April 28, 1953 R. C. WILKIE 2,636,222

METHOD FOR BLENDING TEXTILE FIBERS

Filed April 1, 1950 2 SHEETS—SHEET 1

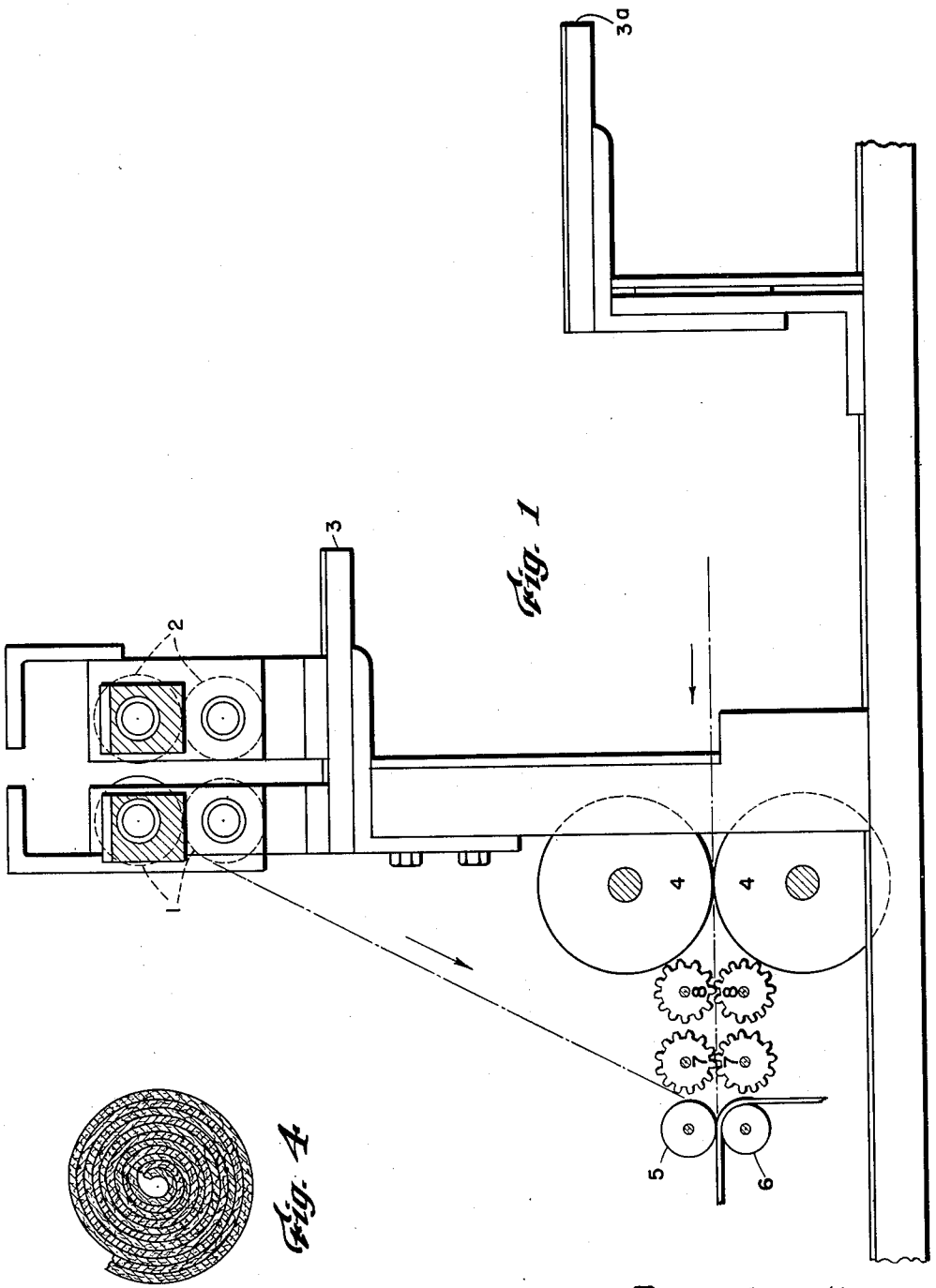


Fig. 1

Fig. 4

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METHOD FOR BLENDING TEXTILE FIBERS

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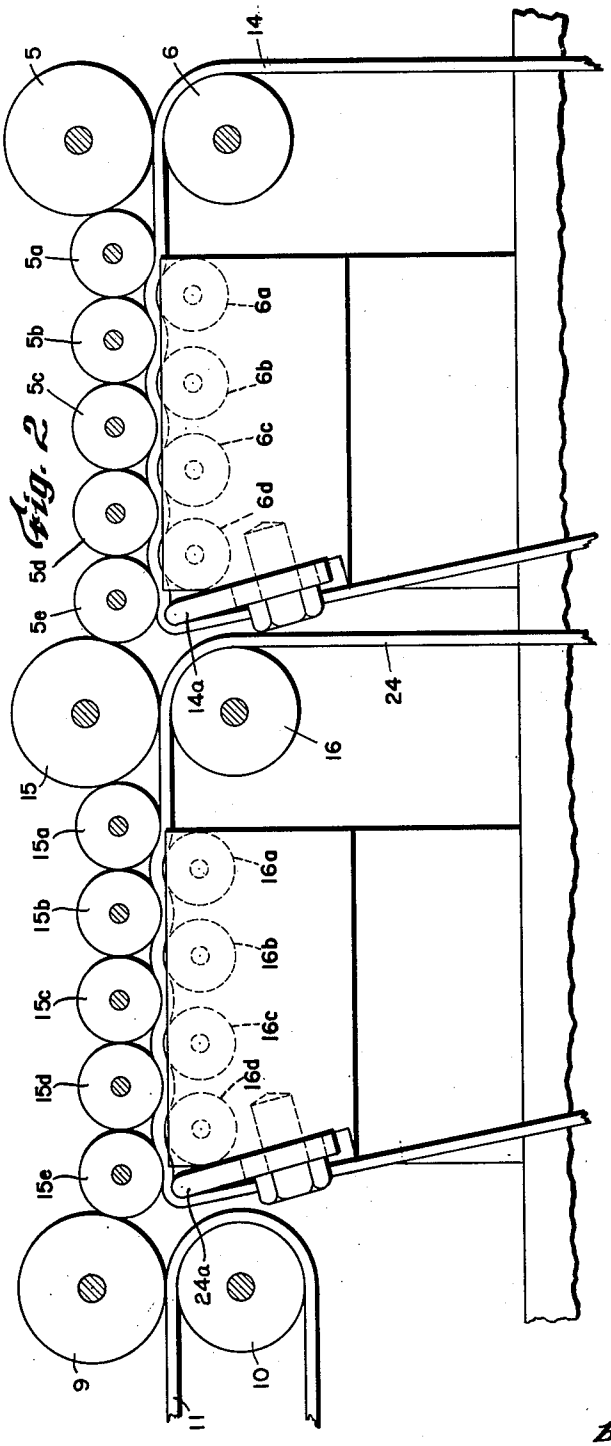


Fig. 2

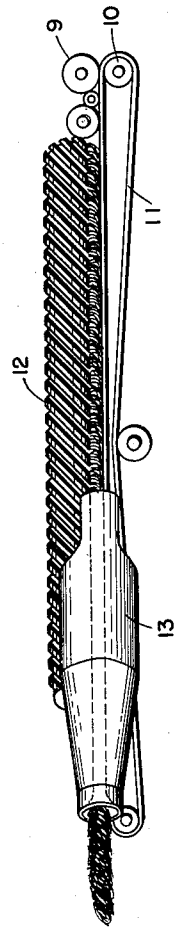


Fig. 3

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METHOD FOR BLENDING TEXTILE FIBERS

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2 Claims. (Cl. 19—146)

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This invention relates to a method of making a blend of textile fibers, and in particular to a method involving the use of mechanism described in U. S. Patent Number 2,438,469.

An object is to provide a method of forming a homogeneous blend of textile fibers, either natural or synthetic, or of fibers of different colors. Another object is to make the blend in a continuous manner with the resulting blend in the form of a sliver of predetermined weight per unit length.

It is customary in the art to make blends by one of two methods.

One method consists of mixing and blending the fibers in loose form by making alternate layers and then placing cross-sections of the layers in one of the many types of pickers designed for such purpose. While this method produces an excellent blend, the material must then be carded to obtain the blended material in a continuous sliver ready for reduction to yarn. Another objection to this type of blending is that, for the worsted system, colored or blended of noils are produced which have small retail value compared to noils of one fiber, or white noil in the case of wool. Also the picking and carding action tends to segregate the fine fibers from the coarse, and the short fibers from the long fibers, due to centrifugal forces inherent in the operation of the machines. A further objection is that in a wool-synthetic fiber blend, additional percentages of wool must be processed to assure the accurate final percentage of wool in the blend.

The other method comprises the preparation of slivers either on the cotton system or worsted system or both. These slivers must be carefully made and, in many cases, specially handled throughout so that, when the slivers of different fibers or colors are brought together, the resulting blend will have the desired percentages of its components. In the actual blending, the slivers of various sorts are laid side and side and introduced to a drawing machine where the combined slivers are drawn out and delivered by the machine as a single sliver of a predetermined weight. A number of these blended slivers are then fed to the next drafting process and the process repeated until a roving of definite weight is produced preparatory to spinning. The objection to this method of blending is that the slivers of various fibers or colors retain their original relative positions all the way through the drawing and into the yarn. Microscopic examination shows the fibers in a "barber-pole" arrangement in the finished yarn. In critical fabrics such as gabardine, where the yarn is tightly twisted and woven into a dense, closely finished fabric, any grouping of like fibers in a blend shows up in small streaks, due to different dye absorption or different light reflectance. Furthermore, this method of blending does not allow very close or unusual percentages to be made. For example, in a blend of 40% wool and 60% rayon, if the finished blend were found to contain 45% wool and 55% rayon, by microscopic analysis, either the original wool sliver or the original rayon sliver would have to be reprocessed to obtain the desired percentage blend. It is expensive to reprocess the sliver, but it would be more expensive to allow 5% more wool to go into the fabric than it was originally designed to contain.

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In the practice of my method, a homogeneous blend is made, eliminating any "barber-pole" effects, and providing very accurate percentages which can be maintained at little cost, and the whole operation is carried on in a continuous manner to produce a sliver ready for further processing into yarn.

In the accompanying drawings,

Fig. 1 is an elevational side view of the rear portion of the apparatus,

Fig. 2 is an elevational side view of the middle portion of the apparatus,

Fig. 3 is an elevational side view on a reduced scale of the forward or delivering end of the apparatus, and

Fig. 4 is a diagrammatical cross-section, on an enlarged scale, of the finished sliver.

Referring to the drawings, drafting rolls 1 and 2, Fig. 1, are mounted on the bracket 3 above the cutter rolls 4. When a blend of wool and synthetic fiber is to be made, a definite amount of wool is fed to rolls 2. The rolls 1 travel at greater surface speed than rolls 2, thus attenuating the slivers fed and producing a thin sheet of wool of known weight per unit length.

The synthetic fibers in the form of tow of a known weight are fed to cutter rolls 4, and a slight draft is given the fibers by fluted rolls 7 and 8, so that the weight per unit length of the cut sheet is known as it approaches the nip of rolls 5 and 6.

To this nip of rolls 5 and 6 the wool sheet delivered by rolls 1 is introduced and superimposed on the synthetic sheet delivered by rolls 7. The laminated sheet is then passed through various phases of drafting and shearing substantially similar to those described in said Patent Number 2,438,469 and delivered by rolls 9 and 10, Fig. 2, to the horizontal apron 11.

The shearing is accomplished by rolls 5*a*, 5*b*, 5*c*, 5*d*, and 5*e* which bear on the top fibers of the laminated sheet and have a greater peripheral speed than the surface of apron 14 on which the bottom fibers of the laminated sheet rest and which is supported by rolls 6, 6*a*, 6*b*, 6*c*, and 6*d* and by nose piece 14*a*. Further shearing is accomplished in the same manner by rolls 15*a*, 15*b*, 15*c*, 15*d*, and 15*e* and by apron 24 which is supported by rolls 16, 16*a*, 16*b*, 16*c* and 16*d* and by nose piece 24*a*. The drafting is accomplished by the greater surface speed of the rolls and aprons by which the fibers of the laminated sheet are successively engaged. The rolls of roll pair 15, 16 are driven at a higher speed than the rolls of roll pair 5, 6 thereby drafting the sheet. Similarly, the rolls of roll pair 9, 10 are driven at a higher speed than the rolls of roll pair 15, 16 thereby further drafting the sheet. As further described in said patent, the diagonal roll 12, Fig. 3, then rolls the sheet on itself, while the latter is still travelling forward, to produce a sliver, composed of the laminated sheets, wound helically on itself, as represented by the cross-section shown in Fig. 4. One shaded area (diagonal lines ascending to the left) represents the synthetic fibers and the other shaded area (diagonal lines ascending to the right) the wool. Due to the fact that both sheets of fibers are very thin and subjected to a drafting while in a superimposed position relative to each other, there is a substantial amount of comingling of unlike fibers at or about the plane of their coincidence.

Then the helically wound sheets are drawn through trumpet 13 and may be subjected to the action of drafting rolls (not shown) in subsequent operations in which the nip of said drafting rolls is perpendicular to the axis of the helix, further increasing the homogeneity of the blend.

Furthermore, a very accurate control of the percentage blend is maintained by providing means for adjusting the surface speeds of rolls 1 and 2 in very small increments to provide accurate control over the relative amounts of the different fibers making up the blend, thus avoiding the necessity of reprocessing the slivers fed, or of giving special handling to the wool sliver before blending. Any of the standard wool slivers may be used directly.

Provision is also made for controlling the maximum length of the natural fibers passed through rolls 1 and 2. In the event the natural fiber contains fibers exceeding the desired length, the distance between rolls 1 and 2 can be set at the maximum length required, so that all the fibers exceeding the distance between rolls 1 and 2 are broken.

In some cases it may be advantageous to actually cut the fibers to a maximum length, in which case rolls 1 and 2 are placed in the alternate position 3–A, the slivers reduced to the correct weight, and then passed through the cutting rolls 4. In the latter case, the synthetic fibers and the natural fibers meet at the nip of rolls 4 and are cut simultaneously.

I claim:

1. A method of blending fibers of different characteristics comprising forming the fibers of one characteristic into a sheet of fibers, cutting said fibers into lengths arranged in sheet form, forming the fibers of another characteristic into a sheet of fibers, superimposing said last named sheet of fibers upon said first named sheet of fibers, shearing and drafting the fibers of said superimposed sheets, forming said sheets into a helical roll and delivering said helical roll in sliver form.

2. A method of blending fibers of different characteristics comprising forming the fibers of one characteristic into a sheet of fibers, cutting said fibers into lengths arranged in sheet form, drafting the fibers of another characteristic to form said fibers into a sheet of fibers, superimposing said last named sheet of fibers upon said first named sheet of fibers, shearing and drafting the fibers of said superimposed sheets, forming said sheets into a helical roll and delivering said helical roll in sliver form.

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Number	Name	Date
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