

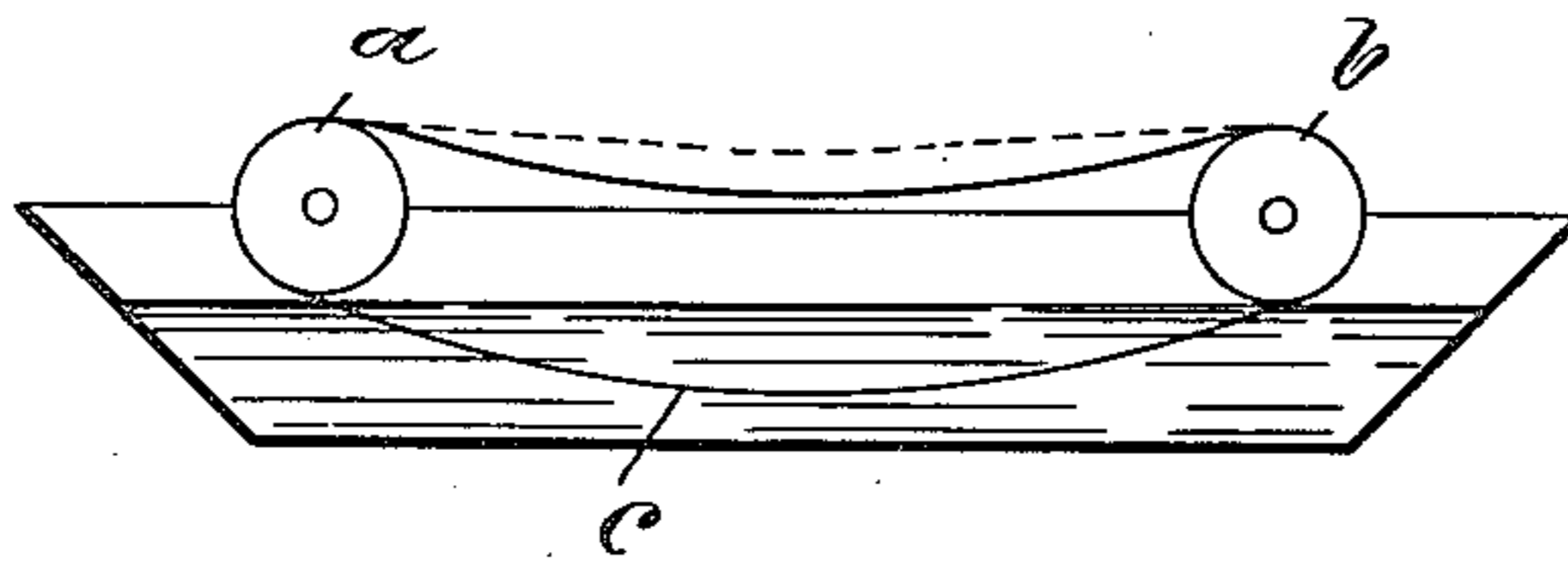
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METHOD OF MERCERIZING COTTON, PREFERABLY IN FORM OF SKEINS.

APPLICATION FILED JAN. 3, 1911.

994,076.

Patented May 30, 1911.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

PAUL HAHN, OF NIEDERLAHNSTEIN, GERMANY.

METHOD OF MERCERIZING COTTON, PREFERABLY IN FORM OF SKEINS.

994,076.

Specification of Letters Patent.

Patented May 30, 1911.

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*To all whom it may concern:*

Be it known that I, PAUL HAHN, manufacturer, a subject of the German Emperor, and residing at Niederlahnstein, Rhineland, Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Methods of Mercerizing Cotton, Preferably in Form of Skeins, of which the following is a specification.

The mercerizing of cotton in skeins or other forms, such as finished knitted goods, for instance stockings and the like is carried out according to the customary methods in two different manners. Either the material is dipped in a slack state into the lye and impregnated with the same, whereupon it is given the necessary stretching either while still in the lye, or immediately after being removed therefrom. Or the material is introduced in an already stretched state into the lye and is impregnated in this state, whereupon the mercerized goods are rinsed, washed, again slackened and further treated.

Both methods have the disadvantage, that the material will not be uniformly dyed in the dyeing process following the mercerizing process, or the dye-liquor will penetrate less into some parts of the material than into others, so that stripes or speckles or blots are produced. The reason for such occurrence in the former mercerizing method is that those parts of the material, which are first introduced into the lye are more strongly shrunk than the following parts. In the same moment, namely, in which the material comes in contact with the lye, it is so considerably shrunk, that the contraction of the fiber is already practically complete, when the parts coming in contact with the lye last are only beginning to shrink. In consequence a stretching is caused already in the lye, by the first impregnated part of the material being shrunk, contracted over its whole length and thereby stretched taut whereas the part coming in contact with the lye last, remains slack and will only participate in the shrinking during the progress of the operation. Say, for example, a skein of thread is being impregnated; it will be evident from the accompanying drawing, that the skein hanging slack over the rollers *a, b* will on its lower half, entering the lye-vessel *c* first, be so tightened in itself by the immediately occurring shrinking, that the upper half, which sags at first more deeply will be drawn from the position indicated by the full lines

into the less curved position indicated by the dotted lines. In this position the upper half will have been stretched to a certain degree and the consequence will be, that the fibers in this portion will, as soon as they reach the lower position in consequence of the rotation of the rollers *a, b* and dip into the lye, owing to their tension, not be able to absorb as much of the lye, as the fully slack threads of the portion, which first dipped into the lye. This self-stretching action, which will proceed from the first immersed part of the material in an increasing ratio to the last immersed part will have during the subsequent dyeing process the hereinbefore already mentioned result, that the dye-liquor penetrates the material in a very unequal manner.

If not mere skeins but knitted goods, stockings or the like, are to be mercerized, the occurrences are practically the same. The parts of the fabric, which first enters into the liquid, will be first shrunk and will in consequence of the absorbed lye increasing its weight exert a certain pull, thus a stretching effect on the upper, not yet immersed, parts. In consequence thereof the latter, when finally immersed into the lye, cannot absorb the same quantity of such lye, as the parts which are first immersed.

If the material is introduced in a stretched state into the lye, the hereinbefore mentioned occurrences can indeed not appear. But now the stretched fiber will not absorb as much of the lye as if it were in a slack state, and the consequence is, that the silky gloss, to obtain which is the object of the mercerizing process, does not appear to the same extent, as if the material had been treated in a slack state.

If the material to be impregnated consists of skeins, it must be remembered, that the knotted ends, that is, the ends of the beginning and ending thread which are knotted and which are therefore left a few centimeters longer than the other windings of thread, will on coming in contact with the lye, in consequence of their slackness, be more strongly impregnated with the lye, than the other parts, so that again differences in the subsequent dyeing are caused. Such differences are also caused—although to a limited degree only—by the single windings of the skein, not being all of exactly the same length, so that some threads are more tightly stretched, than others. If now

the stretched skein is introduced into the lye, it will have to be left, in consequence of this stretched state and its thereby reduced absorbing power longer in the lye, than unstretched material. And just this longer period of immersion of the stretched material will have the result, that the somewhat slacker threads can be more thoroughly saturated with lye, than the tightly stretched threads.

The present invention has the object to avoid these disadvantages of the customary mercerizing methods by a combination of said methods. According to the present invention the material, preferably in form of skeins, is first stretched, then introduced in such a stretched state into the lye and kept stretched until it is entirely immersed in the lye. Beginning with this moment the stretching rollers are approached to each other and thereby the material is slackened at all parts of its entire length, so that the shrinking can start immediately and uniformly on all parts of the material. The material is therewith preferably moved through the lye, by the rollers being rotated and the skein thereby being made to travel in a slack state over the rollers. When the shrinking process has been completed in this manner, the material is again stretched, preferably while still in the lye, by the distance between the rollers being increased. This stretching may also be carried out outside of the lye; it is, however, advisable to carry it out in the lye, and thereby a part of the liquor absorbed by the fibers is driven out by such stretching already within the liquor. The further treatment of the

stretched material is carried out and completed in a manner showing no novel features.

I claim:

1. A method for mercerizing cotton, preferably in skeins, consisting in the material to be mercerized being first stretched, thereupon being completely immersed into the lye, then being slackened while still submerged in the lye and after its shrinking sufficiently, being again stretched and finally submitted in known manner to the finishing processes.

2. A method for mercerizing cotton, preferably in skeins, consisting in the material to be mercerized being first stretched, thereupon being completely immersed into the lye, then being slackened while still submerged in the lye, then being moved through the lye, and after its shrinking sufficiently, being again stretched and finally submitted in known manner to the finishing processes.

3. A method for mercerizing cotton, preferably in skeins, consisting in the material to be mercerized being first stretched, thereupon being completely immersed into the lye, then being slackened while still submerged in the lye, then being moved through the lye and after its shrinking sufficiently, being again stretched, while still submerged in the lye, and finally submitted in known manner to the finishing processes.

In testimony whereof I hereto affix my signature in presence of two witnesses.

PAUL HAHN.

Witnesses:

HERMAN PLISCHKE,  
MARIA MENKE.