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YARN WINDING MACHINE

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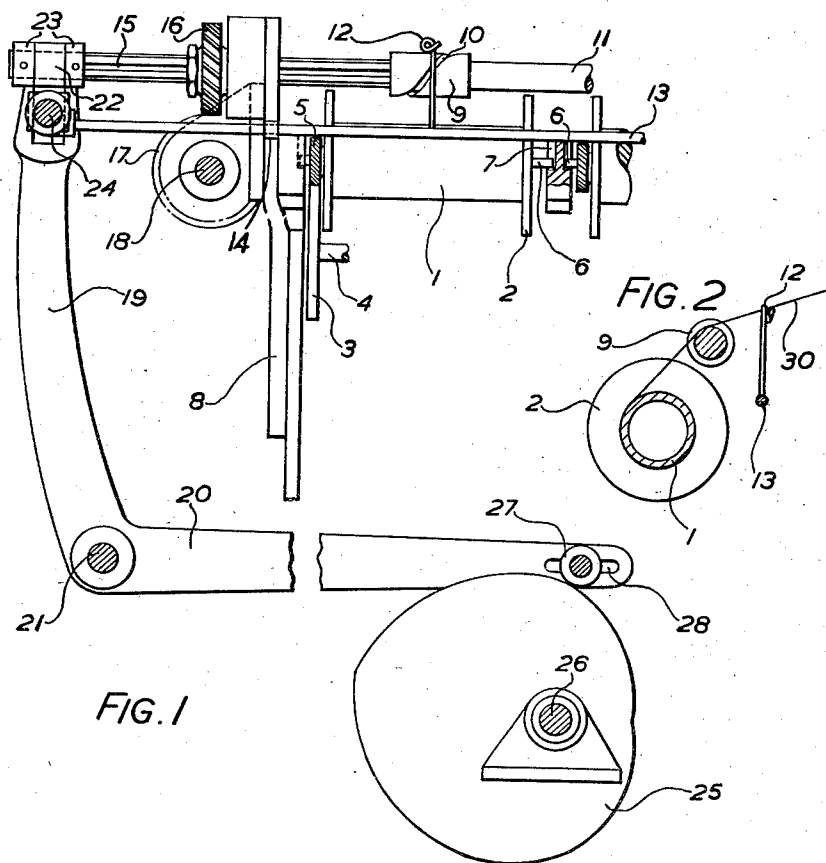
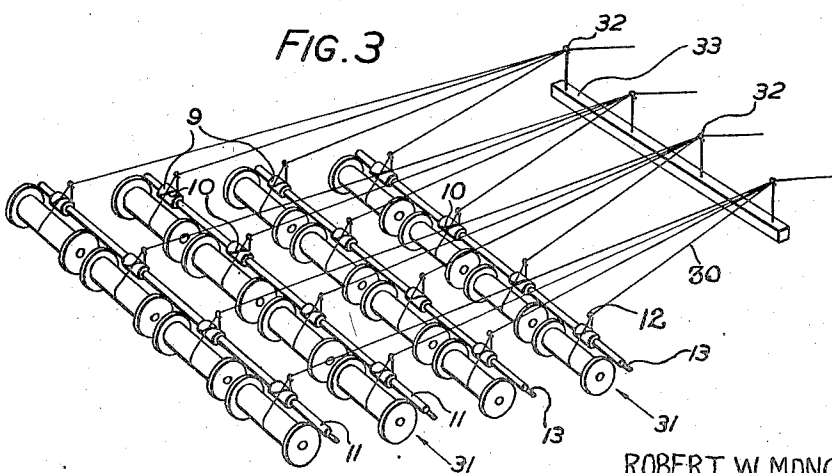


FIG. 1

FIG. 2

FIG. 3



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YARN WINDING MACHINE

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5 Claims. (Cl. 242-43)

This invention relates to yarn winding machines for producing cheeses, bobbins and like packages of yarn.

According to the invention a yarn winding apparatus comprises a package support, means for rotating a package mounted on said support, a rotatable guide member presenting an endless slot or groove through which the yarn is led to said package, means for rotating said guide member, whereby yarn running in said groove is traversed to and fro along a part of the length of said package, a non-rotating guide adapted to conduct the yarn to said rotatable guide member, and means for traversing said rotatable guide member and said non-rotatable guide member slowly together to and fro relatively to said package and from end to end along the length thereof, whereby successive layers of yarn are wound on said package. The non-rotating guide not only directs the yarn into the slot or groove in the rotatable guide member so as to reduce its tendency to escape from the member, but provides for substantial evenness in yarn tension over the whole length of the traverse.

The rotatable member may be in the form of a slotted cylinder, or a pair of members having suitably shaped edges slightly displaced from each other in the direction of their lengthwise traverse of the package so as to form a slot, the package being driven by any suitable means, e. g. a drum bearing the weight of the package and rotating at a peripheral speed substantially equal to the rate at which yarn is fed to the package, or by friction roller or other drive applied to the package support. As the rotatable member rotates, the yarn is traversed to and fro along the package by an amount equal to the length of the member, the field of traverse being, however, gradually moved lengthwise of the package by reason of the traverse of the rotatable member itself lengthwise of the package.

With the rotatable guide member moving bodily over the length of the package, the traversing guide is conveniently attached to a member that serves to effect the lengthwise traverse of the rotary member. One cam or similar mechanism may thereby serve to traverse both the yarn guide and the rotary member.

A yarn winding apparatus according to the invention will now be described in greater detail with reference to the accompanying drawing, in which

Fig. 1 shows the yarn traversing mechanism and its operation upon a single package forming part of a large number of packages;

Fig. 2 is a sectional view showing a detail of Fig. 1; and

Fig. 3 is a diagrammatic perspective view of an apparatus in which a large number of packages may be simultaneously wound by the means according to the invention.

Referring to Fig. 1 the yarn package 1 is in the form of a bobbin having flanges 2 and is driven by means of a friction wheel 3 mounted on a driven shaft 4 and engaging with a friction wheel 5 mounted on a spindle 6 by which the bobbin is carried. The spindle 6 is dropped into slotted bearings 7 in the machine frame 8. Yarn is traversed on the rotating bobbin 1 by means of a rotatable guide member 9 in the form of a cylinder having an endless slot 10 therein, and mounted on a rotatable shaft 11. The yarn is led, according to the invention, to the guide member 9 by means of a non-rotating guide 12 mounted on a bar 13, slidably carried in bearings 14 in the machine frame 8.

The shaft 11 carrying the guide member 9 is splined at 15 to a skew gear 16 and is driven through the skew gear 16 from a further skew gear 17 mounted on the main shaft 18 of the machine. The splining 15 enables the shaft 11 to be reciprocated axially, so that in addition to the short traverse given to the yarn in its passage through the groove 10 by the rotation of the shaft 11 and guide member 9, the yarn receives a longer and slower traverse along the whole length of the bobbin 1. This reciprocation of the shaft 11 is effected by means of a bell crank lever 19, 20, pivotally mounted at 21. To the end of one arm 19 of the bell crank lever 19, 20 the end of the shaft 11 is secured by passing through a block 22 on either side of which are disposed collars 23 secured to the shaft. The block 22 is pivoted at 24 to the end of the lever 19. In order that the non-rotating guide 12 may receive the slow traverse imparted to the rotating guide 9 the rod 13 carrying the guide 12 is also secured to the block 22 and is actuated by the lever 19. The reciprocation of the guides 9 and 12 is effected through the lever 19 by means of a cam 25 rotating on a shaft 26 and acting on a cam bowl 27 mounted on the other arm 20 of the bell crank lever 19, 20. The cam bowl 27 is adjustably mounted in a slot 28 in the end of the lever 20.

Since the yarn is to be wound on bobbins, the rotatable yarn guide member 9 is so arranged that the slot or groove 10 directs the yarn close to the bobbin flanges 2, by being disposed outside the flanges 2 and traversing slightly past them.

The winding device according to the invention is, however, particularly advantageous in the winding of flangeless packages such as cheeses and cones, the traverse imparted during the rotation of the member forming a cross-wind that enables the ends of the packages to be self-supporting and free from lengths of yarn falling over the ends. The invention, therefore, enables flangeless packages to be constructed which contain substantially even-tensioned yarn and have an open wind due to the traverse imparted by the rotary member 9.

As is shown in Fig. 3 the bobbin 1 is a member of a large number or bank of bobbins arranged in several rows 31. Each row 31 is provided with its own traversing mechanism of the kind shown in Fig. 1, the shafts 18 and 26 being common to all the rows. The yarns 30 coming to the bank of bobbins as shown in Fig. 3 pass in groups of 4 (one for each row) through a series of guides 32 (one for each package in a row) mounted on a guide bar 33, and thence proceed to the non-rotating guides 12 of the individual bobbin 1.

Having described our invention what we desire to secure by Letters Patent is:—

1. Yarn winding apparatus comprising a package support, means for rotating a package mounted on said support, a rotatable guide member presenting an endless slot or groove through which the yarn is led to said package, means for rotating said guide member, whereby yarn running in said groove is traversed to and fro along a part of the length of said package, a non-rotating guide adapted to conduct the yarn to said rotatable guide member, and means for traversing said rotatable guide member and said non-rotatable guide member slowly together to and fro from end to end along the length of said package, whereby successive layers of yarn are wound on said package.

2. Yarn winding apparatus comprising a package support, means for rotating a package mounted on said support, a rotatable guide member presenting an endless slot or groove through which the yarn is led to said package, means for rotating said guide member, whereby yarn running in said groove is traversed to and fro along a part of the length of said package, a non-rotating guide adapted to conduct the yarn to said rotatable guide member, and means, comprising a cam and a cam follower operatively connected to said rotatable guide member and said non-rotatable guide member adapted to traverse both said rotatable guide member and said non-rotatable guide member slowly together to and fro from end to end along the length of said package, whereby successive layers of yarn are wound on said package.

3. Yarn winding apparatus comprising a package support, means for rotating a package mounted on said support, a rotatable guide member presenting an endless slot or groove through which the yarn is led to said package, means for rotating said guide member, whereby yarn running in said groove is traversed to and fro along a part of the length of said package, a non-rotating guide adapted to conduct the yarn to said rotatable guide member, and a means for traversing said rotatable guide member and said non-rotatable guide member slowly together to and fro from end to end along the length of said package, whereby successive layers of yarn are wound on said package, said rotatable guide member being disposed at a little distance from said package support so that a flanged bobbin may be employed as the package, and the rotatable guide member may be traversed slightly beyond the flanges thereof so as to direct the yarn close to said flanges.

4. Yarn winding apparatus comprising a plurality of package supports disposed in a bank of rows, means for rotating packages mounted on said supports, a rotatable guide member in connection with each package support, said guide member presenting an endless slot or groove through which yarn is led to said package, common means for rotating the guide members of each row of package supports, whereby yarn running in said groove is traversed to and fro along a part of the length of said package, a non-rotating guide in connection with each guide member adapted to conduct the yarn to said guide member and common means for traversing both the rotatable guide members and the non-rotatable guide members of each row slowly together from end to end along the length of each package, whereby successive layers of yarn are wound on said packages.

5. Yarn winding apparatus, comprising a package support, means for rotating a package mounted on said support, a rotatable guide member in the form of a hollow cylinder having an endless slot in the surface thereof through which the yarn is led to said package, means for rotating said guide member, whereby yarn running in said groove is traversed to and fro along a part of the length of said package, a non-rotating guide adapted to conduct the yarn to said rotatable guide member and means for traversing said rotatable guide member and said non-rotatable guide member slowly together to and fro from end to end along the length of said package, whereby successive layers of yarn are wound on said package.

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