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PRODUCTION OF YARN CONTAINING HAIR FIBERS

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FIG. 1

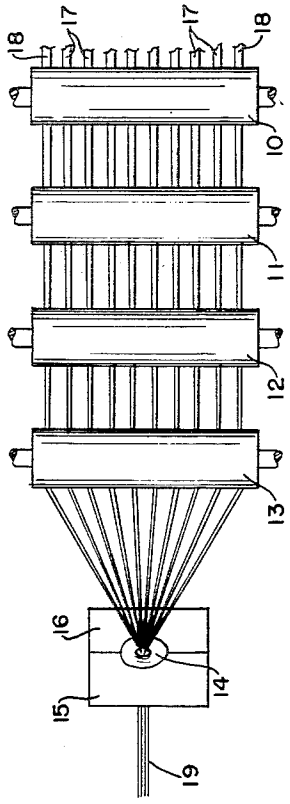
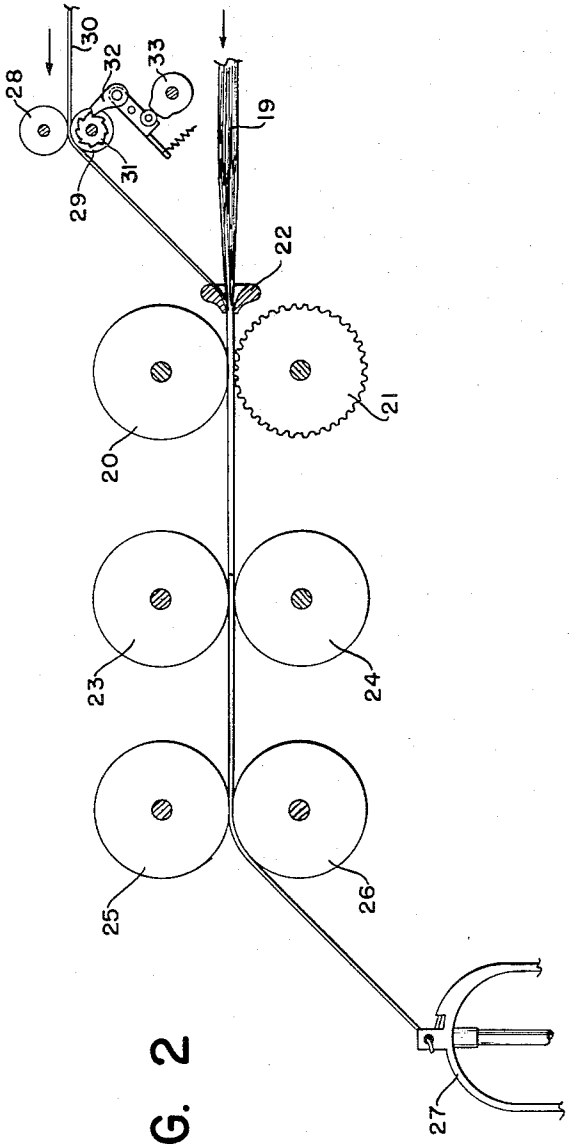


FIG. 2



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PRODUCTION OF YARN CONTAINING HAIR FIBERS

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9 Claims. (Cl. 57—157)

This invention relates to the production of yarn containing a substantial proportion of goat hair and suitable for use as the filling in the weaving of hair canvas of the kind employed for garment interlinings and for like purposes. More particularly, the invention is concerned with a novel method of making a yarn of the stated type, in which the goat hair fibers are relatively short and may be noils produced in a combing operation. A hair canvas woven with a filling made of the yarn produced by the practice of the method of the invention may have the desired resilience, appearance, hand, and other characteristics of hair canvas as made heretofore and is substantially cheaper, since the method can be carried out on the cottom system and the short goat hair fibers are much cheaper than those in the combed yarns previously used.

At the present time, hair canvas for garment interlinings is woven with a warp of yarns of various fibers and a filling of yarn spun from a blend of goat hair and synthetic fibers, such as rayon, with or without a proportion of wool fibers. A typical hair yarn may contain 40% goat hair and 60% rayon fibers and a three component yarn may contain 40% goat hair, 20% wool, and 40% rayon. The goat hair fibers make the yarn stiff and impart resilience to the fabric, in which the yarn is used, while the rayon fibers bind the hair fibers in the yarn and relieve their harshness. The wool fibers replace a part of the hair fibers and give a desirable wooly appearance and hand to the fabric. In the production of the yarn, the worsted system is used and the card sliver is subjected to a combing operation in which fibers of a staple length below a selected minimum, for example, 2", are discarded. Such noils of goat hair and wool have a staple length ranging from ¼" to 2", while the discarded rayon fibers usually range in length from 1 9/16" to 2". Heretofore, the noil mixtures of goat hair, wool, and rayon fibers and of goat hair and rayon fibers have been regarded as useless for the production of hair yarn and have represented a substantial loss.

I have found that a hair yarn, which can be used in the weaving of a hair canvas fully as acceptable commercially as that made heretofore with yarn of long staple length, can be produced from the mixtures of goat hair, wool, and synthetic fibers and of goat hair and synthetic fibers now discarded as noils in the production of hair yarn. In producing the yarn, I utilize the cotton system and I employ modifications of the system particularly in the production of the final roving which is spun into the yarn.

For a better understanding of the invention, reference may be made to the accompanying drawing, in which:

Fig. 1 is a diagrammatic plan view of the rolls of a drawing frame with ends of sliver of two different kinds being fed thereto in accordance with the invention; and

Fig. 2 is a diagrammatic side elevational view of parts of a roving frame, in which a sliver and a roving are

drafted and formed into a roving in accordance with the invention.

In the practice of the method, I prepare a sandwich batch of noils which contains the fibers desired in the yarn in relative proportions determined by the proportions of the fibers to be present in the yarn. A typical batch may contain a mixture of 70% of goat hair and 30% of wool noils, a mixture of 40% of goat hair and 60% of 5.5 denier rayon noils, and a quantity of 3 denier rayon fibers of 1 9/16" staple length. The use of rayon as the synthetic fiber component is not critical and other synthetic fibers of the types now in commercial use may be employed instead of the rayon fibers. The batch of fibers is processed in the usual blending and picking equipment of the cottom system and laps suitable for treatment in a cotton card of the revolving flat or roller types are produced. The carding operation produces a sliver, which may be of a suitable weight, such as 55 grains.

The next operation is that of drawing the card sliver and for this purpose a standard four or five roll drawing frame may be used, such as the four roll frame shown diagrammatically in Fig. 1. A plurality of ends of the sliver are supplied to the frame from the usual cans or in the form of a lap and, after passage through the pairs of rolls **10**, **11**, **12**, and **13**, the drafted ends are combined by passage through a trumpet **14** and a pair of delivery rolls **15**, **16** and the resulting sliver is coiled and deposited in a can. In the drawing operation, I supply ends of rayon sliver to the drawing frame simultaneously with the ends of the card sliver of the blend of fibers and such rayon sliver is of about the same weight as the card sliver and is made by similar operations. The rayon fibers in the rayon sliver are used to bind in short goat hair and wool fibers and I find that best results in this connection are obtained when ends of rayon sliver are supplied to the drawing frame at opposite sides of the group of ends of card sliver. Thus, as shown in Fig. 1, I may feed eight ends **17** of card sliver side by side to the rear rolls **11** of the frame and, at the same time, I feed two ends **18** of rayon sliver as the outer members of the group of ten ends. With this arrangement, the rayon fibers tend to lie at the surface of the resultant sliver product.

The sliver produced on the drawing frame may then go to a roving frame but I prefer to subject the drawing frame sliver to a second drawing operation. In this operation, a number of ends of the sliver determined by the weight of the sliver, the draft of the frame, and the weight of the sliver product desired are supplied to the frame and, after being drafted, are combined into a single end and collected in a can.

The drawing frame sliver is next converted into a roving on a typical roving frame which may be of the three, four, or five roll or high draft types. In the three roll frame shown, the sliver **19** is drawn from its can and passes through the usual trumpet **22** on its way to the rear rolls **20**, **21** and it is drafted in the zone between those rolls and the middle rolls **23**, **24** and further drafted in the zone between the middle rolls and the front rolls **25**, **26**. From the front rolls, the drawn product passes to the usual flyer and is wound on a bobbin.

In a yarn produced on the cotton system from a blend of fibers such as I have described, the goat hair fibers are substantially uniformly distributed through the yarn and it develops that a fabric containing such yarn does not have the resilience of a comparable fabric containing goat hair as heretofore produced. Also, the fabric made with the yarn containing goat hair fibers of short staple length is substantially uniform in color and is distinguishable in this respect from hair canvas as previous-

ly made, which has dark spots and streaks. I have found that a yarn which gives the desired resilience to hair canvas, can be made from a blend containing short goat hairs by a simple modification of the roving operation to cause additional hair fibers to be added at intervals to the sliver being fed to the frame. The resultant roving then contains hair fibers in non-uniform distribution as does the yarn produced therefrom and the yarn both imparts the desired resilience to the fabric and also gives it an appearance resembling that of present hair canvas.

The addition of hair fibers at intervals to the drawing frame sliver **19** being fed to the roving frame is effected by providing the frame with feed rolls **28, 29**, by which a roving **30** is supplied intermittently to enter each trumpet **22** with the sliver **19** passing to that trumpet. The roving **30** contains a substantially higher proportion of goat hair fibers than the sliver **19** and may contain 90% of hair fibers and 10% rayon fibers although, if desired, part of the hair fibers may be replaced by wool fibers. The size of the roving may vary in accordance with the size of the sliver and the final proportions of the constituent fibers to be present in the yarn. I have found that a roving suitable for use with a 55 gr. sliver may be a .40 hank roving having a twist of .9 turn per inch.

The intermittent feed of the roving **30** is accomplished by advancing the rolls **28, 29** stepwise and, for this purpose, the roll **29** may be provided with a ratchet wheel **31** engaged by a spring-pressed pivoted pawl **32** operated by a cam **33** or the roll may be driven by a chain. The length of roving fed may range from ⅛" to 1" or more and the spacing along the sliver **19** between successive lengths of roving is a multiple of at least 2 of such a length of roving. I have obtained good results by feeding ⅛" of roving in each operation and timing the feeding so that ¾" of sliver is fed for each such length of roving fed.

When the apparatus is in normal operation, the end of the roving **30** issuing from rolls **28, 29** lies on top of the sliver **19**, which is being drawn continuously through the trumpet **22** by the rolls **20, 21**, and the sliver tends to pull the end of the roving into the trumpet. When the rolls **28, 29** advance, the end of the roving begins to move through the trumpet with the roving and, when rolls **28, 29** stop, the pull of the sliver on the end portion of the roving causes the roving to break. The break normally occurs in the trumpet and the detached end portion of the roving then moves along with the sliver through the pairs of drafting rolls of the frame. The length of the detached section varies with the length of the advance of rolls **28, 29**.

In the roving frame, the roving produced contains an uneven distribution of hair fibers and, when this roving is spun into a yarn, the yarn also contains the hair fibers in non-uniform arrangement. In the production of the roving **30**, the rayon used is black and, as the goat hair fibers which predominate in the roving, are dark, the feeding of the roving intermittently to the drafting zone of the roving frame results in color variations along the roving issuing from the frame. The final yarn spun from the roving is similarly irregular both in hair fiber distribution and in color.

The yarn produced by the method of the invention may contain goat hair and synthetic fibers or goat hair, wool, and synthetic fibers in varying proportions determined by the characteristics desired in the fabric, in which the yarn is used, and, in all instances, contains not less than 20% of hair fibers. The proportions of the

different fibers used to obtain different effects are substantially the same as those employed in producing hair yarn at present and the yarn produced by the method of the invention can be used with wholly satisfactory results to replace hair yarn made by prior methods. At the same time, the yarn made by the new method is substantially cheaper than prior hair yarn in that it is made of fibers previously discarded as waste and is produced on the cotton system instead of on the worsted system.

I claim:

1. A method of making a yarn, which comprises forming a sliver of synthetic fibers and one member of the class made up of goat hair fibers and a mixture of goat hair and wool fibers with at least 20% of the sliver consisting of goat hair fibers, forming a second sliver of synthetic fibers, simultaneously drawing a plurality of ends of the first sliver and a less number of ends of the second sliver to form a third sliver, feeding a continuous length of the third sliver to a drafting zone and simultaneously feeding to the zone, to be drafted with the sliver, spaced lengths of a roving of synthetic fibers and one member of the class made up of goat hair fibers and a mixture of goat hair and wool fibers, the roving containing a substantially higher proportion of goat hair fibers than the third sliver, twisting the product issuing from the drafting zone to form a final roving, and spinning the final roving into yarn.

2. The method of claim 1, in which the goat hair fibers are present in the third sliver and the roving drafted therewith in such amounts that the yarn contains at least 20% of goat hair fibers.

3. The method of claim 1, in which the goat hair and wool fibers have a staple length not substantially greater than 2".

4. The method of claim 1, in which the operations are performed on the cotton system.

5. The method of claim 1, in which the spacing along the third sliver between successive lengths of the roving fed therewith to the drafting zone is a multiple of at least 2 of a length of roving fed.

6. The method of claim 1, in which the lengths of roving fed to the drafting zone with the third sliver range from ⅛" to 1".

7. The method of claim 1, in which about ¾" of the third sliver is fed to the drafting zone for each ⅛" of roving fed to the zone.

8. The method of claim 1, in which, in the simultaneous drawing of the first and second sliver, the ends of the slivers are fed side by side in a group to a drafting zone and the outermost ends in the group are ends of the second sliver.

9. The method of claim 1, in which a plurality of ends of the third sliver are subjected to a drafting operation to produce a fourth sliver and the fourth sliver is fed continuously to a drafting zone while a roving is fed intermittently thereto.

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