Nov. 16, 1943. A. CAVEDON 2,334,542

APPARATUS FOR PRODUCING NUBBED YARNS

Filed Sept. 30, 1940 2 Sheets-Sheet 1

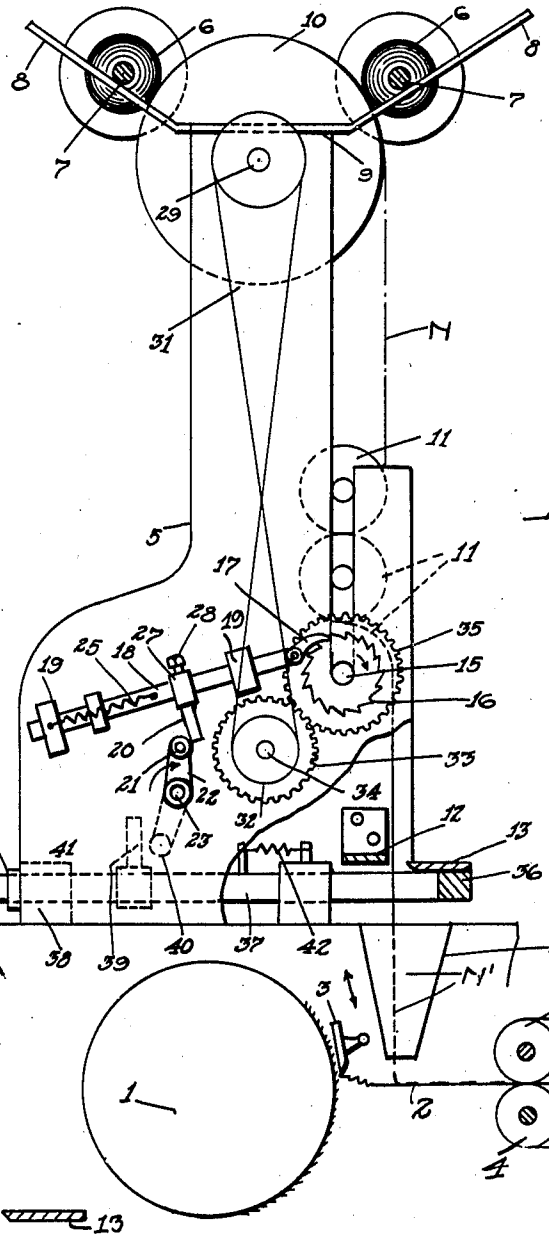

Fig. 1.

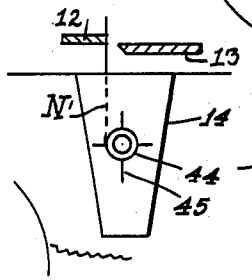

Fig. 4.

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APPARATUS FOR PRODUCING NUBBED YARNS

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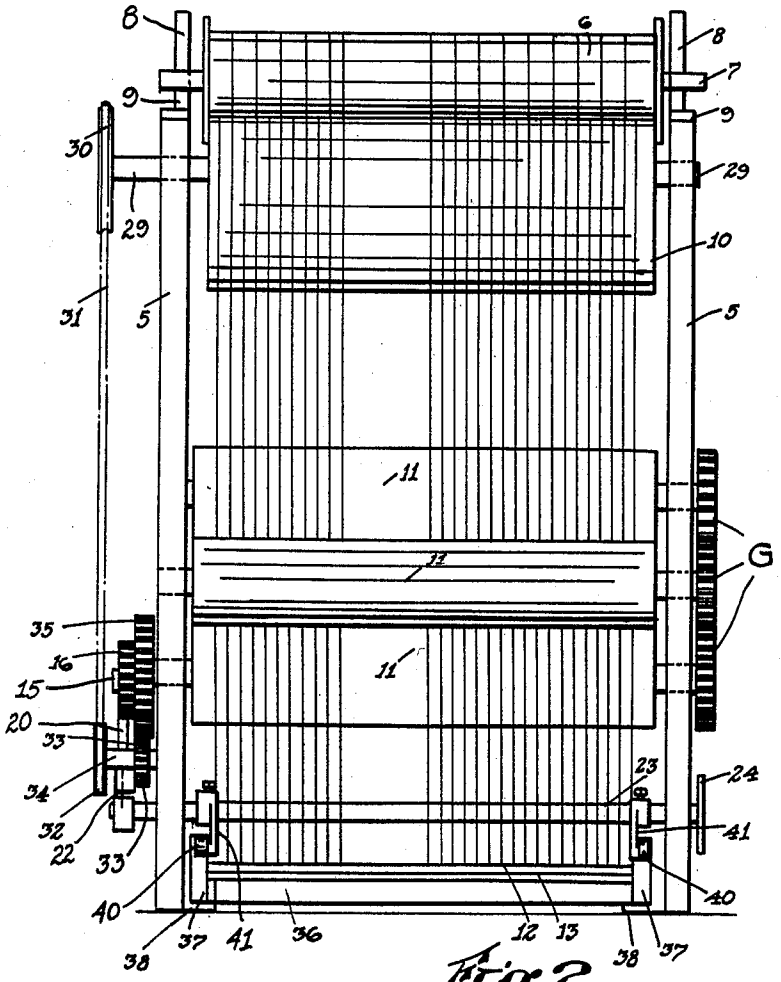

Fig. 2.

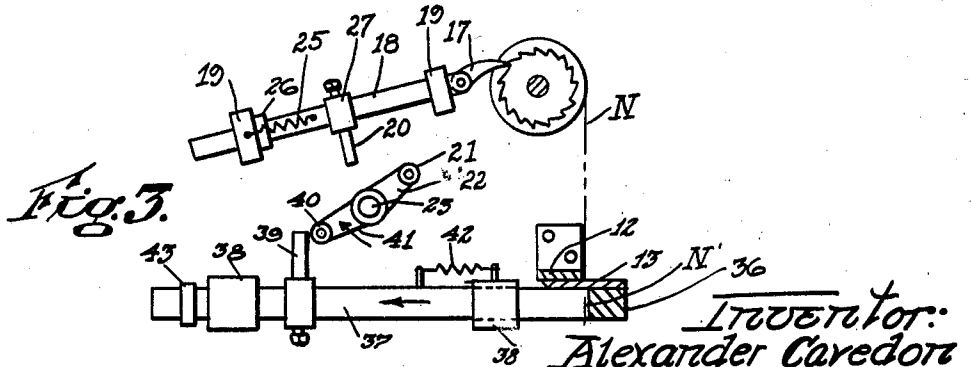

Fig. 3.

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APPARATUS FOR PRODUCING NUBBED YARNS

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Application September 30, 1940, Serial No. 358,991

1 Claim. (Cl. 19—145)

The present invention relates to apparatus for producing nubbed yarns, i. e., yarns having nubs or spots of fibrous material of different character or color incorporated in the yarns at regular intervals, as may be desired.

According to the present invention, the apparatus for producing nubs is located adjacent to the doffer of a finishing card, so as to deliver the nubs to the travelling web of carded fibres just after it leaves the doffer and before it is acted upon by the usual condenser for formation into separate yarns. Thus the nubs dropped onto the web become pressed into the same, and as the web is divided and rubbed into slivers, the nubs become incorporated permanently in the resulting yarns.

The apparatus of the present invention is particularly characterized by the fact that the feeding means for the nub material is so synchronized with the cutting means that the lengths of the individual nubs can be closely controlled to give just the desired distribution of the nubs when incorporated in finished yarn. The above and other advantageous features of the invention will hereinafter more fully appear from the following description considered in connection with the accompanying drawings, in which—

Fig. 1 is a view in side elevation of apparatus for delivering nubs to a travelling web, as doffed from a finishing card, some parts being in section.

Fig. 2 is a view in front elevation of a portion of the apparatus shown in Fig. 1.

Fig. 3 is a fragmentary view, illustrating the operation of the knife blades for cutting the nub material.

Fig. 4 is a fragmentary view of a modification of the means for delivering the nubs.

Referring to the drawings, a portion of the doffer of a finishing card is indicated at 1, from which a web 2 of carded fibres is adapted to be stripped in the usual manner by a comb 3. After being stripped from the doffer, the web 2 passes to the dividing rolls 4 of a condenser, the operation of which serves to form slivers of the web into individual yarns. The nub feeding mechanism of the present invention is adapted to deliver nubs to the web 2 in its passage between the doffer 1 and dividing rolls 4, and is mounted on spaced frame members 5 that extend above the doffer base, indicated at B. These members 5 support the supply of nub material as well as the synchronized mechanism for feeding and cutting the material into nubs of the desired length.

The supply of nub material N is provided on spools 6 in the form of soft or unspun slivers, preferably of different character or color as compared to the fibres constituting the carded web 2. Each spool 6 is supported at its ends on shaft extensions 7 that rest freely on arms 8 provided by a bracket 9 mounted at the top of each frame member 5. A cylinder 10 of considerably larger diameter than the spools 6 is mounted between the spools so that the nub material N rests on the surface of the cylinder, with the individual slivers of nub material spaced apart on the surface of the cylinder, as indicated in Fig. 2. The nub material N passes downwardly around a series of feed rolls 11 connected for rotation in unison by gearing G, see Fig. 2, and then between the relatively movable blades 12 and 13 of a knife mechanism, the operation of which is adapted to cut the nub material into short nubs N', see Fig. 3, which fall into a chute 14 for delivery to the web 2, in a manner hereinafter described.

The lowermost of the feed rolls 11 is mounted on a shaft 15 carrying a ratchet 16 beyond one frame member 5, as best shown in Fig. 2. The teeth of the ratchet 16 are adapted to be engaged by a pawl 17 pivotally mounted at the end of a slide 18 adapted for reciprocatory movement within fixed guideways 19 provided by the frame member 5. The slide 18 carries an actuator 20 extending downward into the path of movement of a roll 21 carried by a crank arm 22 mounted on a drive shaft 23.

The shaft 23 extends between the frame members 5, and is driven from any suitable source of power, as by means of a sprocket 24, see Fig. 2. The slide 18 is yieldably maintained in the retracted position of Fig. 3 by means of a spring 25, with a fixed collar 26 serving to limit the retractive movement by engagement with one of the guides 19. The actuator 20 extends into the path of movement of the roll 21 as the shaft 23 rotates in the direction of the arrow in Fig. 1, so that right-hand movement is imparted to the slide 18 to turn the ratchet 16 through an angle corresponding to the displacement between a predetermined number of ratchet teeth for each revolution of the drive shaft. The slide 18 is shown at the end of its ratchet feed movement in Fig. 1.

The actuator 20 is carried by a sleeve 27 that is adapted to be secured in different positions on the slide by means of a set screw 28, to thereby vary the extent of movement of the slide by the crank arm 22. Adjustment of the actuator

20 on the slide 18 can thus be caused to vary the number of ratchet teeth through which the lower roll 11 is turned by the pawl 17 during each complete revolution of the drive shaft 23, whereby the length of nub material N that is fed downwardly into the chute between the then open knife blades 12 and 13 can be controlled to form individual nubs N' of different lengths for delivery to the web 2.

In order to prevent the nub material N from being subjected to any considerable tension as it is fed by the rolls 11, the cylinder 10 is intermittently driven in synchronism with the rolls 11. To this end, a shaft 29 carrying the cylinder 10 is extended beyond one frame member 5, and carries a pulley 30 connected by a belt 31 to a pulley 32, turnable with a gear 33 mounted on a shaft 34 parallel to the feed roll shaft 15. The gear 33 is in mesh with a gear 35 mounted on the shaft 15 adjacent the ratchet 16, so that the cylinder 10 is turned in unison with the feed roll 11. The ratio between the pulleys 30 and 32 is such that the angle through which the cylinder 10 is turned, as measured on its periphery, can be made to substantially correspond to the length of nub material that is fed by the rolls 11 for each complete revolution of the drive shaft 23.

One knife blade 12 is stationary, with its edge substantially in alinement with the peripheries of the rolls 11, while the other blade 13 is mounted on a bar 36 extending between the frame members 5, and supported at its ends by parallel slides 37 mounted for reciprocatory movement in guides 38 provided by each frame member. Each slide 37 carries an actuator 39 extending upwardly into the path of movement of a roll 40 carried by a crank arm 41 mounted on the drive shaft 23. Each slide 37 is yieldably maintained in a position in which the knife bar 36 holds the blades open by means of a spring 42, a fixed collar 43 serving to limit outward movement of the bar by engagement with a guide 38.

The angular relation between the crank arms 22 and 41 is such that while the roll 21 is in engagement with the actuator 20, to impart turning movement to the feed rolls 11, the knife bar 36 is maintained in the position of Fig. 1. However, just after the roll 21 disengages the actuator 20 to permit retraction of the ratchet slide 18, the rolls 40 engage the actuators 39 to move the slides 37 in unison to the position of Fig. 3. This movement of the blades 12 and 13 severs the lengths of nub material that have been previously fed between the open blades 12 and 13, whereupon the short nubs, designated N', fall upon the carded web 2, as indicated in dotted lines in Fig. 1. The feed rolls 11 are stationary when the cutting of the nub material occurs, after which the bar 36 returns to the position of Fig. 1, to open the knife blades as the rolls 40 disengage the actuators 39.

From the foregoing, it is apparent that during each complete revolution of the shaft 23, starting from the position of Fig. 1 at the end of the feeding stroke of the slide 18, the knife blades 12 and 13 will operate to sever the ends of nub material that have been previously fed into the opening of the chute 14 by the succeeding operation of the feed rolls 11. The nubs N' thus severed will fall through the chute and be delivered upon the surface of the moving web 2 of carded fibres, in advance of delivery of the web to the dividing rolls 4 of the condenser. These nubs N' are pressed into the web, and as the web is divided and condensed into slivers, the nubs N' become incorporated permanently in the resulting yarns.

After the movable knife blade 13 has been returned to the position of Fig. 1 by the right-hand movement of the slides 37, following disengagement of the rolls 40 from the actuators 39, continued rotation of the shaft 23 will impart right-hand movement to the slide 18, to cause the pawl 17 to turn the feed rolls 11. This movement is accompanied by turning of the drum 10 by the belt 31, so that all the ends of nub material N are fed a predetermined amount downwardly between the then open knife blades 12 and 13. Obviously, the above described cycle of operations will be completed for each complete revolution of the drive shaft 23.

As previously pointed out, the sleeve 27 carrying the actuator 20, is adjustable longitudinally of the slide 18 so as to vary the stroke of the slide, and thereby determine the number of ratchet teeth that are traversed by the pawl 17 upon each complete reciprocatory movement of the slide. In this way, the amount of nub material N fed by each operation of the feed rolls, can be closely controlled to form nubs N' of the desired length.

In order to provide for more uniform distribution and mixing of the nubs N' on the web 2, the chute 14 may be provided with a distributing wheel 44 to rotate about a horizontal axis within the chute, as indicated in Fig. 4. The wheel 44 provides a series of vanes 45, which are adapted to receive the entire series of nubs N' upon each operation of the knife blades 12 and 13. The wheel 44 is adapted to be continuously driven, so that the action of the vanes 45 is to mix the nubs N', and to spread them evenly over the surface of the moving web 2, thereby obtaining a very uniform distribution of the nubs in the finished yarns.

I claim:

Apparatus for producing nubbed yarns, comprising in combination, means for conveying a web of carded fibres from a carding machine to a condenser, a supply of nub material, feed rolls around which said material passes, a cutting device comprising relatively movable blades operable in a horizontal plane and normally open to permit the passage of said material therebetween, with the fixed blade having its edge in alinement with the peripheries of said feed rolls, a rotatably driven shaft, a ratcheting device driven from said shaft to turn said rolls through a predetermined angle during each complete revolution of said shaft to feed a predetermined length of said material between said open blades, and means driven from said shaft to move said blades together in a horizontal plane and in the intervals between movement of said feed rolls to cut the material that has been fed into nubs for deposit thereof uniformly across the full width of said web.

ALEXANDER CAVEDON.