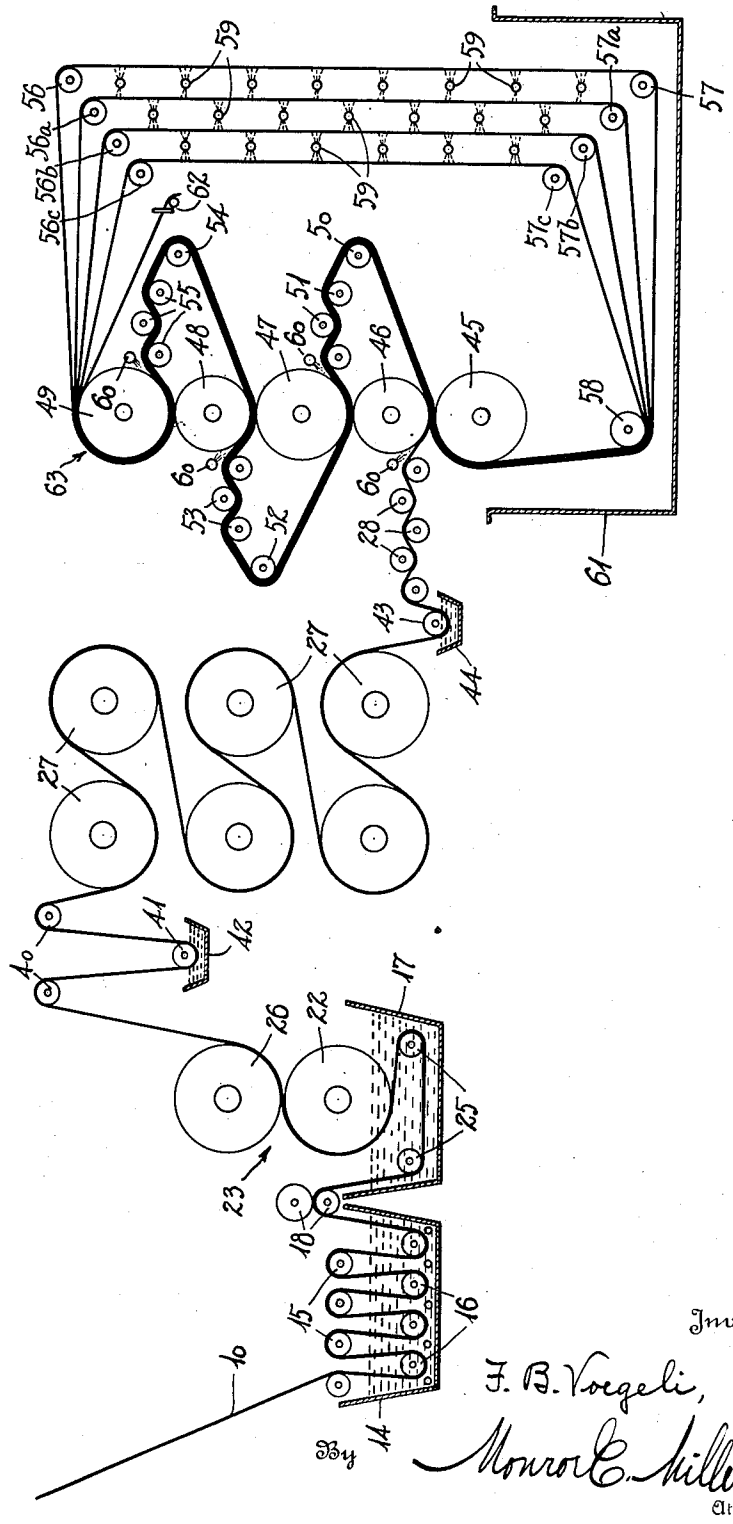
April 26, 1927. 1,626,438

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METHOD OF TREATING TEXTILES

Filed June 11, 1925



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Patented Apr. 26, 1927. 1,626,438

UNITED STATES PATENT OFFICE.

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METHOD OF TREATING TEXTILES.

Application filed June 11, 1925. Serial No. 36,558.

The present invention relates to a method of treating textiles, and is particularly an improvement over the method disclosed in my copending application Serial No. 7,932, filed February 9, 1925, which has matured into Patent No. 1,577,393.

It is an object of the invention to provide a method of mercerizing cotton or similar textiles, which will be economical and efficient, saving both time and expense, and also obtaining highly satisfactory results.

Another object is to provide a novel method of treating the textile goods subsequent to the subjection of the goods to hot caustic baths and cooling effects, in order to obtain several advantages in the processing and results obtained, including the thorough stretching of the goods without injury thereto, the control of the lengthwise stretching of the goods, the thorough washing of the goods and the recovery of the caustic soda.

With the foregoing and other objects in view, which will be apparent as the invention is more fully explained, the invention resides in the method as hereinafter pointed out and claimed, it being understood that changes and variations can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein the figure is a diagrammatical view, portions being shown in side elevation and portions in vertical section.

In the embodiment of the invention as illustrated and described, the apparatus is intended especially for the treatment of cloth or woven textiles.

In carrying out the process, the cloth 10 coming from the singer moves through a tank 14 containing hot caustic soda or potassium solution, or other alkaline solution, which is heated to a temperature up to 100 degrees Celsius or centigrade. The cloth moves in a zig-zag path within the tank 14 downwardly and upwardly repeatedly into and out of the solution, by passing around the upper and lower rollers 15 and 16, and after passing through the solution in the tank 14 the cloth passes through a cold caustic soda or similar solution in a companion tank 17, squeezing rolls 18 being disposed between the two tanks between which the cloth passes so as to squeeze the solution from the cloth back into the tank 14. From the rolls 18 the cloth passes under rollers 25 submerged in the solution in the tank 17, and from the rollers 25 the cloth passes partly around a roll 22 of a mangle 23. Said mangle has a second roll 26 (and more rolls if desired) and the cloth passes between said rolls 22 and 26.

After leaving the mangle 23 the cloth passes around, in a zig-zag path, a series of cooling rolls or drums 27 which cool the cloth down to the required temperature of about 5 to 10 degrees Celsius. This cooling of the cloth is essential in order to obtain the mercerizing of the cloth, inasmuch as the use of the hot caustic solution will not mercerize the cloth. However, by subjecting the cloth to the cooling effect after the hot caustic baths, the cloth will be mercerized, and the temperature of the rolls 27 is regulated and controlled to produce a uniform cooling of the cloth to the desired low temperature. These rolls 27 may be cooled in any suitable manner, such as by passing cold water through them, as disclosed in the aforesaid application.

From the rolls or drums 27 the cloth passes the expanding rollers 28, which expand or stretch the cloth.

As described up to this point, the process is somewhat similar to that disclosed in the aforesaid Patent No. 1,577,393, and the apparatus and process are modified as will presently appear. Between the mangle 23 and cooling rolls 27, the cloth passes over guide rollers 40 and under a guide roller 41, the guide roller 41 being partly submerged in water contained in a water box or tank 42. Also, between the drums 27 and expanding rollers 28, the cloth passes under a guide roller 43 partly submerged in water in a water box or tank 44. The cloth in passing through the water in the boxes or tanks 42 and 44 will assist in gelatinizing the cloth which is impregnated with the strong caustic soda. By the use of the cold caustic soda solution in the tank 17, the cloth is cooled somewhat after being subjected to the hot caustic soda baths, which will reduce the number of cooling drums or rolls 27 required.

Thus, the process as disclosed in said application is modified, up to the point of reaching the expanding rollers 28, by subjecting the cloth after the hot caustic soda baths to a cold caustic soda bath, and in running the cloth through water prior to reaching and after leaving the cooling drums or rolls 27, the advantages of which have already been indicated. The stretching by the rollers 28 is necessary in order to produce the lustre, and the greater the amount of stretch in the width and length of the cloth, the greater will be the lustre obtained.

From the expanding rollers 28 the cloth passes through a heavy geared mangle 63 consisting of a number of rolls of rubber, wood, iron or other suitable material. As shown, there are five superposed rolls 45, 46, 47, 48 and 49 providing four nips. The rolls of this mangle are under heavy pressure to mash or squeeze the cloth tightly between them.

From the expanding rollers 28, of which there are five as shown, the cloth passes between the mangle rolls 45 and 46 in order to subject the cloth to heavy pressure after leaving the stretching rollers 28, so as to set the stretch in the cloth. The cloth then passes around a guide roller 50 and a second set of expanding rollers 51, and from the rollers 51 passes between the mangle rolls 46 and 47. The stretching rollers 51 again stretch the cloth and the mangle rolls 46 and 47 press the cloth in order to set the stretch therein obtained by the rollers 51. This stretching and pressing of the cloth is repeated several times. Thus, from the rolls 46 and 47 the cloth passes around a guide roller 52 and another set of stretching rollers 53, from which the cloth passes between the mangle rolls 47 and 48. The cloth then passes around a guide roller 54 and a fourth set of stretching rollers 55, and then between the mangle rolls 48 and 49. The stretching rollers 28, 51, 53 and 55 may be of any suitable kind, being preferably of the kind disclosed in said Patent No. 1,577,393, and also in my copending application Serial No. 751,135, filed Nov. 20, 1924. Thus, before the cloth passes through each of the four nips of the mangle it is stretched or expanded, in order to stretch the cloth and set the successive stretches in the cloth. However, it is not possible to set the full stretch in any cloth, and the cloth contracts somewhat notwithstanding the application of high pressure. Consequently the stretching and squeezing is repeated to obtain a maximum stretch.

From the last roll 49 of the mangle, the cloth passes over a guide roller 56 and thence downwardly under guide rollers 57 and 58 in succession, for the return of the cloth through the nips of the mangle and corresponding stretchers. Thus, from the roller 58 the cloth again passes between the rolls 45 and 46, expanding rollers 51, mangle rolls 46 and 47, expanding rollers 53, rolls 47 and 48, rollers 55, and rolls 48 and 49. This operation is repeated several times. As shown, the cloth is returned four times to the mangle, so that there are five layers or thicknesses passing through the mangle and expanders. Thus, after reaching the roll 49 the second time, the cloth passes guide rollers 56^a and 57^a and under the roller 58; after reaching the roll 49 the third time the cloth passes over guide rollers 56^b and 57^b and under the roller 58; and after reaching the roll 49 the fourth time, the cloth passes guide rollers 56^c and 57^c and under the roller 58. After reaching the roll 49 the fifth time the cloth passes through the pot eye 62. The rollers 56, 56^a, 56^b and 56^c are located at the top while the rollers 57, 57^a, 57^b, and 57^c are located at the bottom, with four vertical runs of the cloth between the upper and lower sets of rollers spaced apart. Spray pipes 59 are disposed between the vertical runs of the cloth between the upper and lower rollers 56, 56^a, 56^b, 56^c and 57, 57^a, 57^b, 57^c, respectively. Cold or hot water is sprayed from the pipes 59 against the cloth, so as to wash the cloth and remove the caustic soda therefrom. Water spray pipes 60 are also preferably located immediately in advance of the nips of the mangle, or between the expanding rollers and the nips of the mangle, so as to wash the cloth immediately after being expanded and before passing through the nips of the mangle.

A receiving tank 61 is disposed below the mangle 63 consisting of the rolls 45, 46, 47, 48 and 49, and below the spray pipes 59 and 60, so as to catch the liquid which is squeezed out of or which runs down from the cloth during the expanding, mangling and washing operations.

From the pot eye 62 the cloth is run into the usual kiers (not shown) or if the cloth is intended to be rolled, a rolling attachment may be used.

The lengthwise stretch of the cloth is obtained by allowing the mangle 63 to run a trifle faster than the rolls 22, 26, 27 and other parts of the apparatus which the cloth passes before reaching the mangle 63. Furthermore, the cloth has a tendency to shrink in length and will therefore run taut. The cloth is therefore stretched lengthwise as it passes through the apparatus. When passing each set of expanding rollers the cloth is not only stretched in width but is also given a longitudinal stretch because of the transverse tension. On account of the stretched condition of the cloth and the tendency for same to contract both longitudinally and transversely after leaving each set of expanding rollers the several layers may run through the mangle 63 at substantially

the same speed, thereby facilitating the operation of the mangle on the cloth. As the cloth passes the expanding rollers each set of rollers makes the effort to give the cloth a maximum stretch, but on account of the contraction of the cloth after leaving the set of expanding rollers the stretching effort must be repeated, and the stretching action is repeated simultaneously on the several layers of the cloth in the mangle 63. The simultaneous stretching of several layers is of advantage, inasmuch as the layers contact tightly with one another and have a tendency to assist one another in the stretching and setting actions. Thus, during the repeated stretching and setting actions there is a repetition in the effort to bring the cloth to a maximum stretch. If no washing of the cloth is desired by means of the spray pipes 59 and 60, the tank 61 will collect a strong caustic soda solution squeezed from the cloth, and this liquid can, after simple filtration, be used over again.

This process and apparatus provide for increased production, and a reduction in the number of attendants or workmen. The cloth will be thoroughly stretched without injury, both transversely and lengthwise, and it is possible to control the stretch in length. By running the cloth two or more thicknesses through the mangle 63 and stretchers, each fibre in the cloth receives a stretching action. Furthermore, the cloth is mashed and the interstices closed up by the mangling operation. For cloth to be bleached, no water for washing is necessary, inasmuch as the passing of the cloth repeatedly through the nips of the mangle 63 will squeeze out the necessary caustic soda, leaving only enough in the cloth required for the boiling operation preceding the bleaching. The recovery of the caustic soda in the cloth is simplified, and subsequent operations of calendering in many cases are unnecessary. Furthermore, the apparatus requires comparatively small space, and the operation is continuous from the singer to the kiers. Less materials are required for the treatment of the cloth than with previous processes, and the results obtained are favorable.

It is possible to use the apparatus and process for the treatment of yarn, inasmuch as yarn may be run through the apparatus, and the apparatus may be simplified or modified, if desired, when used for yarn only. When treating yarn the longitudinal stretching thereof is employed, without transverse stretching, and this may be obtained either by the tendency for the yarn to shrink lengthwise, or the rollers which the yarn passes in succession may be run at higher speeds in progression, such as suggested hereinbefore to obtain the longitudinal stretching of the cloth. The yarn in being returned through the mangle 63 may have the adjacent portions bunched or held together, either in layers or disposed side by side.

Having thus described the invention, what is claimed as new is:—

1. The steps in the method of mercerizing textile goods comprising subjecting the goods to hot caustic and cold caustic baths in succession and cooling the goods.

2. The steps in the method of mercerizing textile goods comprising subjecting the goods to hot and cold caustic baths in succession, cooling the goods and expanding and washing the goods.

3. The steps in the method of mercerizing textile goods comprising subjecting the goods to hot and cold caustic baths in succession and passing the goods across cooling members.

4. The steps in the method of mercerizing textile goods comprising subjecting the goods to hot and cold caustic baths in succession, passing the goods across cooling members, and expanding and washing the goods.

5. The steps in the method of mercerizing textile goods comprising subjecting the goods to hot and cold caustic baths in succession, squeezing and mangling the goods, and cooling and stretching the goods.

6. The steps in the method of mercerizing textile goods comprising subjecting the goods to hot and cold caustic baths in succession, squeezing the goods between such baths, mangling the goods after the last bath, and cooling and stretching the goods.

7. The steps in the method of mercerizing textile goods comprising subjecting the goods to hot and cold caustic baths in succession, subjecting the goods to water, then cooling the goods, then subjecting the goods to water, and then expanding, squeezing and washing the goods.

8. The steps in the method of mercerizing textile goods comprising subjecting the goods to hot and cold caustic baths in succession, subjecting the goods to water, then passing the goods across cooling members, then subjecting the goods to water, and then expanding and mangling the goods.

9. The steps in the method of mercerizing textile goods comprising subjecting the goods to caustic baths, cooling the goods, and stretching and mangling the goods repeatedly.

10. The steps in the method of mercerizing textile goods comprising subjecting the goods to caustic baths, cooling the goods, and stretching and mangling the goods and returning the goods for repeated stretching and mangling in a plurality of layers.

11. The steps in the method of mercerizing textile goods comprising subjecting the goods to caustic baths, cooling the goods, stretching and mangling the goods repeat-

edly, and then returning the goods for repeated stretching and mangling in a plurality of layers.

12. The steps in the method of mercerizing textile goods comprising subjecting the goods to caustic baths, cooling the goods, stretching and mangling the goods repeatedly, then returning the goods for repeated stretching and mangling in a plurality of layers, and washing the goods during its return for stretching and mangling.

In testimony whereof I hereunto affix my signature.

FREDERICK BENEDICT VOEGELI.