

UNITED STATES PATENT OFFICE.

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PROCESS OF REMOVING FIBER FROM AND FINISHING KNIT GOODS.

SPECIFICATION forming part of Letters Patent No. 658,320, dated September 18, 1900.

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To all whom it may concern:

Be it known that I, JACOB MAY, a citizen of the United States, and a resident of Nashville, county of Davidson, State of Tennessee, have invented a certain new and useful Process of Removing Fiber from and Finishing Knit Goods, of which the following is a specification.

My invention relates to a process for removing rough fiber from knit cotton goods either before the same have been oxidized in the ordinary way during the dyeing process or after oxidation has taken place and the goods have been finished, whereby the said cotton may be finished with a smooth surface without the use of singeing or ironing or other means commonly employed for that purpose prior to my invention.

One object of my invention is to provide a process which will remove the rough fiber from knit cotton goods to a beautiful finish with a shining gloss either before or after the goods are dyed, as practiced in the ordinary process, in order that the goods may be finished in a simple and effective and impressively-beautiful manner without the employment of a singeing or ironing process or other processes commonly employed for this purpose prior to my invention; and my further object is to secure the desired end with the least loss of material in the most economical manner.

It has heretofore been proposed and attempted to remove the rough fiber from knit cotton goods by various means; but the different processes that have been employed with which I am familiar frequently result in a loss of a large percentage of goods, whereas by the process which I have discovered I am enabled to produce not only a beautiful finish with a shiny gloss not otherwise attainable, but also obviate this serious loss, reducing the same with ordinary care in the practice of my process to an average, for example, when treating cotton stockings or the like of not more than a dozen pieces out of five thousand, and if proper care is taken the loss is even less than that amount.

With these objects in view my invention consists in the novel process hereinafter described and claimed.

I will first proceed to describe my process as applied to goods which have not been oxidized, beginning with white cotton goods which have not been submitted to the dyeing process.

In carrying out my process upon white knit goods I proceed as follows: I form a solution in a suitable tank or vessel consisting of alum, blue-stone, chlorate of potash, and sal-ammoniac, mixing such ingredients in the tank or vessel and first adding just enough water to dissolve the ingredients, then boiling the solution thus formed, and at the same time stirring or agitating the mixture thoroughly in order to thoroughly dissolve the ingredients. After they are thoroughly dissolved I add a sufficient quantity of cold water to bring the solution to a density of from 12° to 13° Twaddell, and I call this, for convenience, the "first" solution or mixture. I have found in practice that good results can be obtained by using the following proportions of the ingredients—that is to say, from one hundred to two hundred and twenty-five pounds of alum or sulphate of alumina, from sixteen to twenty pounds of blue-stone, (sulphate of copper,) from eighty-five to one hundred and ten pounds of chlorate of potash, and from eight to twelve pounds of sal-ammoniac, to which is added after the same is dissolved from two hundred to two hundred and twenty-five gallons of cold water in order to bring the solution to the proper density of from 12° to 13° Twaddell. In the second solution or mixture, which forms the dye liquor, I take a barrel of twenty gallons and mix in it a sufficient quantity of water and aniline salt until it reaches a density of 12° to 13° Twaddell—that is to say, placing it in a suitable vessel and adding enough water to dissolve said salt, stirring and boiling the solution well until the aniline salt is thoroughly dissolved, a sufficient quantity of water being used to bring the liquid to a density of from 12° to 13° Twaddell. Having prepared the two solutions or mixtures in the manner defined for the first batch of goods, to be about seventy-five pounds weight, I take twenty gallons of the first solution and twenty gallons of the second or dyeing solution (the two solutions when so mixed to reach a density of not less than

16° Twaddell, the process of mixing bringing it up to that density) and place the mixture, with the goods, in a tom-tom of any well-known construction, starting the machine in operation. I then continue running the machine—say from three-fourths of an hour to an hour—until the liquor formed by the two solutions is thoroughly taken up or absorbed by the goods, so as to thoroughly saturate or permeate the goods with said liquor. It is important to ascertain definitely when the two solutions as above are mixed that the mixture thus formed has, in fact, a density of not less than 16° Twaddell. These goods are then removed from the tom-tom and placed in an extractor, which may be an ordinary centrifugal extractor, and the extractor is operated until all the moisture possible is extracted from the goods, the liquor which is extracted being absolutely saved and caught in a suitable receptacle or receptacles for use in the manner hereinafter indicated in order to thereafter effect a saving in the quantity of chemical ingredients used in the process. After the goods are taken from the extractor I preferably let them stand over night in an ordinary atmosphere and normal temperature, although it is not absolutely necessary to do so, as the goods may be oxidized immediately, though I find that the best results are obtained by allowing the goods to stand over night before subjecting them to the oxidizing action. Before introducing the goods into the oxidizing-cage, which may be of any suitable construction familiar to those skilled in the art, the room is heated to from 125° to 150° Fahrenheit, and the goods are then inserted in the oxidizing-cage, where they remain, and the cage kept revolving from two to four hours or a sufficient length of time until by inspection it is noticed that the goods are dry and the rough fibers have begun to disappear, at which point the doors of the room may be opened so as to cool the room a little, but not enough to chill the goods, which condition is maintained from two to four hours longer, according to the finish desired, it being understood that the goods are still being subjected to the oxidizing operation, in which the temperature has been slightly diminished by the cooling of the room in which the oxidizing cage or machine is located. For the second batch of goods of seventy-five pounds I may take seven and a half quarts of the first solution and mix it with from five to six pounds of aniline salt until dissolved. I then put this latter mixture in the tom-tom, together with the amount of liquor saved from the mixture used in running the first batch, bringing the solution to a density of 16° Twaddell, then placing the goods in the tom-tom and proceeding as before, by which means I am enabled to greatly reduce the cost of the chemicals used on account of the saving effected by using the liquor saved from the goods in the extractor over and over again, and then oxidizing, as before. After

the oxidation has been fully completed to the point desired the goods are removed from the oxidizing-cage and treated in the usual way; but it is preferable to allow them to remain over night before they are subjected to the chroming process for fixing the dye. They are then subjected to any ordinary chroming process. Preferably I use the following chroming-receipt mixture: Take about forty-five or fifty pounds of bi-chromate of soda, put it in a barrel of fifty-two gallons, boil it up, stir well, and then fill it with water. Take a pailful of this, put in enough water to cover the goods well, and boil it up to 130° Fahrenheit. Then take about four, six, or eight ounces of blue oil vitriol and mix well with the other in the tom-tom. Then put in about one pint of olive-oil or two pints of softener to each batch and stir well. Then put in the goods. Run the machine about fifteen or twenty minutes, and then let it stand about three-quarters of an hour longer to soak. The stockings or other goods are then black and fast. Then put them in an extractor and take out all the moisture. Any other chroming receipt can be used; but this is the one that I use, and it works excellently and is cheap. After standing take the goods out. In chroming the liquor should be used but once. New liquor should be used each time to have good work.

In order to use both receipts when the goods have a "blue bottom" on them, on starting the first time I proceed as follows: Use twelve and one-half gallons of each solution or mixture. Put them together in the tom-tom, so that they reach in the tom-tom a density of at least 16° Twaddell. Then take seventy-five pounds or a little over of goods, put them in the tom-tom, and start the machine. Run it from three-quarters of an hour to an hour until pretty nearly all the liquor is forced into the goods. Then put the goods in the extractor, extract, and save every drop of liquor. There will be received about twenty-five gallons or over back again. On account of the blue bottom the goods are wet and moist and will absorb only the strength of the liquor and not reduce its quantity, so there is saved practically the entire quantity of twelve and one-half gallons. In running the second batch and subsequent batches of goods—blue-bottom or boiled goods—I take five and one-half pounds of aniline salt and seven and one-half quarts of the first solution, mixing them together and dissolving in the manner defined. I then place the liquor thus formed, together with the liquor saved from the extractor in running the first batch, in the tom-tom, the density of the said liquor so mixed to reach about 16° Twaddell or a little over, and proceed as before.

I may vary the process above defined in the following way: First, boil seventy-five pounds of white goods about twenty minutes and stir them well. Then put them in the extractor and extract all moisture. Then use

the mixtures and the tom-tom operation as in case of the process provided for blue-bottom goods.

In order to apply my process to goods which have been dyed heretofore, whether they passed through the oxidizing-machine or not, I take of the solution which has been saved from the extractor twenty-five gallons, which reaches about 10° to 12° Twaddell. I then place the liquid in the tom-tom with seventy-five pounds of the goods and then run the machine as before defined.

While I have specified above the proportions of the different ingredients which may be used in practicing my invention, I wish it understood that I do not limit myself to these proportions specified, since they may be varied within reasonable limits to suit varying conditions of goods, temperature, &c., and according to the finish desired, all within the knowledge of a skilled dyer, the proportions given being those which I have found by actual practice suitable for effecting the result in a most satisfactory and a very economical manner not heretofore reached by any other process, nor do I wish to limit myself to the use of all the ingredients specified under all circumstances, since sal-ammoniac or blue-stone, or both, may be omitted without destroying the beneficial result desired. Although I believe the use of all the ingredients to be preferable, as I find by actual practice that the result can invariably be secured by such use, I do omit sal-ammoniac or blue-stone and add a little more alum or potash instead, and thus reach the same result.

While I have described my invention as applicable to the finishing of goods which have been oxidized for the purpose of removing the rough fiber, as well as to goods which have not been oxidized, I should add that it is preferable to apply the process to goods which have not been oxidized during the dyeing operation, because of the saving of time which is effected by that procedure, and I may add while I find that my process is particularly adapted for use upon cotton hose or the like, which through my process acquire a most excellent and not-heretofore-reached perfection and finish, it may be applied to any variety of cotton goods from which it is desired to remove the rough fiber and get a good shiny finish.

I claim as my invention—

1. The process herein described of removing the rough fiber from cotton goods, said process consisting in thoroughly saturating or permeating the goods with a solution containing alum, and chlorate of potash, then extracting said solution from the goods, and allowing the goods to dry in an ordinary tem-

perature, and then subjecting the goods to an oxidizing action, substantially as described.

2. The process herein described of removing rough fiber from cotton goods, which consists in saturating or permeating the goods with a solution of alum, chlorate of potash, and a dye liquor, then extracting the said solution from the goods and permitting the goods to dry in an ordinary temperature, and then subjecting the goods to an oxidizing action, substantially as described.

3. The process herein described for removing rough fibers from cotton goods, consisting in thoroughly saturating or permeating the goods with a solution containing alum, chlorate of potash and an aniline salt, then extracting the solution from said goods, and allowing the goods to remain in an ordinary temperature a suitable period, and finally subjecting the goods to the action of an oxidizing-machine, substantially as described.

4. The process herein described of removing rough fibers from cotton goods, consisting in saturating or permeating the goods with a solution containing chlorate of potash, alum, blue vitriol and aniline salt, by forcing the said solution into the goods, then extracting the liquor from said goods and finally subjecting the goods to oxidation, substantially as described.

5. The process herein described of removing rough fiber from cotton goods, consisting in thoroughly saturating or permeating the goods with a solution containing alum, chlorate of potash, blue vitriol and sal-ammoniac, and an aniline salt, by forcing said solution into the goods, then extracting the solution from said goods and permitting them to remain in an ordinary temperature a suitable time, and finally subjecting the goods to an oxidizing action, substantially as described.

6. The process herein described for removing rough fibers from cotton goods, which consists in saturating or permeating the goods with a solution containing chlorate of potash, alum, blue vitriol and sal-ammoniac, in suitable proportions, and an aniline salt, at a density of 16° Twaddell, then extracting the liquor from said goods, and permitting them to remain for a suitable time in an ordinary temperature, and finally subjecting the goods to an oxidizing action, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JACOB MAY.

Witnesses:

RICHARD S. WEST,
ROBT. O. ALLEN.