

UNITED STATES PATENT OFFICE.

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COTTON PRODUCT AND PROCESS FOR MAKING THE SAME.

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Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, RAYMOND W. JACOBY, a citizen of the United States, residing at Garnerville, in the county of Rockland, State of New York, have invented certain new and useful Cotton Products and Processes for Making the Same, of which the following is a complete description.

My invention relates more particularly to a process for increasing the strength of cotton yarns, threads and fabrics, and is based on the discovery by me that cotton yarns, threads and fabrics may be considerably strengthened by removing a substantial part or all of the natural waxes and oily substances forming a part of the cotton fibers ordinarily employed, provided these substances are removed in such a manner as not to impair the structure of the fibers. These waxes and oils tend, as I have discovered, to decrease the friction between the fibers or the capacity of the fibers to engage and hold each other when spun and fabricated, and their removal gives greater strength to the product.

In practising my invention, the waxes and oily substances may be removed in any suitable way, either by dissolving them out or by emulsification or saponification. In practice I have found that they may be readily removed, and the finished product materially increased in strength up to 25% by dissolving them out with ether, gasoline, benzol, or similar solvents. They may be also removed, and a corresponding advantage obtained, by subjecting the fibers for a sufficiently long period to soap, thereby emulsifying and removing them, or they may be removed by saponification, as by treating the fibers to a weak solution of soda. Inasmuch as the object of my process is to strengthen the resulting product, it is essential that whatever treatment be employed to remove the wax and oily substances, shall not be carried to the extent of affecting and weakening the structure of the fibers themselves, as is always the case in bleaching operations. In these bleaching operations the waxes and oils are incidentally removed along with the coloring matters and other impurities, but the fibers are substantially weakened by the severe treatment necessary. This weakening of the fibers in the old bleaching operations is due primarily to oxidation of the

cellulose of the fibers into new compounds by the strong acid, alkali or other chemical baths required in bleaching operations. In my process, whatever bath is employed is so regulated that no oxidation and resulting weakening of the fibers takes place. The degumming in my process may be effected by a milder treatment than that required for bleaching processes.

In practising my process the waxes and oily substances may be removed either from the loose fibers, the yarn, or the finished thread or fabric. In practice, however, owing to the desirability of having the waxes and oily substances present during the spinning of the yarn, it is preferred to remove them either from the yarn or, where the finished product is not to be bleached, from the finished thread or fabric. In case the yarn is to be woven into fabric, decided advantage may be derived from my process by removing the waxes and oily substances from the yarn or threads; by doing this, the yarn or threads are materially strengthened, and it is possible, by reason of this strengthening, to obtain a much tighter weave, and this advantage of a tighter weave will remain even though the fabric be bleached, so that substantially all coloring matters and other impurities be removed. Also, in case the yarn is to be manufactured into fabric by some other process than weaving, treatment of the yarn according to my process prior to such manufacturing is beneficial because this reduces the breakage of the yarn during the manufacturing process and is therefore of advantage even though there would be no advantage in securing a more compact fabric. The amount or degree of treatment required in order to remove the natural waxes and oils, without impairing the strength of the fibers, may readily be determined for goods of any particular kind. For ordinary gray goods I have found that they may be removed without injury to the fibers by extraction for one hour with commercial benzol at the boiling point of the benzol, or they may be removed by boiling for three hours in a water solution containing one per cent. of soap and one per cent. of soda ash. These figures are given merely for purposes of illustration and are not to be construed as limitations on my invention, because the treatment must be varied some-

what, depending upon the weight and tightness of the spin or weave of the fiber, yarn, or fabric.

I am aware that in the processes of bleaching cottons ordinarily employed, substantially all impurities are removed, and incidentally the waxes and oily substances are removed with the coloring material and other impurities. The removal of the waxes and oily substances, however, as above stated, is incidental to the removal of the coloring material and other impurities, and no material strengthening of the fabric results; on the other hand, as ordinarily practised, there is a material diminution in strength. My improved process is distinguished from these old bleaching processes by the fact that the removal of impurities is confined to the removal of natural waxes and oily substances and is with the object of strengthening, and is not concerned with the bleaching of the product.

Any suitable apparatus may be employed for carrying out my process, as, for example, when employing solvents, I have used an old and well known type of extractor in which the solvent is vaporized and caused to condense and percolate through the fabric. Any other suitable apparatus, of which there are many types, may be used in practising the method according to either the solvent, the saponification or emulsification modifications.

While I have described the preferred method of practising the process, I am aware that modifications may be made, and I desire protection for all such modifications as come within the scope of my claims.

What I claim is:

1. As a new product, an unbleached cotton yarn formed of fibers from which a substantial amount of the natural waxes and oily substances has been removed.

2. An unbleached cotton fabric formed of

fibers from which a substantial amount of the natural waxes and oily substances has been removed.

3. As a new product, a cotton yarn formed of fibers from which a substantial amount of the natural waxes and oily substances has been removed but which otherwise are substantially in their natural condition.

4. As a new product, a cotton yarn formed of fibers substantially free from the products of cellulose oxidation and from which a substantial amount of the natural waxes and oily substances has been removed.

5. The process for producing spun or woven cotton materials of increased strength which consists in removing a substantial amount of the natural waxes and oils from the fibers without materially oxidizing or otherwise changing the material of the fibers.

6. The process for producing cotton fabrics of increased strength which consists in spinning the fibers into yarn, then removing the natural waxes and oily substances without material oxidation or weakening of the internal structure of the fibers, and then manufacturing the yarn into fabric.

7. The process for producing bleached cotton fabrics of increased strength which consists in spinning the fibers into yarn, then removing the natural waxes and oily substances in such a way as not materially to oxidize or otherwise change the structure of the individual fibers, then weaving the yarn into fabric and bleaching the fabric after it has been woven.

8. The process for producing spun or woven cotton materials of increased strength which consists in removing a substantial amount of the natural waxes and oils from the fibers without materially altering the size, composition or strength of the individual fibers.

RAYMOND W. JACOBY.