Sept. 21, 1937. H. D. CAMP 2,093,415

METHOD AND MEANS FOR MANUFACTURING MOTTLED FABRICS

Filed Dec. 22, 1932 2 Sheets-Sheet 1

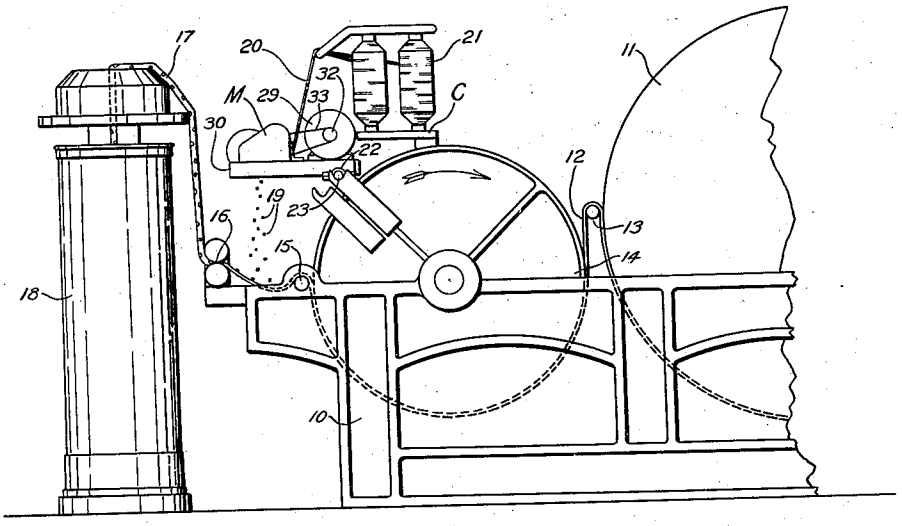


Fig. 1

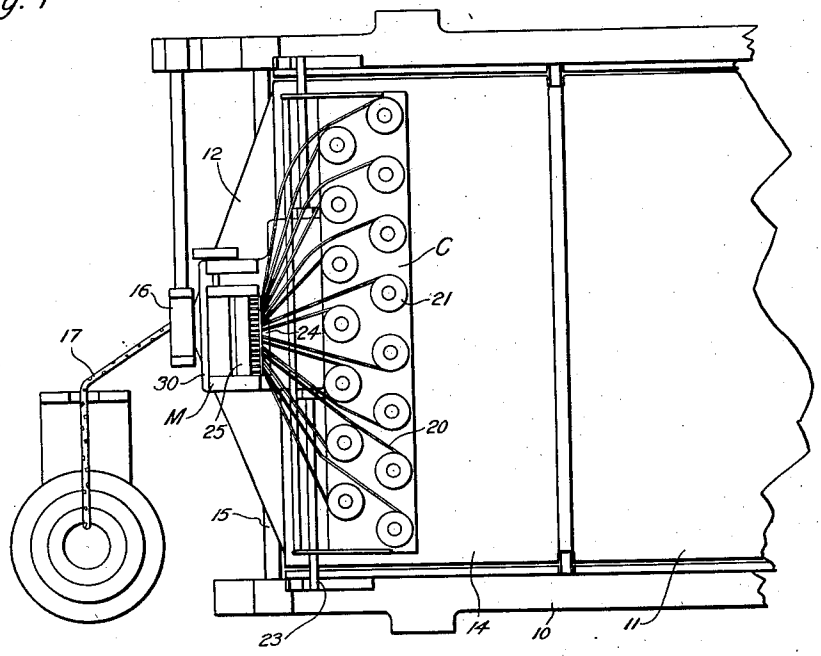


Fig. 2

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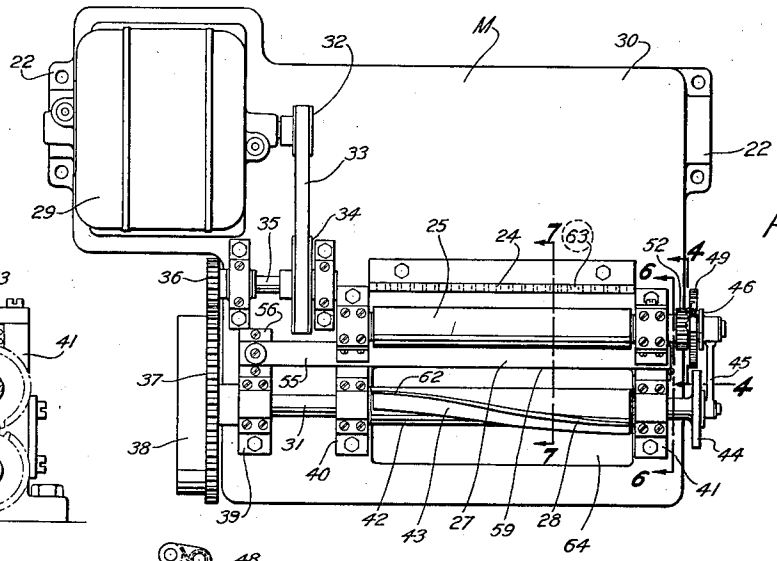


Fig. 3

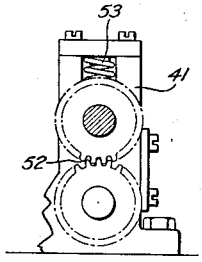


Fig. 4

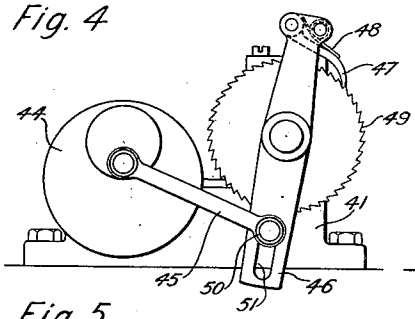


Fig. 5

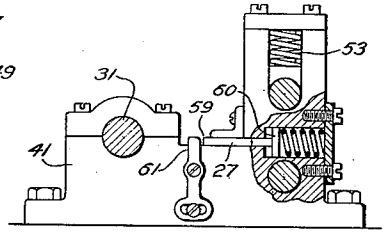


Fig. 6

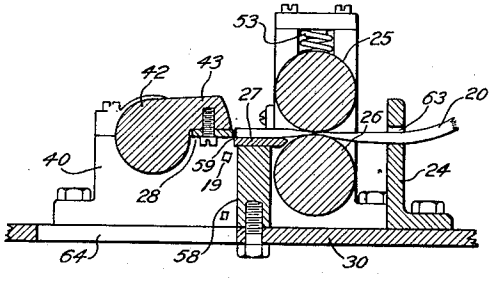


Fig. 7

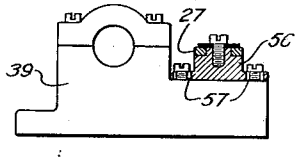


Fig. 8

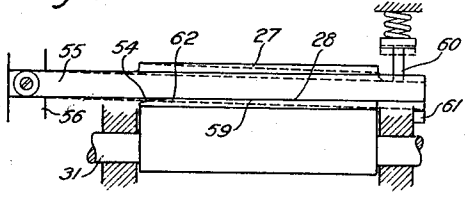


Fig. 9

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Patented Sept. 21, 1937 2,093,415

UNITED STATES PATENT OFFICE

2,093,415

METHOD AND MEANS FOR MANUFACTURING MOTTLED FABRICS

Hugh D. Camp, Roanoke Rapids, N. C.

Application December 22, 1932, Serial No. 648,346

8 Claims. (Cl. 19—145)

This invention relates to the manufacture of mottled colored threads and fabrics, and stated specifically, the invention resides in the method and means of introducing small colored pieces of material or nubs into the web in the card, or other processing machine, to produce spotted slivers from which yarn is spun.

Heretofore, it has been the practice to cut the nubs in one operation and then deposit them in a bin or container in a manner whereby they may become mixed with the web in the card, in another operation. When desirable to introduce a variety of different colored nubs into the web, it has been the usual custom to mix the different colored nubs after they are cut and before they are placed in the bin, thus requiring still another operation. The apparatus for performing the mixing operation in many cases is complicated and expensive. In another instance, the nubs have been blown on a vertically disposed traveling web, thus requiring additional equipment.

One of the objects of this invention is to reduce the number of operations or various steps required in the manufacture of spotted yarn.

Another object of the invention is the provision of means for cutting and mixing a variety of different colored nubs with the web in the card in a single operation.

Another object of the invention is to provide a simplified and compact device that is practical to effectively cut nubs from the strands of cotton roving, the roving being very loose and fluffy.

Further objects are to provide such a device that can be adjusted to cut nubs of various sizes, that can mix the nubs with the web in the card either uniformly or otherwise, as desired, and that can be arranged to provide a wide variety of combinations of different colored nubs in the web to produce various combinations of different colored spots in the yarn.

Still further objects of the invention are to improve upon past methods and means for making spotted yarn, to simplify the manufacturing process, and lessen the labor and time required therefor, and thus economize in the cost of manufacture. With the present invention the labor cost of making spotted yarn is about the same as that for making plain yarn.

Other objects and advantages of the invention and novel detail features of the nub cutting device will become apparent during the course of the following description and claims taken in connection with the accompanying drawings forming a part hereof.

In the drawings:

Fig. 1 is an elevational view of a portion of a card embodying the invention,

Fig. 2 is a plan view of the structure shown in Fig. 1,

Fig. 3 is a plan view of the machine for cutting and feeding nubs,

Fig. 4 is an enlarged vertical section taken on line 4—4 of Fig. 3,

Fig. 5 is an enlarged right side elevation of a part of the structure illustrated in Fig. 3,

Fig. 6 is an enlarged vertical sectional view taken on line 6—6 of Fig. 3 with parts broken away.

Fig. 7 is an enlarged vertical section taken on line 7—7 of Fig. 3,

Fig. 8 is an enlarged detail view partly in section to illustrate an adjustable mounting at an end of one of the cutters, and

Fig. 9 is a diagrammatic view illustrating the action of the cutting knives.

Referring to Figs.1 and 2 of the drawings, the numeral 10 designates the base of a carding machine or card of the usual type, and the main card cylinder is shown at 11. The stock 12, in this case being a fleece or web of cotton fibers, is fed at 13 to the doffer 14 by the main cylinder 11 in the usual manner. The doffer 14 is rotating in the direction indicated by arrow and the web 12, is removed by the doffing comb 15 after traveling over the doffer. Condenser rolls 16 receive the web of fibers 12 from the comb 15 and act to form or rub said web into a relatively thick strand 17 which is deposited in a container 18 in condition to be spun into yarn, by any preferred process which need not be described. In moving from the comb 15 to the condenser rolls 16 the web travels in a lateral path.

A machine M for simultaneously cutting and feeding a variety of different colored nubs, 19, of cotton roving onto the web 12, is disposed directly over the web at the side of the doffer 14 from which the web 12 is removed, in a position whereby the nubs drop onto the web immediately after it is removed from the doffer and before the web has reached the condenser rolls 16. By introducing the nubs at this point during the manufacture of mottled yarn, the best final results are obtained, as there is no carding out of the nubs and their individuality is retained in the final fabric.

A plurality of comparatively thin strands, 20, of cotton roving, from which the nubs are cut, is supplied to the machine M from a creel C located above the doffer 14 and at one side of the machine M. The creel is arranged to carry

a desired number of bobbins 21 from which the strands 20 unwind as the machine M functions. The cutting and feeding machine is operated by a constant power source, as will hereinafter be more fully described, and by knowing the number of bobbins in the creel, the approximate number of nubs fed onto the web can be predetermined. The number of nubs fed to the web 12 will be substantially the same for each fixed length of the web, while the same number of bobbins are in the creel.

The number of bobbins can be varied to vary the number of nubs produced and fed onto the web. Any combination of colored nubs can be fed to the web by placing in the creel a bobbin of different colored roving for each of the colors in the desired combination, and it is apparent that various predetermined percentages of the different colored nubs can be fed onto the web by providing the desired percentage of bobbins of different colored roving in the creel. It will be noted in Fig. 2 that the creel extends the full width of the web 12 at the point where the web is removed from the doffer, that the condenser rolls 16 gather the web inwardly toward the center of the card, and that the machine M is preferably located over the central portion only of the web so that all the nubs will positively fall into the web.

The machine for cutting and feeding nubs onto the web may be supported in position in any desirable manner, here shown as being attached by means of clamps 22 to a cross bar 23 fixed to the card. The principal parts comprising the machine M are, a guide plate 24 (Fig. 3), a pair of delivery rollers 25, 26, an anvil knife 27, a rotatably mounted knife 28, suitable power means 29 for driving the rollers and the knife 28, and the necessary power transmitting or driving connections.

The power means, here illustrated as an electric motor, may be located in any desirable position with respect to the other mechanism, but is shown as being secured to the frame member or base 30 of the machine in proximity to the other mechanism, in order to provide a compact design. Rotary motion of the shaft of the motor 29 is imparted to a shaft 31 carrying the knife 28 by power transmitting mechanism comprising a pulley 32 on the shaft of the motor, a belt 33, a pulley 34 on an intermediate stub shaft 35 which is mounted on the base 30, a pinion 36 on the intermediate shaft, and a gear 37 on the shaft 31 meshing with the pinion 36, the pinions and gears being fixed to the shafts upon which they are mounted. This transmitting mechanism serves as speed reducing means, so that the shaft 31 rotates, slower than the motor pulley 32, at the desired speed, and a flywheel 38 assures uniform rotary motion of said shaft 31.

Spaced pillow blocks 39, 40 and 41 are attached to the base of the machine and provide bearings for the shaft 31. The portion 42 of the shaft 31, disposed between the pillow blocks 40 and 41, is enlarged and provided with a helically formed flange 43 to which the knife 28 is detachably secured, this knife also being helical in shape.

A circular plate 44 on the end of the shaft 31 opposite the end carrying the flywheel 38, is concentric with the axis of the shaft, and a connecting rod 45 is pivoted at one end to the plate 44, eccentric thereof, and at its other end to a rocker arm 46 which is loosely mounted intermediate its end on the shaft of the delivery roller 25. The rocker arm 46 at its upper end carries a pawl 47 maintained in engagement by means of a spring 48 with the teeth of a ratchet wheel 49 fixed to the shaft of the delivery roller 25. Rotary motion of the shaft 31 causes oscillatory movement of the arm 46 by means of connecting rod 45, and oscillatory movement of the arm 46 imparts intermittent rotary motion to the roller 25 by means of the spring-held pawl 47, as is usual with such mechanism.

The delivery rollers 25, 26 are mounted in corresponding pillow blocks and the rollers are geared together at 52 to intermittently rotate together in directions opposite to each other. When the shaft 31 makes one complete revolution, the delivery rollers are caused to move through a segment only of a circle by the structure described in the foregoing paragraph. The axes of the delivery rollers are each parallel to the axis of the shaft 31 and contained in a vertical plane spaced from the shaft 31. The rollers 25, 26 are arranged to contact with each other, and the top roller 25 will move slightly upward compressing the springs 53 when strands 20 are drawn between the rollers. The angle through which the arm 46 rocks can be varied by changing the distance between the axis of the delivery roller 25 and the axis of the pivot 50 by relocating the pivot 50 in a slot 51 in the rocker arm, thus varying the number of rachet teeth over which the pawl 47 passes with each oscillation of the arm 46 and changing the degree of the segments through which the delivery rollers move with each revolution of the shaft 31.

The anvil knife 27 is loosely pivoted at one end 55 to a support 56 provided with slotted holes 57 so that the anvil knife and support can be adjusted in fixed positions on the pillow block 39 toward or away from the shaft 31. The knife 27 is arranged to contact with the knife 28 upon each revolution of the latter. The portion of the knife 27 between the pillow blocks 40 and 41 rests upon an anvil 58 and is arranged so that its cutting edge 59, which is straight, lies disposed in a plane substantially coinciding with the plane passing through the axis of the shaft 31 and the contact point of the delivery rollers. A spring-held plunger 60, acting on the end of the anvil knife opposite to the end that is pivotally supported, tends to maintain and press this knife in a direction toward the axis of the shaft 31, thus assuring effective contact of the knives during the entire cutting period thereof. Importance is stressed upon this feature to obtain proper functioning of the embodiment of the invention, as it has been found difficult to successfully cut all the strands of cotton roving due to the loose and fluffy nature thereof. The action of the spring actuated plunger 60 upon the anvil knife is limited by a stop 61 when the knives are not in contact, and the position of this stop can be adjusted to compensate for wear of the knives.

The end 62 of the rotatably mounted knife 28 engages the anvil knife during the first part of the cutting period and as the knife 28 rotates, the cutting edge thereof follows along the edge of the anvil knife until contact has been made throughout the entire length of the cutting edge. Every point along the edge of the rotatably mounted knife is equidistant from the axis of the shaft 31, and the normal position of the edge 59 of the anvil knife is arranged at a slight angle with the axis of this shaft as shown by dotted lines in Fig. 9. During the period that the knives are in contact, the knife 28 forces the anvil knife a slight distance away from the axis of the shaft

31. The spring-held plunger 60 returns the anvil knife to its normal position when the knives are not in contact. To prevent vibration and shock to the machine, and damage to the cutting edges of the knives as they come together, the edge of the end 62 of the knife 28 is slightly beveled at 54.

The plate 24 is removably fixed to the base 30 and provided with a row of apertures 63 for receiving the strands of roving from the bobbins in the creel and guiding or directing the strands between the delivery rollers 25, 26. The apertures 63 are arranged in the plane passing through the axis of the shaft 31 and the contacting point of the delivery rollers, and the walls of these apertures curve into each of the surfaces of the plate 24 to eliminate the possibility of the strands of roving being caught on sharp edges. Guide plates having different sizes of apertures therein may be substituted when it is desired that the machine handle strands of roving of different sizes.

The strands of roving 20 are drawn through the apertures in the guide plate by the delivery rollers which intermittently transfer the strands over the top of the anvil knife, and the ends of the strands overlying the cutting edge of the anvil knife, are simultaneously cut into nubs and dropped or fed onto the web 12 upon each revolution of the knife 28, as the web 12 is traveling and while it is being produced by the carding mechanism, the nubs falling through an opening 64 in the base 30. The size of the nubs can be varied by changing the degree of the segment of a circle through which each delivery roller moves with one revolution of the rotatable knife 28, as heretofore described, and it is apparent that the operation of the cutting and feeding structure is accomplished by a common power means independently of the operation of the carding mechanism.

As is well known, the web issuing from the doffer is caused to vary in size and speed of travel in order to produce different sizes of yarn; and if desired, a few strands of roving may be inserted through the center apertures only of the guide plate 24 when nubs are to be fed to a web that is narrow in width, or a plurality of duplicate machines, supplied with strands of roving from either one or a plurality of creels, may be mounted to feed nubs onto one web.

By the term "roving" used herein, I do not limit myself to the definition of any one authority.

It is to be understood that various alterations may be made in the arrangement of parts without departing from the spirit of the invention which has been described in one of its embodiments, without attempting to disclose all possible modifications that come within the scope thereof.

I claim:

1. The method of making spotted slivers, consisting in producing a web of fibers, causing said web to travel, producing a series of strands of roving above said web, and sequentially cutting across said series to form nubs and allow them to drop one by one upon said web.

2. The method of making spotted slivers, consisting in producing a web of fibers, causing said web to travel from the means producing it to means for condensing it to a sliver producing a series of strands of roving above said web, and sequentially cutting across said series to form individual nubs, in a direction transverse to said web, and allow said nubs to drop thereupon, whereby they are more uniformly distributed in the resulting sliver than if they were not fed sequentially to said web.

2. The method of making slivers having a variety of differently colored spots, consisting in producing a web of fibers, causing said web to travel, producing a series of strands of roving of different colors above said web and sequentially cutting across said series to form nubs and allow them to drop one by one upon said web.

4. The method of making spotted slivers, consisting in producing a web of fibers, causing said web to travel, producing a series of horizontally disposed strands of roving above said web, and sequentially cutting across said series to form nubs and allow them to individually fall by gravity upon said web.

5. The method of making spotted slivers, consisting in producing a web of cotton fibers, causing said web to travel, producing a series of strands of cotton roving above said web, and sequentially cutting across said series to form nubs and allow them to drop individually upon said web.

6. In combination, in carding mechanism arranged to form a web and cause it to move, condenser means for forming a sliver from said web, and means disposed above said web between said carding mechanism and condenser means, for supplying a series of strands and sequentially cutting across said series to form nubs and distribute them one by one across said moving web.

7. In combination, in carding mechanism arranged to form a web and cause it to move, condenser means for forming a sliver from said web, and means disposed above said web between said carding mechanism and condenser means for supplying a series of horizontally disposed strands of roving and sequentially cutting across said series to form nubs and distribute them one by one across said moving web.

8. In combination, in carding mechanism arranged to form a web of cotton fibers and cause it to move, condenser means for forming a sliver from said web, and means disposed above said web between said carding mechanism and condenser means, for supplying a series of strands of cotton roving, and sequentially cutting across said series to form nubs and distribute them one by one across said moving web, whereby they are more uniformly distributed in the resulting sliver than if they were not fed sequentially to said web.

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