H. D. COLMAN.

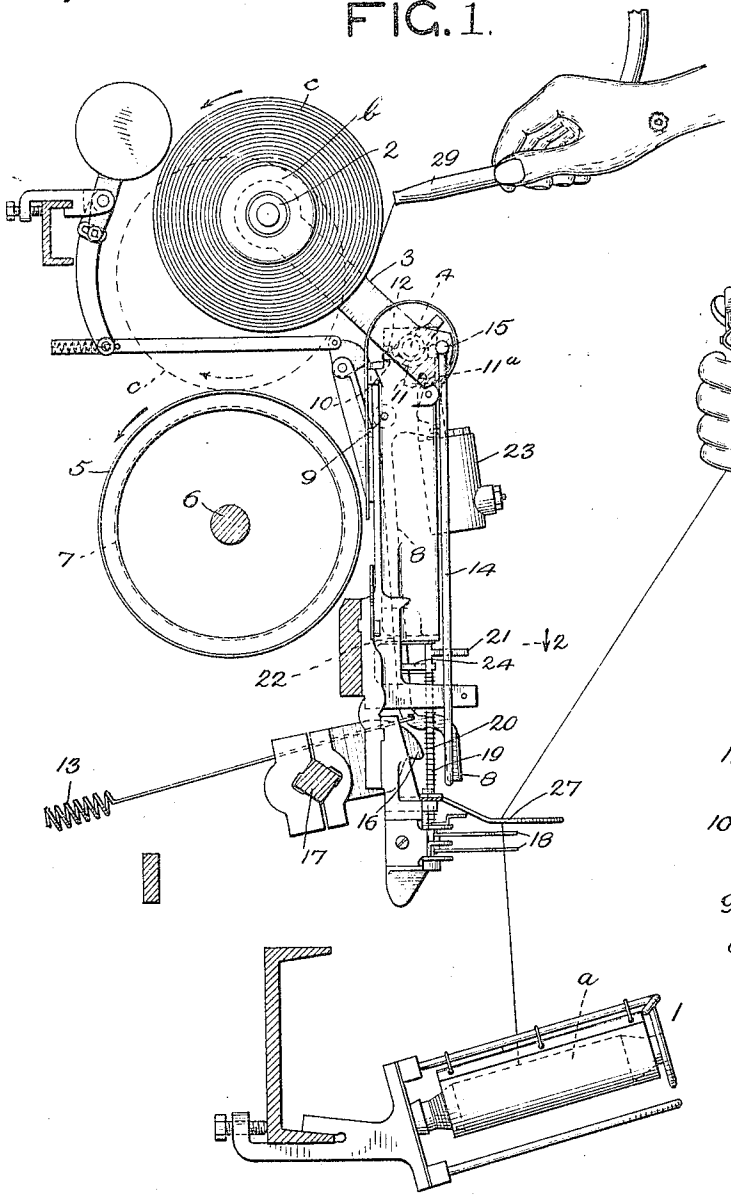
METHOD OF WINDING YARN.

APPLICATION FILED MAR. 9, 1916.

1,258,986.

Patented Mar. 12, 1918.

FIG. 1.



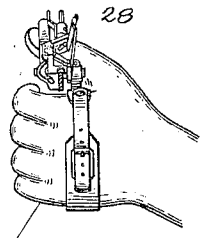
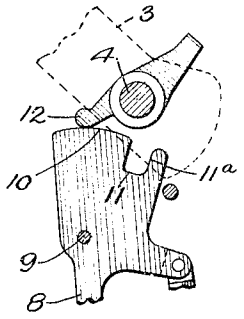


FIG. 3.



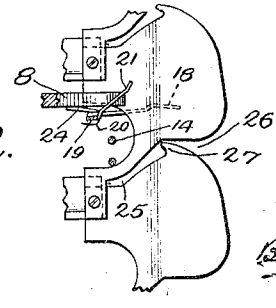


FIG. 2.

Witnesses:

J. C. Clerick.

George L. Chindahl

Inventor:

Howard D Colman.

By Ruthven L. Miller
Atty.

UNITED STATES PATENT OFFICE.

HOWARD D. COLMAN, OF ROCKFORD, ILLINOIS, ASSIGNOR TO HOWARD D. COLMAN, LUTHER L. MILLER, AND HARRY A. SEVERSON, COPARTNERS TRADING AS BARBER-COLMAN COMPANY, OF ROCKFORD, ILLINOIS.

METHOD OF WINDING YARN.

1,258,986. Specification of Letters Patent. Patented Mar. 12, 1918.

Application filed March 9, 1916. Serial No. 83,009.

To all whom it may concern:

Be it known that I, HOWARD D. COLMAN, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented a certain new and Improved Method of Winding Yarn, of which the following is a specification.

This invention relates to a method of forming a long thread from a plurality of shorter threads, and winding such long thread upon a container.

In the accompanying drawings Figure 1 is a fragmental sectional view of a mechanism which may, if desired, be employed in practising the method herein disclosed. Fig. 2 is a sectional view taken approximately in the plane of dotted line 2 of Fig. 1. Fig. 3 is a fragmental detail view.

The improved method of winding herein disclosed may be practised by means of the machine fully illustrated and described in my co-pending application Serial No. 628,474, filed May 25, 1911 (Patent No. 1,175,710, dated March 14, 1916); and it may be carried out with the aid of manually-actuated implements and mechanisms, as indicated in the present drawings.

The mechanism herein illustrated is adapted to rewind yarn from successive bobbins *a* onto a tubular container *b* to form a cylindrical cross-wound yarn mass or cheese *c*. The bobbin *a* may be supported in any suitable manner; for example, it may be non-rotatably supported for the drawing of the yarn off the tip of the bobbin, or it may be rotatably supported for the unwinding of the yarn from the side of the bobbin. Herein is shown a bobbin-holder 1 which is substantially similar to the bobbin-holder shown in Patent No. 1,045,879, dated December 3, 1912.

The cheese core *b* is removably supported upon a hub 2 which is rotatably mounted upon the end of an arm 3, said arm being pivoted at 4. The means for revolving the cheese to draw yarn from the bobbin consists of a drum 5 mounted upon a driving shaft 6, said drum having a peripheral cam groove 7. When the yarn mass is in peripheral contact with the drum 5, as indicated by dotted lines in Fig. 1, the yarn mass is rotated and the yarn rapidly traversed.

Means is provided for pressing the yarn mass against the drum 5. Herein is shown a lever 8 pivoted at 9 to the machine frame. The upper end of the lever is rounded, as at 10, and has a notch 11 therein to receive a lug 12 fixed to the arm 3. When the cheese is in contact with the driving drum 5 the lug 12 lies in the notch 11, and a spring 13 acting upon the lever 8 presses the cheese against the drum.

Means may be provided for automatically removing the yarn mass from contact with the drum 5 when the yarn breaks or is completely unwound from the bobbin. Such a means is fully disclosed in said application Serial No. 628,474, and therefore need not be illustrated or described in detail herein. The present drawings, however, show a link 14 pivoted at 15 to the end of the arm 3 opposite to that which supports the cheese. The lower end of said link is adapted to be engaged by a hook 16 fixed upon a rock shaft 17. 18 are detector fingers fixed upon a vertical shaft 19 and yieldingly pressed against the running thread by means of a torsion spring 20 surrounding said shaft. 21 is an arm fixed to the detector shaft 19. When the thread exhausts, the shaft 19 is revolved under the action of the spring 20, whereby the arm 21 swings against the link 14 and carries said link within the range of action of the hook 16. Upon the next downward movement of the hook the link 14 is pulled downward so as to raise the cheese off the driving drum 5 and remove the lug 12 from the notch 11. As the lug 12 is being forced out of the notch 11, the lever 8 is caused to swing forward a little, but as soon as the lug has left the notch, the spring 13 swings the lever 8 against a stop 22, the action of the spring being controlled by a dashpot 23. The surface 10 is thus placed under the lug 12, whereby the cheese is held in the withdrawn position while a new bobbin thread is being

tied to the exhausted thread. 24 is an arm on the shaft 19 arranged to be engaged by the lever 8 for the purpose of moving the detector fingers into the thread-receiving position shown in Fig. 2.

25 (Fig. 2) indicates a passageway through which the running thread extends. This passageway serves to guide the thread of a new bobbin into running position. 26 is a flaring entrance to said passageway. 27 is a hook located at one side of the entrance. The hook 27 keeps the thread of a new bobbin in position to be engaged by the detector fingers 18 as said fingers swing into operative position.

The cheese cores *b* are returned from the warper creel with a small amount of yarn remaining thereon. The operator places such a cheese core upon the hub 2, takes a bobbin *a*, finds the end thereon, unwinds a sufficient length of yarn from the bobbin, inserts the bobbin in the bobbin-holder, places the bobbin thread within the hook 26, finds the end upon the cheese, and unites the bobbin thread and the cheese thread. The threads may be united in any suitable way, as by means of a hand-tied knot, or, if desired, a knot-tying implement mounted upon the hand of the operator may be employed. A knotter 28 similar to the one shown in Patent No. 755,110, dated March 22, 1904, is illustrated in the present drawings. To find the end of the thread upon the cheese, the operator causes the cheese to revolve in the unwinding direction and while the cheese is thus rotating, the operator subjects the periphery of the cheese to an exhaust air current, as, for example, by means of a suction tube 29. The tube 29 is connected to a suitable fan (not shown) and is preferably suspended from an overhead support. As herein shown, the lower end of the tube is arranged to be held in the right hand of the operator, but, if desired, it may be attached in any suitable manner to the back of the left hand of the operator. The end of the thread on the cheese having been picked up by the air current, the operator lays said thread and the bobbin thread across the thread-guides of the knotter and actuates the knotter to tie the two threads together and trim off the ends of the knot.

Before releasing the united threads, the operator rotates the cheese by hand in the direction to wind up the thread, thus taking the slack out of the threads and preventing any kinks that may have formed from being wound upon the cheese. The operator next draws the lever 8 forward to allow the detector fingers to move into contact with the thread, and to remove the surface 10 from beneath the lug 12 and bring the upper end of the wall 11^a of the notch into contact with the lug 12. The operator then allows the spring 13 to draw the lever 8 slowly rearward.

As the lug 12 passes down into the notch 11, the cheese descends upon the cam drum 5, the operator keeping the thread taut as it approaches the running position. After the thread has been released and has assumed the running position, the operator releases the lever 8, thereby permitting the spring 13 to press the cheese against the cam drum.

When the thread exhausts, the cheese is automatically withdrawn from the cam drum, the operator removes the spent bobbin from the bobbin-holder, and the series of operations just described are repeated. When the desired amount of yarn has been wound upon the cheese core *b*, the latter is removed and another core *b* substituted.

I claim as my invention:

1. The process of forming a long thread from a plurality of shorter threads, and winding such long thread upon a container, consisting in rotating the container to wind a thread thereon, reversing the direction of rotation when the thread is exhausted, subjecting the periphery of the yarn mass on the container to an exhaust air current while the container is being revolved in the reverse direction, whereby the loose end of the thread is found, uniting said end to the end of another thread, and revolving the container in the forward direction to wind such other thread on the container.

2. The process of rewinding yarn from a plurality of bobbins in succession to another container, which consists in rotating said other container to draw yarn from a bobbin until the yarn exhausts, disconnecting the container from said rotating means, subjecting the periphery of the yarn mass on the container to an exhaust air current while revolving the yarn mass in the reverse direction, uniting the thread picked up by the air current to the thread of another bobbin, and again placing the container in operative relation to said rotating means.

3. The process of rewinding yarn from a plurality of bobbins in succession to another container, which consists in rotating said other container to draw yarn from one of said bobbins, traversing the yarn to produce a cross-wound yarn mass on the container, disconnecting the container from said rotating means when the yarn exhausts, subjecting the periphery of the yarn mass on the container to an exhaust air current while revolving the yarn mass in the reverse direction, uniting the thread picked up by the air current to the thread of another bobbin, and again placing the container in operative relation to said rotating means.

4. The process of rewinding yarn from a plurality of bobbins in succession to another container which consists in rotating

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said other container to draw yarn from a bobbin until the yarn exhausts, disconnecting the container from said rotating means, subjecting the periphery of the yarn mass on the container to an exhaust air current while revolving the yarn mass in the reverse direction, uniting the thread picked up by the air current to the thread of another bobbin, taking the slack out of the united threads to remove kinks, and again placing the container in operative relation to said rotating means.

In testimony whereof, I have hereunto set my hand.

HOWARD D. COLMAN.