *i* and the thread-guide is thereby moved a slight distance outward along the winding spindle in the direction indicated by the arrow. In other words, at each traverse of the thread-guide the wheel *k* contacts with the winding at its point of largest diameter to gradually feed the thread-guide outward along the winding spindle A. This action causes the guide to lay the yarn in the superimposed concentric, conical layers, indicated by *f*, *f*, Fig. 1, and the body of the cop is built out to the required length and terminates in the pointed nose from which the yarn delivers.

Heretofore, in all winding systems operating on this principle the axis of the winding spindle A is arranged parallel to the traverse-bar. In some cases, the winding spindle is reciprocated instead of the traverse-bar, but with either arrangement the path of reciprocation is always in a straight line. This results in building the body of the cop with a cylindrical periphery, as indicated by the dot-and-dash lines *z*—*z* in Fig. 1.

In my present improvement I build the body of the cop with a slight taper, preferably a little greater than the taper of the surface on which the winding is performed; and to provide for this it is necessary that the contact wheel which engages the periphery of the cop shall travel in a plane inclined to the axis *o*—*o* 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

winding spindle, and Fig. 3 illustrates one form of such an arrangement. With the mechanism as here shown the traverse-bar is formed in two parts i and i^2. The main portion i^2 of the bar reciprocates to a plane parallel to the axis of the winding spindle, and the portion i is swiveled at p so that its outer end can swing in toward the axis of the spindle. At the outer end of the portion i I provide a swiveled bearing n which is offset from the plane of the bar portion i^2. The dot-and-dash lines r indicate the position the traverse-bar would assume if it were reciprocated in a straight line parallel to the axis of the winding spindle, but as shown by the full lines the bearing n is set in toward the axis of the spindle so that the bar i takes a position inclined to the axis of the winding spindle.

It will be evident, of course, that as the inner end of the bar i moves out in a plane parallel to the axis of the spindle the inclination of the whole bar i will be increased slightly as the guide moves outward, but this is not material because the contact wheel k only contacts with the winding when the traverse-bar is at the rearward extent of its traverse. That is, the portion i of the traverse-bar will always be in a position inclined to the axis of the winding spindle on which the cop is wound when the friction wheel k is contacting with the winding, so that the points of contact of the wheel k with the cop are maintained in a plane inclined to approach the outer end of the winding spindle. As illustrated graphically in Fig. 3, the distance s will be slightly less than the distance t, and as shown in Fig. 1 the distance u will be less than the distance v, so that the thickness of yarn at the outer end of the cop where the diameter of the tube is smallest will be less than 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 less constrictive force at the outer end of the cop than at the inner end. There is another advantage in building the cop of this form, in that the taper of the layers is maintained at substantially uniformly the same angle throughout the building of the body of the cop. As shown by the dot-and-dash lines q in Fig. 1, if the cop is built with a cylindrical body, and the traverse remains uniform throughout the winding, the taper of the layers will change somewhat from one end of the cop to the other. That is, the nose of the cop will be more blunt or obtuse than the taper of the first layers which are deposited. Such variation in the angles of the several layers results in a disadvantage which is now pointed out. After the proper angle has been determined for winding the separate layers this angle must be maintained throughout the whole body of the cop. Otherwise, if the layers gradually become steeper the yarn will not hold its position so well and is more liable to become loosened and slough off at the point of the nose of the cop.

In my improved cop the angle of inclination of the layers of winding is never allowed to become steeper as the winding progresses, but on the contrary the taper becomes less and less as the body is built out. This provides that there will be less tendency for the coils of winding to slip off of the conical nose at the outer end of the cop and therefore the mass becomes more stable and less liable to break down or be distorted.

The above described method of winding the cop has been found advantageous with certain classes of materials which are especially difficult to wind. As before stated, there is a greater tendency for the mass of yarn to become disarranged at the outer or nose end of the cop than at the base end. By building the cop with a less volume of yarn at the outer end of its body this tendency is overcome and the cop made more stable and less liable to be deformed. With my new form of cop it is possible to wind materials which will not build up a suitable package with previously known systems of winding, and an improved product is produced which is better adapted for use in the shuttle.

In Fig. 2 I have shown my improved form of bobbin wound on a wooden tube w, the shank of which is slightly tapered. This form of tube has a conical butt w' on which the first layer of yarn f' is deposited and succeeding layers f^2, f^2, etc. are wound in concentric conical planes. The dot-and-dash lines show the conformation of the usual style of bobbin wound with a cylindrical body portion and illustrate the difference in taper in the present system of building the bobbin.

It will be understood that the taper of the body of my new cop or bobbin is not determined by the taper of the tube or support on which it is wound, but the body is built with any taper as best adapted to the requirements of the material being wound. It will also be evident that a cop or bobbin might be wound on a straight or cylindrical tube with its body portion tapered as above described.

I do not herein claim the means or mechanism for building my improved cop or bobbin, as the same forms the subject matter for a separate application, Serial No. 545,434, filed February 23d, 1910. The present invention is limited to the improved form of cop shown and described.

What I claim is:

1. A cop or bobbin wound on a tapered

support and having an extended body portion consisting of coniform layers of uniform length and terminating in a conical nose, with said body portion tapering from its base to the nose with a greater taper than that of the support on which the bobbin is wound.

2. A cop or bobbin having an extended body portion consisting of coniform layers of uniform length and terminating in a conical nose, with said body portion tapering from its base to the nose and inclined to the surface on which the bobbin is wound.

3. A cop or bobbin wound with concentric, coniform layers of yarn of uniform length superimposed to form an extended body portion with a tapered periphery and a conical delivery end, said body portion tapered so that its periphery is nearer the surface of the tube on which the bobbin is wound at the outer end of the bobbin than at the base end.

4. A cop or bobbin wound on a tube with concentric coniform layers of yarn of uniform length advancing progressively to form the body of the cop, the edges of the successive layers forming a tapered periphery on the body with said periphery nearer the surface of the tube at the outer end of the cop than at the base end.

5. A cop or bobbin having an extended body portion wound with all the layers of the same length and terminating in a conical nose, with said body portion tapering from its base to the nose so that the thickness of the yarn at the outer end of the cop is less than at the base end.

6. A cop or bobbin wound on a support, with an extended body portion consisting of coniform layers of uniform length and terminating in a conical nose, with said body portion tapered from its base to the nose to provide a less thickness of the yarn around the outer end of the support than at the base end.

7. A cop or bobbin having coniform layers of yarn superimposed to form an extended body portion with all of the layers in said body of uniform length and terminating in a conical delivery end, with the angle of inclination of the layers of winding becoming less steep as the cop increases in length.

8. A cop or bobbin wound with coniform layers of yarn advancing progressively to form the body of the cop, with all of the layers in said body of uniform length the edges of the successive layers forming a slightly tapered periphery on the body and the angle of inclination of the layers decreasing in a steepness from the base to the nose of the cop.

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

CLAES RYDEN.

Witnesses:

ARTHUR A. ARMINGTON,

GRACE W. BROWN.