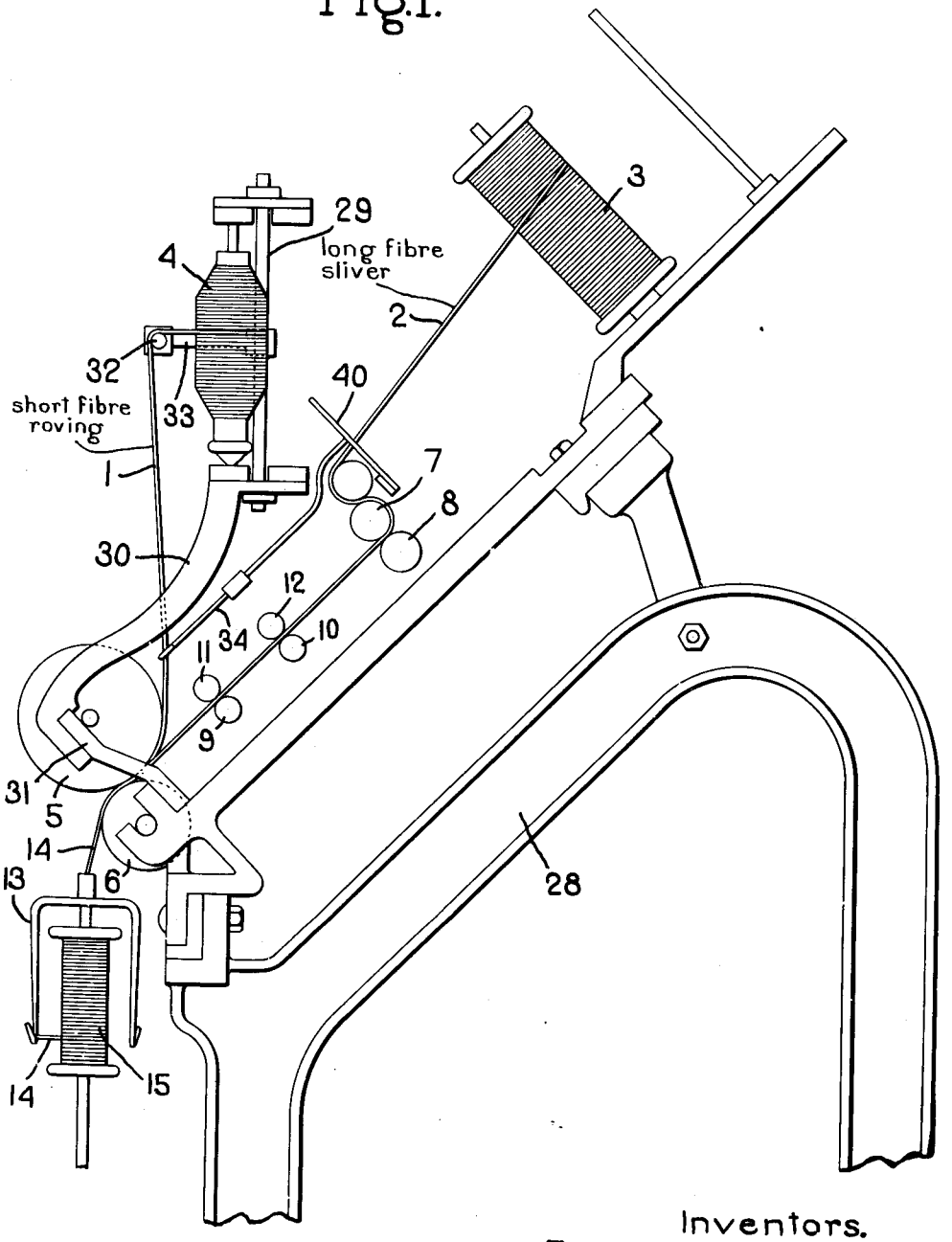
Oct. 21, 1941. F. E. NUTTER ET AL 2,260,229

METHOD OF SPINNING SINGLE PLY YARN COMPRISING A BLEND OF RELATIVELY LONG FIBERS AND RELATIVELY SHORT FIBERS

Filed Nov. 20, 1940 3 Sheets-Sheet 1

Fig.1.



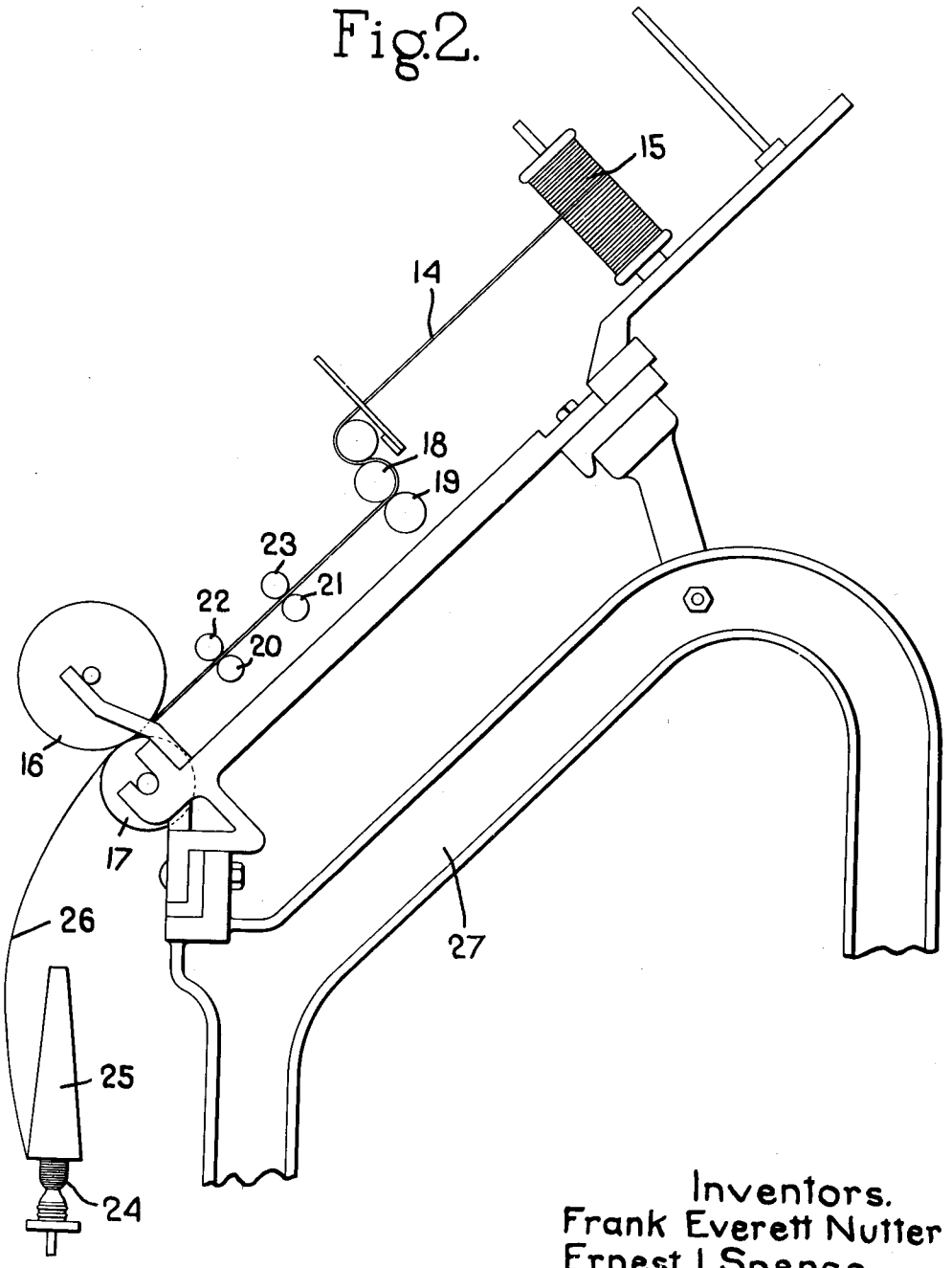
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Fig.2.



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Fig. 3.

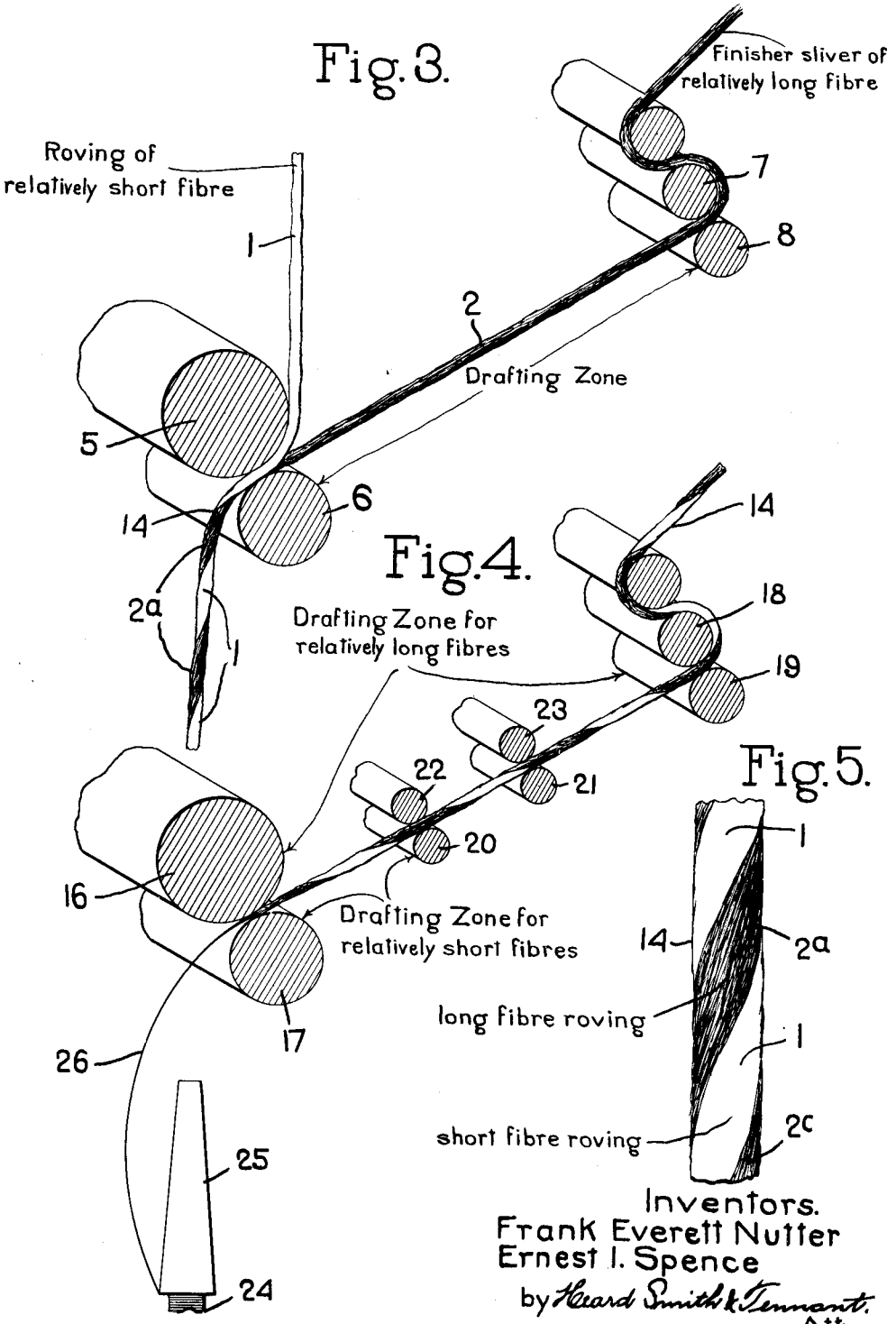


Fig. 4.

Fig. 5.

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2,260,229

METHOD OF SPINNING SINGLE PLY YARN COMPRISING A BLEND OF RELATIVELY LONG FIBERS AND RELATIVELY SHORT FIBERS

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Application November 20, 1940, Serial No. 366,356

3 Claims. (Cl. 57—156)

In U. S. Patent No. 2,016,387, October 8, 1935, there is described a method of spinning a single ply yarn comprising a blend of relatively long fibers and relatively short fibers, according to which the fibers of each length are separately subjected to the combing, carding, drawing and other operations, to which such fibers are usually treated to reduce them to the form of a roving ready for the spinning operation, and then the two rovings, one of the relatively long fibers and the other of the relatively short fibers, are placed in a spinning machine having a special form of drafting apparatus by which the two rovings are individually drafted, each according to its own fiber length, and the two individually drafted rovings are delivered from the front rolls at the same point and are subjected to the usual spinning twist to spin them into a single ply yarn which is a blend of the relatively long fibers and the relatively short fibers.

In the present invention, the relatively short fibers are treated in usual manner to reduce them to the form of a roving which is ready for the spinning operation, the same as in the above-mentioned Patent 2,016,387, but instead of being blended or united with the relatively long fibers during the spinning operation, as in said patent, the roving of relatively short fibers is combined with the relatively long fibers during the last stage of the operation by which such relatively long fibers are being drafted and reduced to a roving form ready for the spinning operation, thereby to produce a roving made up of the relatively short fibers and relatively long fibers, which roving is then transferred to the spinning machine where it is drafted and spun into a single ply yarn.

In carrying out our invention, the relatively long fibers will be treated in the usual way to reduce them to the form of a sliver, and this sliver will be subjected to the requisite drafting operations to reduce it to the form of a roving ready for spinning. The sliver which is receiving its last drawing operation to reduce it to roving form is commonly referred to in the trade as a "finisher sliver." The drafting apparatus which is commonly used for giving the finisher sliver its final drafting delivers said sliver in the form of a loosely twisted roving, the twist in the roving being just sufficient to hold the fibers together so that said roving can be manipulated when being transferred to the spinning frame.

In accordance with our present invention, the roving of relatively short fibers, which is ready for the spinning operation, is delivered to the front rolls of the drafting apparatus by which the "finisher sliver" of relatively long fibers is receiving its final drafting to convert it into a roving ready for spinning, and the two rovings, one of relatively short fibers, and the other of relatively long fibers, are delivered from the front rolls of the drafting apparatus simultaneously and at the same point. This drafting apparatus is designed to give a slight twist to the roving, and as a result, the two rovings, one of relatively short fibers and the other of relatively long fibers are loosely twisted together to make a composite roving made up partly of relatively short fibers and partly of relatively long fibers. This composite roving is then transferred to the spinning frame where it is given its final draft and is spun into a single ply yarn.

In accordance with our invention, the drafting of the composite roving in the drafting apparatus of the spinning frame is carried on in such a way that both the relatively short fibers and the relatively long fibers will each be properly drafted so as to produce an even yarn containing both the relatively long and the relatively short fibers.

In order to give an understanding of the invention, we have illustrated in the drawings somewhat diagrammatically the various steps employed in carrying out the improved method.

Fig. 1 is a fragmentary view showing a portion of a drafting apparatus by which the finisher sliver of relatively long fiber is reduced to roving form and by which the roving of relatively short fiber is combined therewith.

Fig. 2 is a fragmentary view of a spinning apparatus by which the roving containing both the relatively short and relatively long fibers is spun into a single ply yarn.

Fig. 3 is a diagrammatic view illustrating the operation of combining the two rovings, one of relatively short fibers, and the other of relatively long fibers, thereby to produce a composite roving which is subsequently spun into a single ply yarn.

Fig. 4 is a diagrammatic view showing the spinning of this composite roving.

Fig. 5 is a view illustrating the structure of the composite roving.

In the drawings (see Fig. 1), 1 indicates a roving of relatively short fiber, such, for instance, as cotton fiber, and which is ready for the spinning operation. This roving has been produced by the usual processes employed in reducing cotton fiber to roving form, which in-

cludes not only carding operations but successive drafting operations.

2 indicates a sliver of relatively long fiber, such, for instance, as mohair or wool, or any other long fiber. This sliver 2 has also been formed by any of the usual methods employed in reducing mohair, wool, or any other relatively long fiber, to sliver form. The sliver 2 which is shown as being taken from a spool 3 is ready for the last drafting operation by which it is reduced to roving form ready for the spinning operation.

In Fig. 1, there is shown a drafting apparatus by which the sliver 2 (which is in the form usually referred to as a "finisher sliver") is being given the final drafting operation by which it is reduced to the form of a roving ready for the spinning operation. This drafting apparatus comprises the usual front rolls 5, 6, and the usual back rolls 7, 8, said front rolls and back rolls being spaced apart the correct distance for drafting the relatively long fibers of which the sliver 2 is composed. The drafting apparatus illustrated in Fig. 1 is of that type commonly known as the "worsted type" that is used for drafting relatively long fiber, such drafting apparatus including not only the back rolls and front rolls but also carrier rolls 9 and 10 and tumbler rolls 11 and 12. This drafting apparatus functions in usual way to give the sliver 2 the necessary draft to reduce it to the roving form.

In accordance with our invention, the roving 1 of relatively short fibers, which is ready for the spinning operation, is fed to the front rolls 5, 6 of the drafting apparatus at a point adjacent the drafted sliver 2, the roving 1 of short fiber being delivered to and from the front rolls 5, 6, without being subjected to any drafting operation.

As the undrafted roving 1 of relatively short fibers and the drafted sliver 2 of relatively long fibers are delivered from the front rolls contiguous to each other, they are taken to a fly frame 13 of usual construction which twists them loosely together to form a composite roving 14, and winds such roving on a spool 15. By this means the two strands, that is, the roving 1 of relatively short fibers and the drafted sliver 2 of relatively long fibers are delivered with the same tension, so that both strands are under the same tension as they are wound together to form the composite roving 14.

The fly frame 13 is operated so that the roving 1 of relatively short fiber and the drafted sliver 2 of relatively long fibers are loosely twisted together, it being important that there should be no more than ten turns twist per inch, since the twist which is put into the composite roving should be only sufficient to enable it to be handled but should be insufficient to interfere with subsequent drafting operation in the spinning frame.

The composite roving 14 is then transferred to a spinning frame shown in Fig. 2 which is equipped with suitable drafting apparatus for giving the final draft to the composite roving, and also with any suitable or usual means for twisting the drafted roving to form it into yarn and for winding the yarn on a yarn package. The drafting apparatus is constructed so that the drafting of both the relatively long fibers and the relatively short fibers of the composite roving can be done, each according to its own fiber length. The drafting apparatus of the spinning frame shown in Figs. 2 and 4 comprises the front rolls 16, 17, and the back rolls 18 and 19 which are spaced apart sufficiently to provide for proper drawing of the relatively long fibers.

Said drafting apparatus also includes the carrier rolls 20 and 21 which are preferably driven at substantially the same speed as the back rolls, and weighted tumbler rolls 22, 23 which cooperate with the carrier rolls, the rolls 20, 22, being spaced the proper distance from the front rolls 16, 17 for drafting the relatively short fibers, it being understood that the front rolls are operating with a surface speed considerably in excess of the surface speed of the rolls 20, 22.

The tumbler rolls 22, 23, are weighted sufficiently to control the drafting of the relatively short fibers but insufficiently to interfere with the proper drafting of the relatively long fibers. These relatively long fibers, such as mohair, or wool, have considerable strength, and although they are subjected to the weight of the tumbler rolls 22, 23, yet this weight is not sufficient to prevent the relatively long fibers which have been caught by the front rolls from being pulled through the rolls 21, 23, or the rolls 20, 22 without breaking, and hence the weight of the tumbler rolls 22, 23, does not interfere in any way with the drafting of the relatively long fibers which occurs between the rapidly rotating front rolls 16, 17, and the slower rotating back rolls 18 and 19. The rolls 20, 22 are spaced from the front rolls 16, 17 a distance slightly greater than the length of the relatively short fibers, and the weight of the tumbler roll 22, although not sufficient to interfere with the drafting of the relatively long fibers, is sufficient to provide the necessary nip or grip on the relatively short fibers to cause said short fibers to be drafted between the front rolls and said rolls 20, 22.

Since the rolls 21, 23 and 20, 22 are rotating at substantially the same surface speed as the back rolls 18 and 19, the relatively short fibers will be fed forward by these rolls at a uniform speed, but as soon as the leading end of any of the short fibers is gripped by the front rolls 16, 17, which are rotating at a surface speed faster than the rolls 20, 22, said fibers will be pulled forward rapidly while the relatively short fibers which have not been gripped by the front rolls will be held back by the tumbler rolls and thus the short-fiber portion of the composite roving 14 will be subjected to a drafting or attenuating operation.

Hence the composite roving 14 will be delivered from the front rolls 16, 17 with both the long fiber section and the short fiber section properly drafted, each according to its own fiber length. From the front rolls 16, 17, this drafted composite roving is delivered to the spinning apparatus 25 which puts into the roving the spinning twist to form yarn 26, and then winds the yarn on a suitable yarn package 24.

The amount of twist which is put into the composite roving 14 by the drawing machine shown in Fig. 1 will preferably be just sufficient to hold the roving together so that it can be wound on the package 15 and can be unwound therefrom and delivered to the drafting apparatus of the spinning frame shown in Fig. 2 without danger of breakage, but should be insufficient to interfere in any way with the drafting operation which occurs in the drafting apparatus of the spinning frame shown in Figs. 2 and 4.

As the attenuated or drafted composite roving 14 is delivered from the front rolls 16, 17 of the spinning apparatus, it is given the usual spinning twist and is wound on a yarn package 24 by any

suitable spinning means. In Fig. 2, the spinning of the yarn 26 and winding it on the yarn package 24 is accomplished by means of a cap spinning device 25 having any usual or well-known construction.

While any suitable means may be employed for supporting the spool or package 4 containing the roving 1 of short fibers in order to permit it to be delivered to the front rolls 5 and 6, yet we have herein illustrated this yarn package as supported on a suitable creel 29 which is mounted on a bracket 30 that is attached to the front roller casting 31.

32 indicates a guide over which the roving 1 passes as it is delivered from the spool 4, said guide being carried by an arm 33 mounted on the creel 29.

34 indicates a suitable guide for the roving 1 which is herein shown as secured to and extending from the guide member 40 by which the finisher sliver 2 is guided.

The relative amounts of relatively short fiber and the relatively long fiber in the composite roving 14 may be varied within wide limits without departing from the invention. In fact, a composite roving having 25% to 30% of fiber of one length as compared with 75% to 70% of fiber of the other length can be used in accordance with this invention for making a yarn comprising a blend of the relatively long and the relatively short fibers.

By the terms "relatively short fiber" and "relatively long fiber" we refer to two fibers of such different lengths as to require different types or settings or drafting apparatus for drafting the fibers where each fiber is treated separately. And while we have successfully used the invention in producing a yarn comprising a blend of cotton fiber (which is relatively short fiber) and mohair fiber (which is relatively long fiber), yet the invention is equally applicable for producing yarn comprising a blend of other fibers, some of which are relatively long and others of which are relatively short.

We claim:

1. The method of producing a yarn comprising a blend of relatively long fibers and relatively short fibers, which consists of (1) forming in usual way a roving of relatively short fiber which is in condition to be spun into a yarn on a spinning machine, (2) forming in usual way a finisher sliver of the relatively long fiber which is in sliver form but is ready for the final drawing operation to reduce it into a roving ready for the spinning operation, (3) drafting the finisher sliver of relatively long fibers to reduce it to roving form, (4) loosely twisting together said drafted sliver or relatively long fiber and the roving of relatively short fiber to form a composite roving, and (5) then spinning said composite roving into a single ply yarn.

2. The method of producing a yarn comprising a blend of mohair and cotton fibers which consists of (1) forming in usual way a roving of cotton fiber which is in condition to be spun into a yarn on a spinning machine, (2) forming in usual way a finisher sliver of mohair which is in sliver form but is ready for the final drawing operation to reduce it into a roving ready for the spinning operation, (3) drafting the mohair finisher sliver to reduce it to roving form, (4) loosely twisting together said drafted sliver of mohair and the roving of cotton fiber to form a cotton-mohair roving, (5) subjecting the cotton-mohair roving to a drafting operation, and (6) spinning the drafted roving into yarn.

3. The method of producing a yarn comprising a blend of mohair and cotton fibers which consists of (1) forming in usual way a roving of cotton fiber which is in condition to be spun into a yarn on a spinning machine, (2) forming in usual way a finisher sliver of mohair which is in sliver form but is ready for the final drawing operation to reduce it into a roving ready for the spinning operation, (3) drafting the mohair finisher sliver to reduce it to roving form, (4) loosely twisting together sad drafted sliver of mohair and the roving of cotton fiber to form a cotton-mohair roving, (5) subjecting the cotton-mohair roving to a drafting operation during which the cotton fibers and the mohair fibers are each drafted according to their own length, and (6) spinning the drafted roving into yarn.

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