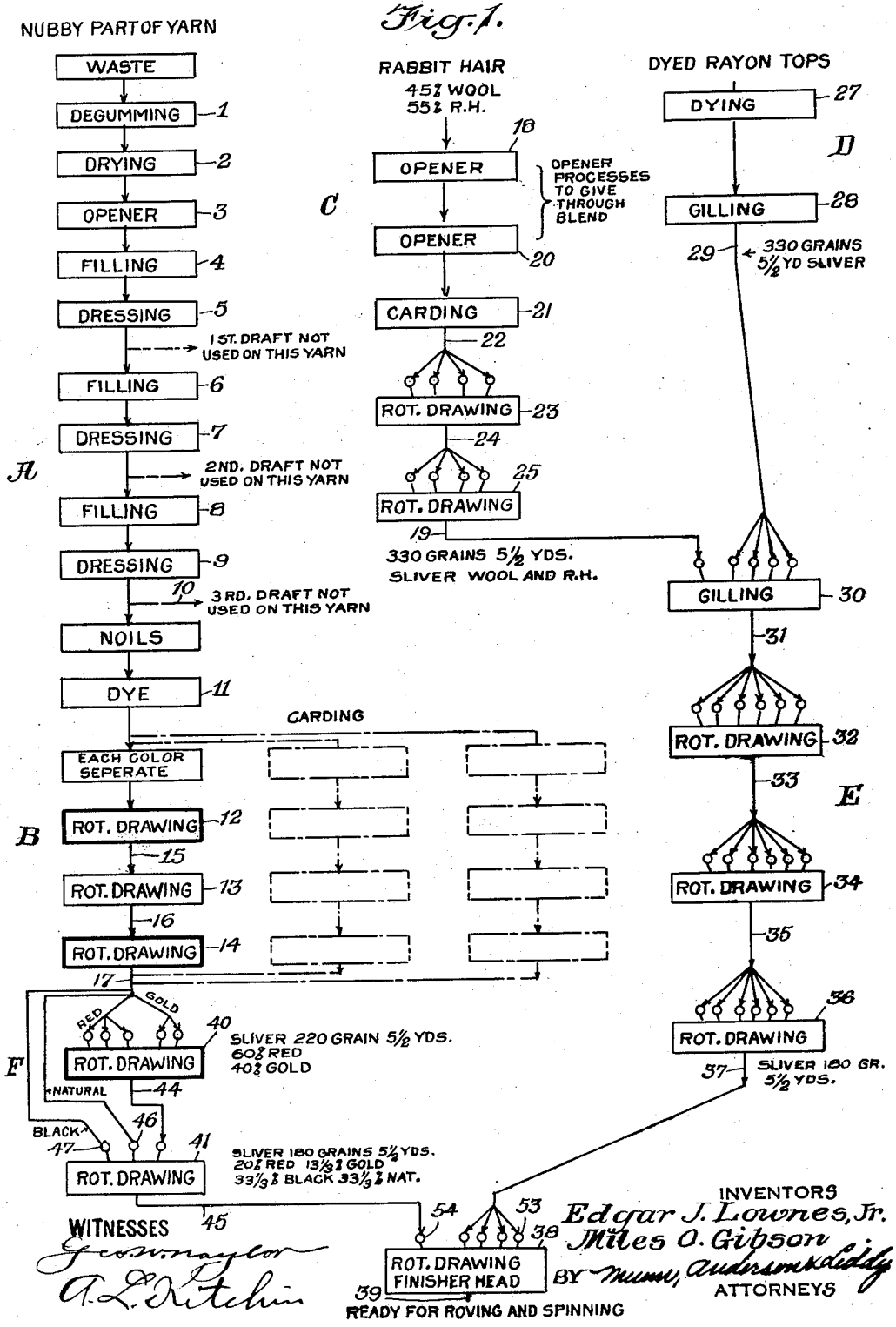
Dec. 15, 1936. E. J. LOWNES, JR., ET AL 2,064,762

METHOD OF PRODUCING YARN

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Fig. 1.



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Fig. 2.

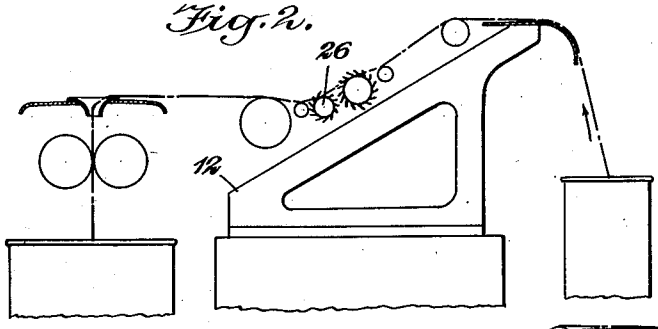


Fig. 3.

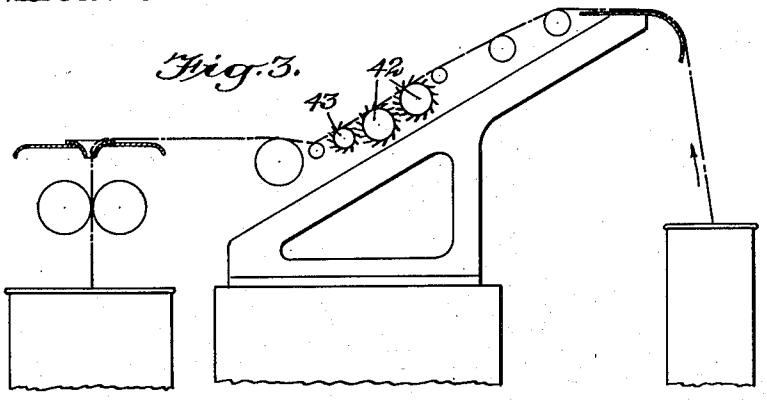


Fig. 4.

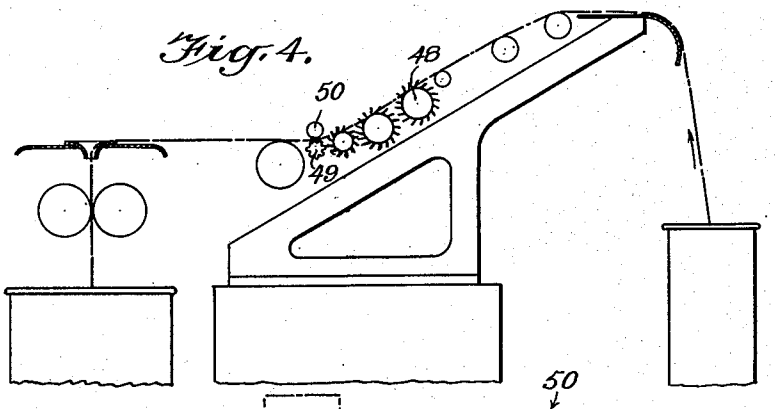


Fig. 5.

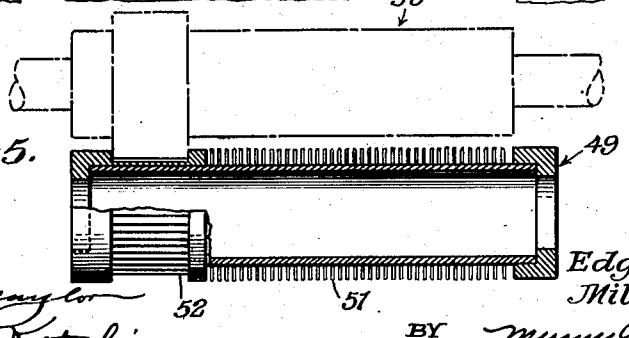


Fig. 6.



Fig. 7.



WITNESSES

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METHOD OF PRODUCING YARN

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Application June 22, 1935, Serial No. 28,005

6 Claims. (Cl. 19—146)

This invention relates to an improved ornamental yarn and method of producing the same, an object being to provide a pleasing form of yarn in which is embodied a desired quantity of silk noils with a supporting base and with rabbit's hair or other substantially similar material.

Another object in view is to provide an improved method wherein silk noils, rabbit's hair, wool, and rayon may be formed into an ornamental yarn with the respective materials distributed in a specified order.

An additional object is to provide an improved method of using silk noils with rayon tops and a mixture of wool and rabbit's hair to form a sliver or roving ready for spinning with the various ingredients dyed various colors so that the color scheme will be in proportion to the particular ingredients used.

An additional object, more specifically, is to provide a method whereby there are formed slivers or strands of combined wool and rabbit's hair, strands of silk noils, and strands of rayon, all blended together into a single roving sliver without losing the identity of any strand, so that the finished yarn will have distributed in certain proportions the various materials forming the yarn for the full length of the yarn.

In the accompanying drawings—

Figure 1 is a diagram showing the various steps of the method whereby a finished roving sliver ready for spinning is produced;

Fig. 2 is a view principally formed as a diagram showing a machine known as a rotary drawing machine, with certain parts changed to produce one of the steps of the method;

Fig. 3 is a view similar to Fig. 2 but showing a standard rotary drawing machine;

Fig. 4 is also a view similar to Fig. 2 but showing a modified construction to both Figs. 2 and 3;

Fig. 5 is an enlarged view partly in section showing one of the herissons illustrated in Fig. 4 formed with a fluted end;

Fig. 6 is a side view on an enlarged scale of a section of yarn produced according to the present method;

Fig. 7 is a fragmentary view of the yarn shown in Fig. 6, the same being on a greatly enlarged scale.

In the accompanying drawings, certain drawing machines and other machines have been shown either in diagram or partially in diagram, said machines being old and well known in the silk-spinning industry.

In Figs. 2 to 5, inclusive, old structures are shown with certain modifications necessary to produce the yarn shown in Fig. 6 and also necessary to carry out the present method. In Fig. 1 a diagram is disclosed indicating certain machinery and certain movement of material whereby the method may be carried out to produce a sliver for roving and spinning.

When the finished single sliver is produced the roving is an old and well-known step, namely, merely winding the sliver on a spool or other object. From this spool the sliver is fed into any usual preferred form of spinning machine whereby the sliver or band is twisted and in most instances is pulled out during the twisting action so as to have less material in it than in the sliver or roving.

Referring more particularly to Fig. 1, it will be seen that the various machines have been arranged in groups in order to carry out the method embodying the invention, these groups being specified as groups A, B, C, D, E and F. Group A comprises diagrams of machines which operate upon the nubby part of silk fibers to produce silk noils, while group C presents, in diagram, different machines for converting a mass of wool and rabbit's hair into a single sliver of a given weight for a certain length. Likewise, group D acts upon rayon tops for producing a sliver of a given weight. Group B combines certain yarns as hereinafter fully described to produce a single sliver having a plurality of colored yarns therein, while group E does the same thing in respect to certain other yarns. The finished slivers from groups E and F are brought over and passed through a rotary drawing finishing head to produce a single finished sliver ready to be roved or spun.

In forming the particular yarn shown in Fig. 6, the diagram in Fig. 1 has been illustrated with designations indicating the color and proportion of each ingredient. It will be understood, however, that the same method may be carried out using different colors and different proportions and the same yarn produced except that it will be heavier or lighter and the colors might be varied.

In regard to group A, a quantity of waste silk fiber is taken and thrown into a degumming machine 1. This waste silk fiber may be the usual waste found in silk mills, said waste having fibers of various lengths. Also this waste may contain pierced cocoons or portions of cocoons. This mass of material is usually more or less gummy and sometimes contains grease and other foreign matter. Also the waste is in a more or less matted and lumpy condition. The degumming machine cleans the waste of gum, oils and the

like. From the degumming machine the mass of waste is placed in a drying machine 2, which may be of any desired kind, as, for instance, an ordinary drying machine or a hot room. From the drying machine the mass of waste now degummed and dried is dumped into a machine 3 known as an opener. This opener pulls the matted waste apart and loosens up the entire mass so that it will be capable of being further handled to secure the desired results, namely, the separation of the fibers into various lengths and the final separation of the very short bunches of fibers known as "noils". From the opener the mass of fibers is fed into a filling machine 4. This filling machine fills what are known as "sticks", which really are bars having clamps for clamping a certain supply of fibers so that they will project therefrom. These sticks, so called, are placed in a dressing machine 5, which machine acts in the usual way to separate the longest fibers from the remaining fibers. These longest fibers are removed and are known as the "first draft". It will be understood that all the machines so far discussed are old and perform their function in the usual and well-known manner.

From the dressing machine 5 all of the material, except the first draft, is fed into a filling machine 6. This filling machine acts in the same manner as the filling machine 4 as it is the exact structure. The sticks from the filling machine with the yarn thereon are fed into a dressing machine 7 which acts in the usual way of machines of this kind and removes the longest fibers which are known as the "second draft", this second draft being the next longest to the first draft above mentioned. The same operation is carried out in regard to the filling machine 8 and the dressing machine 9 so that a third draft 10 is removed. After the third draft 10 is removed the remaining fibers consist of short fibrous matter arranged in bunches more or less knotted together. These bunches are comparatively small and are known as "noils". These noils are further treated to produce a sliver.

In producing the particular yarn as shown in Fig. 6, the noils are dyed in any form of dyeing machines 11; for instance, one dyeing machine may dye the noils red and another may dye the noils gold. The red-dyed noils are then fed into a rotary drawing machine 12. Also, at the same time if desired, the gold-dyed noils may be fed into another drawing machine. As many colors may be used as desired and each color kept separate and the noils passed through drawing machines 12, 13 and 14. The drawing machine 12 converts the mass of noils into a sliver 15, which is rather heavy and this sliver passing through drawing machine 13 is drawn out and blended to a great extent so that the sliver 16 therefrom is usually smaller. The sliver 16 is fed into the drawing machine 14 and the sliver 17 discharged therefrom is the finished noil sliver. Instead of running one color through all of these drawing machines, a mixture of colors may be run through similar machines indicated by dot-and-dash lines at the right, or, if desired, another group could be provided and several slivers each being of a different color may be combined and run through the machines.

While the noils are being treated as just described to produce the finished sliver 17, or at some other time, group C might be functioning. When group C is functioning wool and rabbit's hair may be mixed together as a mass and thrown into a machine 18, known as an opener, which is identical with the opener 3. In the particular yarn disclosed, the finished sliver 19 of wool and rabbit's hair consists of forty-five per cent wool (sheep) and fifty-five per cent rabbit's hair. This material is dumped into the opener 18, which is an old and well-known machine in the industry, and functions in the usual way. The opener 18 pulls the matted mass of wool and rabbit's hair and mixes the same somewhat. During the pulling operation it loosens up all the lumps or thickly matted parts so that when the mixture is discharged from the opener 18 it is in a loose mass more or less mixed. To secure better results, however, the mass matter from the opener 18 is preferably dumped into an opener 20 and the same operation takes place whereby a greater mixing and greater loosening effect are produced. This blends the two materials more or less together so that the strands of wool will entwine with the individual hairs of the rabbit's hair and act to hold the rabbit's hair in the sliver which is formed later and also in the finished yarn as shown in Fig. 6.

The mass of material is fed from the opener 20 into a carding machine 21, which is the usual form of carding machine commonly used in silk mills, cotton mills, and elsewhere. This carding machine cards the material in the usual way and the sliver 22 therefrom is discharged into a receptacle known in the trade as a can. This action continues until the can is filled and then the operator breaks off the sliver 22 and directs the same into a second can. When the second can is filled the operator breaks the sliver again and directs the outcoming sliver into a third can. This operation is continued as long as the carding machine is in use so that a supply of filled cans is thus produced.

In the particular proportions illustrated in the drawings, four of these filled cans are placed near a rotary drawing machine 23 which acts in the usual manner of drawing machines for drawing and blending more or less the four slivers fed therein so that there will be one sliver 24 discharged therefrom, said one sliver being approximately the same size and weight as any one of the slivers fed therein. The sliver 24 is discharged into cans as described in regard to the carding machine 21, and four of these filled cans are arranged adjacent a drawing machine 25 so as to be fed therein. The drawing machine 25 again blends and draws out to a certain extent the slivers so that the finished sliver 19 is approximately the same size as any one of the slivers fed into the machine 25. In the example given the sliver 19 has a weight of 330 grains per each five and one-half yards. The drawing machines 23 and 25 are of the usual kind now in use, but the drawing machines 12 and 14 heretofore referred to are somewhat different. For instance, the drawing machine 12 is shown more in detail in Fig. 2 wherein the structure is identical with the drawing machine now in common use except that the bottom herisson 26 is reversed. This permits the material to be fed through the drawing machine without drawing the material as much as usual in drawing machines of this kind. It is undesirable to draw out or pull the silk noils as it is desired to have the matted or central part remain intact to produce more or less ornamental protuberances on the finished yarn as shown in Fig. 6. The rotary drawing machine 14 is similar to the drawing machine 12 and acts in a similar manner. It will, therefore, be seen that these three drawing ma-

chines 12, 13 and 14 will not produce as much drawing and blending of fiber as the ordinary machines.

While group C is operating, or at some other time, group D is caused to function. The rayon tops are used in this group. Rayon tops is a well-known commercial product now on the market and the mills using the same usually purchase the tops from manufacturers thereof. These tops are rayon fibers of various lengths similar to the silk waste except that the lengths are much greater and the tops are not matted as in silk waste. These tops are placed in a dyeing machine 27 of any desired kind and from this dyeing machine the dyed tops are passed to a drying room after which they are fed into a gilling machine 28. This gilling machine is an old and well-known structure for straightening the various fibers and arranging the same into a band or sliver. In the present instance, the discharged sliver 29 of rayon tops has a weight of 330 grains per five and one-half yards. This sliver is discharged into cans as heretofore described in regard to the wool and rabbit's hair.

A number of these filled cans are then placed near a gilling machine 30. In the example given, four cans of rayon-top sliver are placed adjacent the gilling machine 30 and one can filled with the sliver from group C. It will thus be seen that the gilling machine 30, which is the usual structure of gilling machines, will discharge a sliver 31 having one part of combined wool and rabbit's hair and four parts rayon tops. Six cans of sliver 31 are arranged adjacent the drawing machine 32 and as they are operated upon by this drawing machine, which is the usual drawing machine now in common use, the sliver 33 is discharged, which is of substantially the same size and weight as any one of the slivers fed into the machine. This operation is repeated in regard to the rotary drawing machine 34, there being six cans of the sliver 33 fed into the machine 34.

In order to obtain a fuller and greater blending, the sliver 35 from the drawing machine 34 is fed into cans and six of these cans are fed into the rotary drawing machine 36 so that the sliver 37 from drawing machine 36 will be produced after the material has passed through three rotary drawing machines. All of these machines draw and blend the fibers so that they are substantially parallel to each other when formed into the sliver 37. Four cans of the sliver 37 are then fed into the rotary drawing machine and finishing head 38. At the same time, one can from group F is fed into the machine 38. This produces the finished single sliver 39 which is ready to be wound on a spool to form a roving sliver and also ready for the spinning machine. The sliver 39 is spun in the usual way with any desired number of turns and the finished product is substantially as shown in Fig. 6.

In regard to group F there is used a rotary drawing machine 40 and a rotary drawing machine 41. These drawing machines are identical except that the rotary drawing machine 40 has a top herisson 42 reversed as shown in Fig. 2.

It will be seen that in producing the yarn shown in Fig. 6, with certain parts dyed gold and certain red, the method used in group A is varied by having the dyeing machine 11 act to dye a supply of noils gold and a second supply of noils red, while other supplies are dyed black or left natural. For instance, when gold is desired, the dyeing machine 11 is provided with a gold dye and the desired number of cans of gold slivers 17 provided. The dye is then changed to red and the desired number of cans of red slivers 17 provided. After this has been done, the dye in the machine 11 is changed to black and the desired number of cans of black slivers 17 provided. Also the dyeing machine 11 may be removed completely and the natural color noils converted into slivers 17, which slivers will have the natural color. After the desired cans of slivers 17 have been provided, two cans of gold slivers and three cans of red slivers are arranged adjacent the machine 40 and are passed through this machine, which blends, straightens and pulls out the various slivers so that the single sliver 44 discharged therefrom will be about the same size and weight as any of the slivers fed into the machine 40.

One can of sliver 44 is arranged adjacent the machine 41 and one can of sliver 17, indicated by the numeral 46, is also placed adjacent the machine 41, said can of sliver 46 being natural color. One can of black sliver 17, designated as 47, is arranged adjacent the machine 41, and all three cans of slivers are fed into the machine 41, which acts in the usual way to produce a sliver 45, which is approximately of the same size and weight as any one of the slivers fed therein but includes the gold and red mixed sliver 44, the natural sliver 46 and the black sliver 47. The sliver 45 in the particular illustration given weighs 180 grains per five and one-half yards and contains twenty per cent red material, thirteen and one-third per cent gold color material, thirty-three and one-third per cent black color material, and thirty-three and one-third per cent natural color material. The rotary drawing machine 41 does not blend these colored slivers in the sense of mixing the same but draws out and lengthens each sliver that is fed into the machine and these drawn out or thinned slivers are arranged side by side in a certain sense but adhere sufficiently to form a band or sliver or to retain their shape sufficiently so as to be fed into a drawing machine and later fed into a can.

One can filled with sliver 45 and four cans filled with sliver 37 are fed into the rotary drawing and finishing head 38. This rotary drawing and finishing head is constructed as shown in Fig. 4, which is the usual construction except that it has a special herisson 49 caused to function properly by a special carrier roll 50. The herisson 49 is shown in Fig. 5 wherein the larger part is provided with the usual pins 51 which in common use are sixteen pins to the inch, though they could be placed nearer together or further apart without departing from the invention. However, one section 52 is provided with a fluted band or surface rather than pins. These parts are so arranged that the slivers from the respective cans 53 will be acted on by the pins 51, while the sliver 54 (Fig. 1) will be acted on by the fluted surface 52. In this way the sliver from can 54 will be properly fed through the rotary drawing and finishing head but will not be drawn out, while the slivers in cans 53 will be drawn out and blended together. In this way the sliver formed from the noils of silk will still maintain the characteristic of having certain of the fibers entwined to form a continuous sliver, while all or certain of the fibers at irregular portions will form enlargements presenting protuberances in the finished yarn.

After the sliver 39 has been spun it will present a yarn as shown in Figs. 6 and 7. In this

yarn there is provided a body or base **55** which is made up principally of rayon tops. However, in this body **55** there is extending the full length thereof and also forming a part thereof, wool and rabbit's hair, the rabbit's hair protruding from the base as indicated at **56**, thus giving a more or less fuzzy appearance for the full length of the yarn. The sliver **45** as it merges into sliver **39** really extends for the full length of the yarn, but the enlargements formed by the thickened portions of the noils present protuberances **57** which are sometimes rather large and sometimes small, with extending fibers entwined with the body or base **55**. As the sliver **45** is made up of red, gold, black and natural colors, the various protuberances **57** will be of different colors and the fibers extending therefrom will likewise be of different colors, whereby a desired ornamental appearance will be given to the yarn in addition to the pleasing and odd appearance of the protruding part of the noils. Some of these protruding portions **57** may be white, others red, while others may be gold or black, the white protruding portions being the natural noils. Occasionally one of the noils will be much larger than the others and when this occurs it will appear as indicated at **57'** in Fig. 7. As a matter of fact, the various protuberances caused by the noils vary widely in size and also vary in color according to the color scheme of the sliver **47**.

We claim:

1. The method of forming a yarn of silk noils, wool, rabbit's hair and rayon fibers, consisting in separating the silk noils from a supply of silk fibers, forming said separated silk noils into a sliver, mixing, carding and blending wool and rabbit's hair separately from the noils until a sliver is produced, gilling rayon tops separately until a sliver is produced, blending the combined wool and rabbit's hair sliver with a plurality of rayon slivers, then blending into a single sliver the silk-noil sliver with the combined rayon, wool and rabbit's hair sliver, and finally spinning the blended single sliver.

2. The method of forming a yarn of silk noils, wool, rabbit's hair and rayon tops, consisting in separately forming a sliver of silk noils, a sliver of rabbit's hair and wool, and a sliver of rayon tops, then forming a strand from the slivers of wool, rabbit's hair and rayon tops, then forming a single roving strand from the mixed strands of wool, rabbit's hair and rayon tops and a strand of silk noils, and finally spinning said single strand.

3. The method of forming a roving strand of silk noils, wool, rabbit's hair and rayon fibers, consisting in separating the silk noils from a supply of silk fibers, forming said noils into a sliver, mixing carding and blending wool and rabbit's hair separately from said noils until a sliver is produced, gilling rayon separately until a sliver is produced, subjecting the combined wool and rabbit's hair sliver and a plurality of rayon slivers to a blending and drawing machine for forming a mixed sliver, subjecting said mixed sliver with the silk noil sliver to a drawing machine for forming a final sliver, and finally subjecting said final sliver to a drawing machine until a roving strand of the desired weight per yard is secured.

4. The method of forming a roving strand from silk, wool, rabbit's hair and rayon, consisting in forming silk noils from a supply of silk fibers, forming a sliver from said silk noils, mixing a supply of wool and rabbit's hair, forming a sliver from the mixed wool and rabbit's hair, forming a sliver of rayon, subjecting the sliver of mixed wool and rabbit's hair and the sliver of rayon to the action of the same drawing machine to produce a mixed sliver, and then subjecting said last mentioned sliver and a sliver of silk noils to a drawing machine for forming a finished roving strand ready for spinning.

5. The method of forming a roving strand from four ingredients including silk noils consisting in mixing two of said ingredients, forming a sliver of said mixed ingredients, forming a sliver of a third ingredient, subjecting said mixed sliver and the sliver formed from the third ingredient to the action of a drawing machine to form a combined sliver, forming a sliver of silk noils of less weight per yard than either of the other silvers, and then subjecting the sliver of silk noils and said combined sliver to the action of a drawing machine for forming a finished roving strand ready for spinning, the action of said drawing machine being continued until a roving strand has the desired weight per yard.

6. The method of forming a roving strand ready for spinning consisting in forming a sliver of silk noils, blending a quantity of rabbit's hair and wool until the strands of wool are entwined and interlocked with the rabbit's hair, forming a sliver of said blended rabbit's hair and wool, forming a sliver of a third ingredient, then partly blending said slivers of blended rabbit's hair and wool and third ingredient to form a mixed sliver, and finally partly blending said silk noils sliver and said mixed sliver to form a roving strand, said blending being stopped at a point which will leave certain of the slivers distinguishable in the finished roving strand.

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