Sept. 19, 1933. B. GORDON, JR 1,927,547

COP WINDING MACHINE

Filed Dec. 21, 1928 2 Sheets-Sheet 1

FIG. 1.

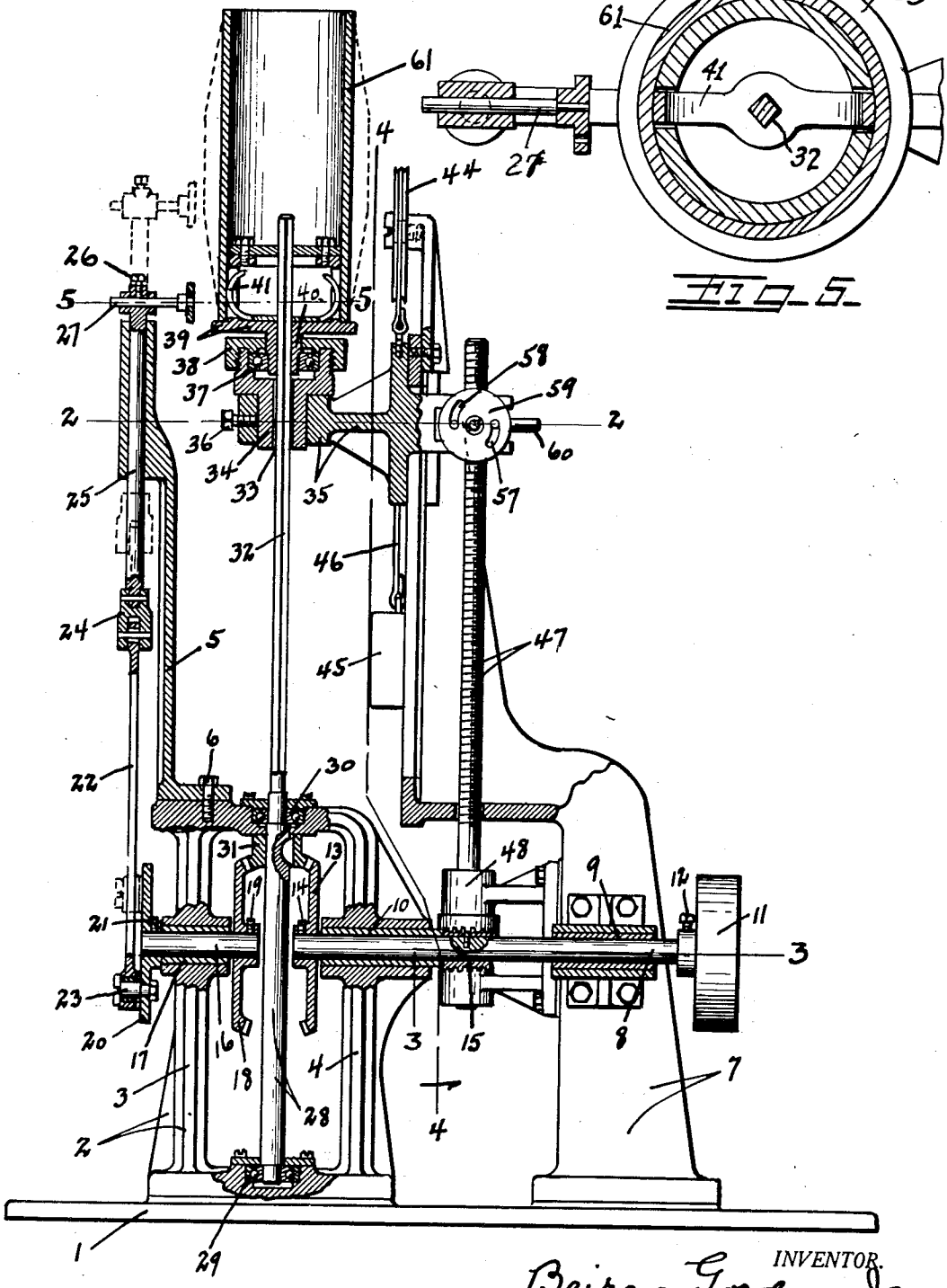


FIG. 5.

INVENTOR.
Beirne Gordon, Jr.
BY
Dinsmore & Thompson
ATTORNEYS.

WITNESS.
H. V. Hurst

Sept. 19, 1933. B. GORDON, JR 1,927,547

COP WINDING MACHINE

Filed Dec. 21, 1928 2 Sheets-Sheet 2

Fig. 2.

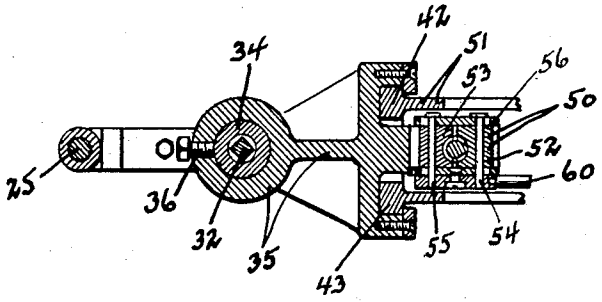


Fig. 3.

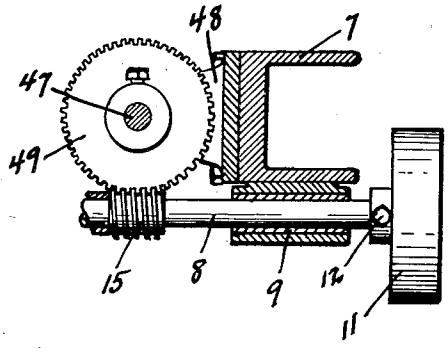
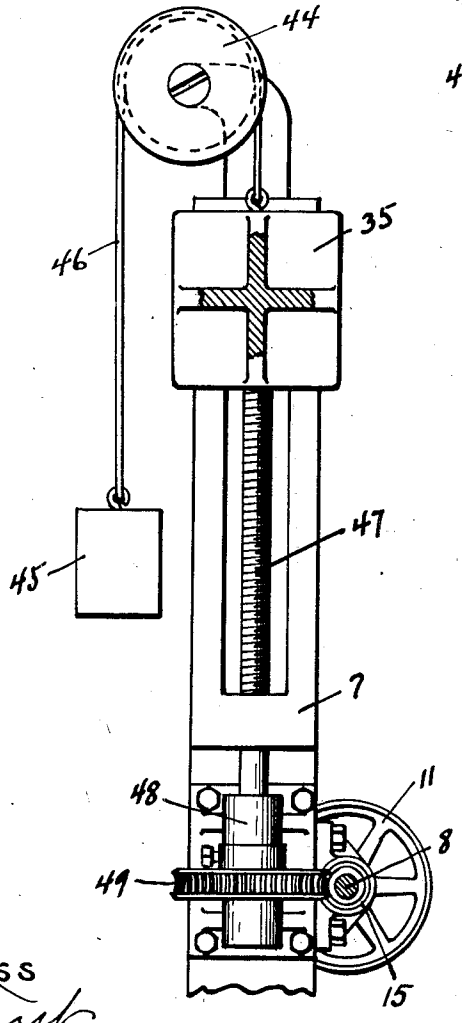


Fig. 4.



Beirne Gordon, Jr.
INVENTOR.

BY Denison Thompson

ATTORNEYS.

WITNESS
H. Hurst

Patented Sept. 19, 1933 1,927,547

UNITED STATES PATENT OFFICE

1,927,547

COP WINDING MACHINE

Beirne Gordon, Jr., Utica, N. Y., assignor to Skenandoa Rayon Corporation, Utica, N. Y., a corporation of New York

Application December 21, 1928
Serial No. 327,611

5 Claims. (Cl. 242—43)

This invention relates to a new and improved winding machine more especially designed for winding yarn, thread and the like, such as silk, wool, cotton, rayon, etc.

The usual method of winding such material is to provide a bobbin mounted on a rotating spindle and to cause the thread to pass to the bobbin through a traversing thread-guide which also has a gradual movement, as for instance is gradually elevated with respect to the bobbin.

A difficulty in connection with such machines as at present constructed resides in the fact that the speed of the traverse is to a certain extent limited, due to the necessity of successively raising or elevating the traversing plane, and an object of this invention is to provide a construction of winding machine which can be run at almost any desired speed, due to the fact that the traverse guide always remains in one plane.

A further difficulty with present machines resides in the fact that the traverse plane of the thread-guide is not continuous and the operation is not positive and smooth, and another object of this invention is the provision of a construction in which the element which receives the material being wound, as for instance a bobbin, is caused to move continuously, positively and uniformly, with respect to the unchanged traversing plane of the thread-guide.

Another advantage of this invention resides in the fact that the angle of the thread from its usual guide to the traverse guide remains within the limits of the traverse, whereas this angle is constantly changing in present types of machines wherein the traverse guide is being successively raised to accomplish the building of the package being wound.

This change of angle in present machines causes a constant change in tension on the thread to its disadvantage, particularly in the winding of material, such as rayon. Furthermore, such a change in tension results in a package of uneven density.

Other objects and advantages relate to the size, shape and relation of the parts, all as will more fully appear in the following description taken in connection with the accompanying drawings, in which:—

Figure 1 is a vertical section through my device.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is a section on line 3—3, Figure 1.

Figure 4 is a section showing certain parts in elevation on line 4—4, Figure 1.

Figure 5 is a section on line 5—5 of Figure 1.

In the drawings I show a base —1— having secured thereon an upwardly extending frame —2— having opposed bearing-supports —3— and —4—. On the upper surface of bearing-support —3— is secured a vertically extending thread-guide support —5— by means of bolts —6— (one only being shown).

A second frame —7— is secured on base —1— in parallel relation to support frame —2— and thread-guide support —5—. A shaft —8— has one end journaled in a bearing —9— secured to support —7— and has its opposite end journaled in a bearing —10— on bearing-support —4—.

The outer end of shaft —8— carries a pulley —11— secured thereto by a set screw —12—. The inner end of shaft —8— carries a beveled gear —13— secured thereto by a set screw —14—. A worm —15— is secured to shaft —8— between bearings —9— and —10—.

A second shaft —16— is journaled in a bearing —17— in bearing-support —3— and carries on its inner end a beveled gear —18— secured thereto by a set screw —19—. The outer end of shaft —16— is provided with a crank-arm —20— secured thereto by a set screw —21—. A link —22— has one end pivotally mounted on crank-arm —20— by means of pivot pin —23— and has its other end pivotally mounted in a yoke —24— secured to the lower end of a reciprocating shaft —25— journaled in thread guide-support —5—. The upper end of shaft —5— has secured thereto a thread-guide —27— by means of a set screw —26—.

A bobbin-shaft —28— has its lower end journaled in the base of bearing-support —2—, preferably by means of a ball bearing —29—. A ball bearing —30— positioned in the upper end of bearing support —2— acts as an intermediate bearing for shaft —28—.

A beveled gear —31— is keyed to shaft —28— beneath bearing —30— and is continuously in mesh with gears —13— and —18—. The upper end —32— of shaft —28— is square in cross-section, and extends upwardly through an aperture —33— in bearing-support —34—. Aperture —33— is sufficiently large in diameter to permit the free rotation therein of end —32— of shaft —28—.

Bearing support —34— is secured in the main bobbin support —35— by a set-screw —36—. A ball bearing —37— is held in position on the upper end of bearing support —34— by a bearing-cap —38—.

A bobbin-spindle —39— carries a downwardly extending shank —40— journaled in bearing —37— and is provided with a curved spring

—41— having its opposite ends extending outwardly through slots in bobbin-spindle —39—. Bobbin-spindle —39— is provided with a central aperture square in cross-section, and of a size to receive the upper end —32— of shaft —28— which is slidably, but not rotatably mounted therein.

The outer end of main bobbin support —35— is slidably mounted on guides —42— and —43— carried on the upper end of frame —7—. A pulley —44— is rotatably mounted on the upper end of frame —7— above main bobbin-support —35—. A counterweight —45— is secured to one end of a cable —46— which passes over pulley —14— and has its other end secured to main bobbin support —35— to support the weight of the latter.

A threaded shaft —47— has its lower end journaled in a bracket —48— secured to frame —7—, and carries adjacent its lower end a worm gear —49— continuously in mesh with worm —15— on shaft —8—. Threaded shaft —47— extends upwardly through a split nut —50— which is held against rotation in a cage —51— carried on main bobbin support —35—.

The opposite halves —52— and —53— of split nut —50— are provided respectively with pins —54— and —55—. One of the ends of pins —54— and —55— are slidably mounted in a plate —56— and the other ends of pins —54— and —55— extend outwardly into curved slots —57— and —58— in a pivoted plate —59—. An operating handle —60— is attached to plate —59—. When plate —59— is pivoted pins —54— and —55— will move in slots —57— and —58— and will be forced outwardly to disengage split nut —50— from threaded shaft —47— so that the main bobbin support —35— may be moved vertically independently of threaded shaft —47—.

Operation

When it is desired to wind a cop on a bobbin, a bobbin —61— is placed in position on bobbin spindle —39—. I have shown as illustrative, a solid cylindrical bobbin, but obviously a bobbin of my desired form may be used and the bobbin may be perforated, if desired. Split nut —50— is then opened and main bobbin support —35— is moved vertically until the lower end of bobbin 61 is in line with thread guide —27— with shaft —25— in the downward position. Split nut —50— is then closed into engagement with threaded shaft —47—. The thread to be wound (none here being shown) is then passed through thread guide —27— and around the lower end of bobbin —61—.

With the parts in this position, shaft —18— is caused to revolve from any convenient source of power (none here being shown) with the result that through gears —13— and —31— shaft —28— will be made to revolve, and inasmuch as the upper end —32— of shaft —28— is in operative engagement with bobbin spindle —39—, the spindle —39— will also be caused to revolve, carrying with it bobbin —61—, which is held securely on spindle —39— through the action of spring —41— which is in resilient engagement with the inner surface of bobbin 61. The rotation of bobbin 61 will cause the thread to be drawn through thread guide 27 and wound on bobbin 61.

The rotation of shaft —8— will, through gears —13—, —31— and —18— cause the rotation of shaft —16— with a resulting rotary movement of crank arm —20—. The rotary movement of crank-arm —20— will through link —22— and yoke —24—, cause a reciprocating movement of shaft —25— so that thread-guide —27— will be moved up and down a limited distance in relation to bobbin —61— to cause the thread to be wound on bobbin —61—.

The rotation of shaft —8— will, in addition, through worm —15— and worm gear —49— cause the rotation of threaded shaft —47—. Threaded worm shaft —47— being in engagement with split nut —50— which itself is held against rotation in cage —51— on main bobbin-support —35—, split nut —50— and main bobbin support —35— will be moved downwardly, carrying with them bobbin —61—. This downward movement of bobbin —61— past thread guide —27— will be continued until the upper end of bobbin —61— is in line with thread guide —27—, when the latter is in the raised position. When this movement has been completed, the machine will be stopped so that the bobbin with the cop thereon may be removed and a new one substituted for a repetition of the cop-winding operation.

In Figure 1 I have shown in heavy lines a thread-guide —27— in the down position, and in dotted lines thread-guide —27— in the raised position as illustrative of the traversing movement of said guide. I have also shown in dotted lines the shape which the cop will have when it has been wound on bobbin —61—, the cop being thicker at the central part than at the end because of the fact that the reciprocating movement of thread-guide —27— combined with the continuing downward movement of bobbin —61— will progressively increase the number of overlapping threads from the lower end of the bobbin, and it will also progressively decrease the number of overlapping threads as thread-guide —27— approaches the upper end of bobbin—61—. The speed of the vertical or downward movement of the bobbin and its support with respect to the traversing guide is determined by the speed of shaft —8— and the pitch of the threads upon shaft —47— which, as shown, are of comparatively low pitch.

I have here shown an apparatus in which the thread-guide and the bobbin-support move vertically with relation to each other, but it will be understood that a similar result will be obtained if the parts are arranged so that they will move horizontally or in any other direction, provided only that they move in substantially parallel relation.

It will also be understood that the mechanical means for obtaining my result may be varied to a considerable extent without departing from the spirit of my invention, and although I have shown and described a specific structure and form of parts thereof as an exemplification or embodiment of my invention, I do not desire to restrict myself to the exact size, shape, or relation of parts, as various changes may be made within the scope of the appended claims.

I claim:

1. In a device of the class described, a shaft having one end non-circular, a support slidable on the non-circular end of the shaft and free of driving connection therewith, a bobbin holder rotatably mounted on the support and non-rotatably but slidably mounted on the non-circular end of the shaft, and separate means for rotating the shaft and moving the support whereby the bobbin holder will be moved axially of the shaft.

2. In a device of the class described, a frame, a shaft having one end non-circular rotatably

mounted in the frame, a non-rotatable support slidably mounted on the frame and having an aperture to permit rotation therein and the passage therethrough of the shaft, a bobbin holder rotatably mounted on the support and non-rotatably but slidably mounted on the non-circular end of the shaft, and separate means for rotating the shaft and moving the support whereby the bobbin holder will be moved axially of the shaft.

3. A cop winding machine comprising a frame, a shaft journaled in the frame for rotary movement, a bobbin holder support slidably mounted on the frame, a builder screw associated with the bobbin holder support, a split nut forming a quick detachable connection between the builder screw and the bobbin holder support, a manually operated cam for operating the split nut, a bobbin holder rotatably mounted on said support and slidably mounted on said shaft, means for rapidly rotating said shaft, and means for slowly rotating the builder screw.

4. In a device of the class described, a shaft having one end non-circular, means holding the shaft against axial movement, means for rotating the shaft, a non-rotatable support having an opening therein through which the non-circular end of the shaft freely extends, a bobbin holder rotatably mounted on the support and non-rotatably but slidably mounted on the out-of-round end of the shaft, and means for moving the support whereby the bobbin holder will be moved axially of the shaft.

5. In a device of the class described, a shaft, a non-rotatable support slidable on the shaft, a bobbin holder rotatably mounted on the support and non-rotatably but slidably mounted on the shaft, axially aligned drive and driven shafts respectively at opposite sides of the first named shaft, connections between the drive and driven shafts constituting drive means for the first named shaft, a thread guide and connection between the driven shaft and thread guide for reciprocating the guide in a straight line parallel with the axis of said bobbin holder.

BEIRNE GORDON, JR.