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J. KILLARS, JR

2,103,080

PROCESS FOR PRODUCING LINEN LIKE MATERIALS AND PRODUCTS THEREFROM

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Fig. 1.

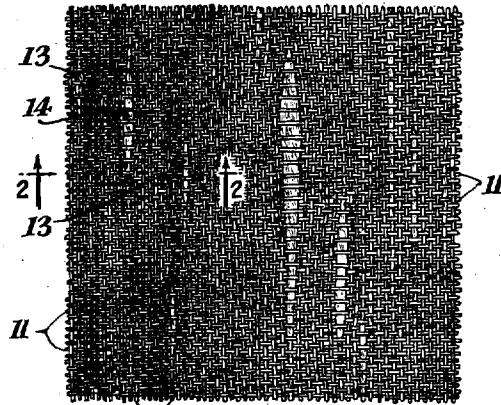


Fig. 2.

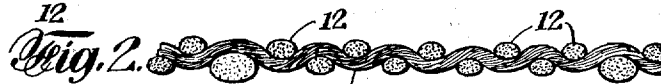


Fig. 3.

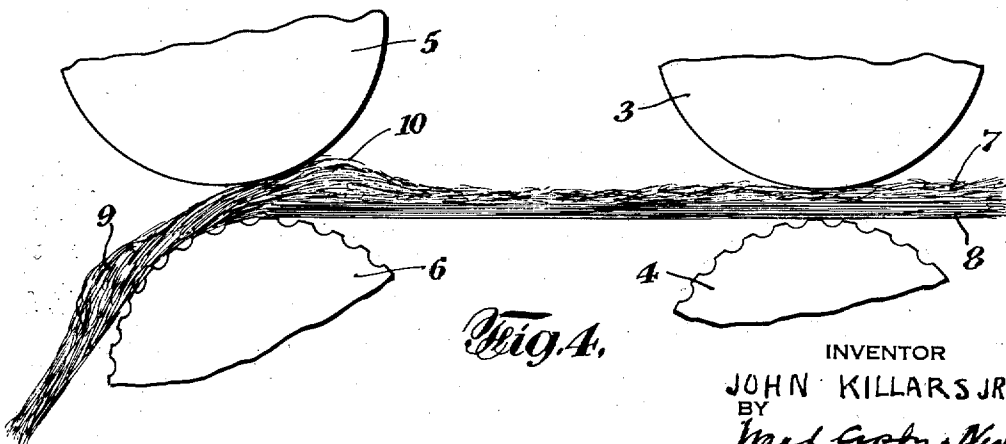
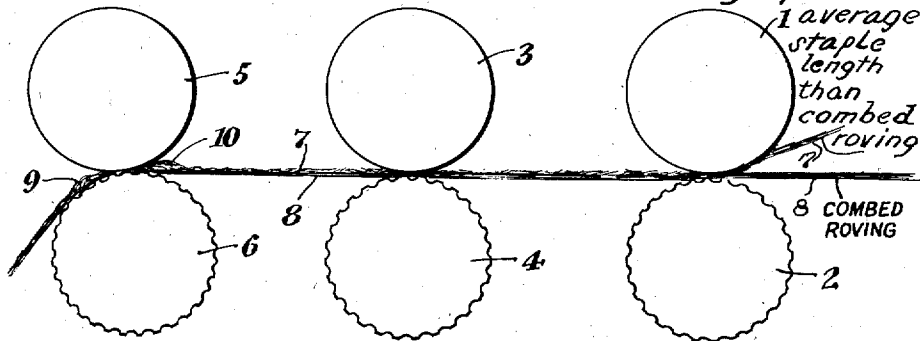


Fig. 4.

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UNITED STATES PATENT OFFICE

2,103,080

PROCESS FOR PRODUCING LINEN-LIKE MATERIALS AND PRODUCTS THEREFROM

John Killars, Jr., Spartanburg, S. C., assignor,
by mesne assignments, to Heberlein Patent
Corporation, New York, N. Y., a corporation
of New York

Application December 29, 1933, Serial No. 704,400

7 Claims. (Cl. 117—22)

This invention relates to process for changing cotton into yarn or fabric resembling linen, and products obtained therefrom.

Real linen yarn or fabric is characterized by threads of irregular size and shape which occur at random throughout the material. It is also characterized by a smooth feel and is harder and stiffer to the touch than cotton fabric or yarn of similar thread size.

The principal object of my invention is to change cotton into a material having the structural irregularities of linen, which may then be treated to provide the other linen characteristics.

Further and more specific objects, features and advantages will clearly appear from the detailed description given below taken in connection with the accompanying drawing which forms a part of this specification and illustrates by way of example an embodiment of a fabric produced in accordance with the invention and a diagrammatic showing of an apparatus for carrying out the process of the invention.

In the drawing, Fig. 1 is an enlarged view of a fabric made in accordance with the invention; Fig. 2 is an enlarged cross-section on the line 2—2 of Fig. 1; Fig. 3 is a diagrammatic showing of three rolls of a jack frame with the front top roll advanced to a forward off-center position; and Fig. 4 is an enlarged view of the front and center rolls of Fig. 3.

Referring now to Figs. 3 and 4, three rolls of a jack frame are shown designated with the numerals 1 to 6. As here shown these rolls are adjusted to spin cotton of about $1\frac{3}{8}$ " average staple. The top front roll 5 of the jack frame is moved forward to an off-center position. The distance between the centers of rolls 1 and 3 and 2 and 4 respectively, according to this setting, is about $1\frac{3}{8}$ ". The distance between the centers of rolls 4 and 6 is about $1\frac{1}{8}$ " while the distance between rolls 3 and 5 is about $1\frac{3}{8}$ ", roll 5 being thus advanced about $\frac{1}{8}$ ". This advance is provided in order to aid the forming of irregular masses of fibers between the jaws of these rolls, as will be more fully described below.

I take two cotton rovings of unequal average staple length. The specific upper roving shown in Fig. 3 and designated by the numeral 7 is a card strip roving which is uncombed and therefore has its fibers in a generally criss-cross condition. The lower roving designated 8 is a combed roving having an average staple length of about $1\frac{3}{8}$ " which is greater than that of the roving 7. These rovings are introduced between

the rear rolls 1, 2 and are combined. According to the setting of the rolls of the jack frame, the combed roving of longer staple length will draft in the usual manner, but the shorter uncombed roving will not draft in the usual manner on the rolls with this setting. The result, therefore, is that the lower roving 8 proceeds to draft in the usual way and acts as a carrier for the upper roving 7. The speed of the roll 4 is about 1.05 times that of the roll 2, and the speed of the roll 6 is about 8 times that of the roll 2. This is the usual ratio of speeds for jack frames. The result of this difference in speeds is to pull out the fibers of the roving and this roving, after leaving the front roll of the jack frame, is put upon the spinning frame where it is spun in the regular way. The fact that the upper roving is too short to be drawn with this roll setting means that every now and then at irregular intervals there will be a separation of the fibers of the upper roving 7. This will occur particularly between the middle and front rolls, since there is the greatest change in speed there. This separation means that there will be a thinning out of certain of the parallel short fibers, which will be carried along by the lower carrier roving 8. The criss-cross fibers, which make up the larger part of the upper roving, will however become bunched and groups of them at irregular intervals will be passed along by the carrier roving 8. As mentioned, most of this action will take place between the front and middle rolls of the jack frame.

The parallel fibers of the upper roving will tend to be drawn out to form slubs or thinned places at random in the resulting yarn, while the criss-cross fibers will pass through in irregular masses to form neps at random in the resulting yarn. In order to give the neps a chance to build up and therefore to produce larger size irregularities in the resulting yarn, the front roll is advanced as noted above. The off-setting of this roll bends the fibers before they reach the tangent point of the two rolls and that bending tends to throw up the upper layer of fibers from the roving 7 and tends to separate them from the lower fibers of the roving 8. The fibers thus disengaged collect at or near the jaws of the rolls 5, 6 until there is sufficient drag by the lower fibers to carry them along through the rolls. After the fibers have passed through the rolls 5, 6 they are twisted into yarn and wound on bobbins in the usual manner on the spinning frame.

The result—that is the yarn twisted on the bobbins—is a cotton yarn having irregularly

spaced neps of twisted fibers 9 and slubs of more nearly parallel fibers 10, giving the cotton an appearance of the uneven and irregular fibers of linen.

5 The jack frame which I have shown and described as the machine for combining and treating the rovings is a preparatory machine to the spinning frames proper. The jack frame really performs a part of the spinning process in the
10 broad sense but as is well understood by those skilled in the art what is called spinning in mill parlance is done only on the spinning frame. The jack frame is to attenuate or draft the roving to a smaller size and prepare it for the spinning frame which still further attenuates the
15 roving before introducing the final twist. The process of drawing yarn on the spinning frame is substantially identical with that on the jack frame, with the exception that the setting of the rolls is closer on the spinning frame and does not permit of the wide setting obtained on the jack
20 frame. Instead of employing the jack frame, therefore, for carrying out the process of producing my linen-like yarn, I may use the spinning frame and in that event the front rolls would be off-set in a similar manner to the off-setting of the front rolls of the jack frame. It
25 will be understood, however, that because of the close setting of the spinning frame rolls, the slubs and neps would not be as prominent as those made on the jack frame.

The yarn so formed is then woven according to well-known methods to produce various kinds of fabrics. An enlarged microscopic view of the
35 fabric produced according to my process is shown in Fig. 1. In that case the warp threads 11 are shown as made of ordinary cotton warp. The filler threads 12 are made of the linen-like yarn described above, exhibiting the neps 13 and slubs
40 14 at random throughout the fabric. This produces a fabric resembling French linen, as it is called in the trade, which is a linen having a cotton warp and linen filler. Instead of having a plain warp and linen-like filler as shown in the
45 figures, both warp and filler may be made of the yarn of my invention. If my yarn is used as both warp and filler, I prefer to twist the warped yarn somewhat tighter than the filler. The fabric so woven is then treated with a chemical reagent to
50 produce a permanent change in the material producing a linen-like feel and an appearance more nearly resembling linen. For this purpose I may use various known reagents such as caustic soda lye or sulphuric acid as described for instance in
55 the various examples of the patent to Eduard Heberlein, #1,439,519. In the patent mentioned it is stated that yarns or webs made from cotton of English numbers above 80 exhibit translucency, or border on transparency, whereas all coarser
60 yarns, that is to say those under #80 exhibit the typical linen effect. Due to the irregularity in the yarns produced by my process, it is difficult to classify these yarns exactly, but to the extent that my yarn can be classified with the English
65 numbers, I obtain the results as stated in the patent. In actual plant practice using rovings of a staple length as mentioned above, and with roll settings in the jack frame as indicated, I have obtained for example yarns which could be
70 roughly classified as No. 60 which, when woven and treated by the process of the Heberlein patent mentioned, produce a true linen effect. Although I prefer to employ the processes of the Heberlein Patent #1,439,519, it is to be understood that
75 I am not restricted thereto as I may employ the

same or other reagents under suitable conditions to produce effects which although not the same as the linen effects of the said patent, are nevertheless desirable and useful.

Instead of preparing the yarns, then weaving
5 them and then treating with caustic soda or otherwise as above, I may treat the yarns themselves with the characteristic irregularity of linen made according to my invention, with caustic
10 soda or other chemical reagent to obtain the further linen effects and thereafter I may weave these yarns into fabrics either to produce the French linen or the linen having both warp and
15 filler made of the yarn of my invention.

While I have described my invention in considerable detail and with respect to a preferred
20 form thereof, I do not desire to be limited to such details or form since many changes and modifications may be made and the invention embodied in widely different forms without departing from
25 the spirit and scope thereof in its broader aspects. Therefore, I desire to cover all modifications and forms coming within the language or scope of any one or more of the appended claims.

What I claim as new and desire to secure by
25 Letters Patent is:—

1. A process for producing linen-like material from cotton which comprises taking two cotton
30 rovings of unequal staple length, feeding the fibers of the rovings between rolls and separating the fibers of one roving at irregular intervals to form irregularly spaced neps and slubs and
35 maintaining a substantially uninterrupted and unbroken feeding of the other roving so that it acts as a carrier to transport the neps and slubs formed, whereby the resulting combination
40 of rovings shows irregularly spaced neps and slubs in the resulting product.

2. A process for producing linen-like material from cotton which comprises taking a carded
40 roving and a combed roving of greater staple length than the carded roving, feeding the fibers of the carded roving as an upper layer on top of the fibers of the combed roving forming the
45 lower layer, separating the upper fibers at irregular intervals to form irregularly spaced neps and slubs while maintaining an uninterrupted and unbroken feeding of the combed lower roving
50 so that it acts as a carrier to transport the neps and slubs formed, whereby the combined carded and combed roving shows irregularly spaced neps and slubs in the resulting product.

3. A process according to claim 2 in which the product is thereafter treated with a suitable
55 chemical under conditions of time, temperature and concentration to produce in the yarn the appearance and feel of linen.

4. A process for producing linen-like material from cotton which comprises taking two cotton
60 rovings of unequal staple length at a stage when the roving is ready to be fed to a jack- or spinning-frame, feeding the fibers of the rovings between rolls of such frame and separating the fibers of one roving at irregular intervals to form
65 irregularly spaced neps and slubs and maintaining a substantially uninterrupted and unbroken feeding of the other roving so that it acts as a carrier to transport the neps and slubs formed, whereby the resulting combination of rovings
70 shows irregularly spaced neps and slubs in the resulting product.

5. A spun cotton yarn of linen-like character, having irregular spaced groups of fibers forming
enlargements in the yarn at irregular and substantially unrepeatd intervals throughout, said

5 yarn being formed of two strands or plies of unequal staple length twisted together, one ply being of varying diameter by reason of alternate attenuation and bunching of the fibers of said ply at irregular intervals, said bunching comprising bunches of fibers of the lesser staple length.

10 6. A woven cotton fabric resembling linen, containing yarn having irregular spaced groups of fibers therein forming enlargements in the yarn at irregular and substantially unrepeatd intervals throughout, said yarn being formed of two

strands or plies of unequal staple length twisted together, one ply being of varying diameter by reason of alternate attenuation and bunching of the fibers of said ply at irregular intervals, said bunching comprising bunches of fibers of the lesser staple length. 5

7. A yarn according to claim 6, in which the yarn has been treated with a chemical reagent to produce a permanent change in the yarn, to give a linen-like feel and an appearance more nearly resembling linen. 10

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CERTIFICATE OF CORRECTION.

Patent No. 2,103,080.

December 21, 1937.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 53, claim 3, for the claim reference numeral "2" read 1; page 3, second column, line 7, claim 7, for the claim reference numeral "6" read 5; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of February, A. D. 1938.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

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