

# UNITED STATES PATENT OFFICE.

JOHN MERCER, OF OAKENSHAW, ENGLAND.

IMPROVEMENT IN CHEMICAL PROCESSES FOR FULLING VEGETABLE AND OTHER TEXTURES.

Specification forming part of Letters Patent No. 8,303, dated August 19, 1851.

*To all whom it may concern:*

Be it known that I, JOHN MERCER, of Oakenshaw, within Clayton-le-Moors, in the county of Lancaster, gentleman, a subject of the Queen of Great Britain, have invented or discovered new and useful Improvements in the Preparation of Cotton and other Fabrics and Fibrous Materials; and I, the said JOHN MERCER, do hereby declare that the nature of my said invention and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof—that is to say:

My invention consists in subjecting vegetable fabrics and fibrous materials, cotton, flax, &c., either in the raw or manufactured state, to the action of caustic soda or caustic potash, dilute sulphuric acid, or chloride of zinc of a strength and temperature sufficient to produce the new effects and to give the new properties to them which I have hereinafter described.

The mode I adopt of carrying into operation my invention to cloth made wholly or partially from any vegetable fibers and bleached is as follows:

I pass the cloth through a padding-machine charged with caustic soda or caustic potash at 60° or 70° Twaddle's hydrometer at the common temperature—at, say, 60° Fahrenheit or under—and, without drying the cloth, wash it in water, then pass through dilute sulphuric acid and wash again; or I run the cloth over and under a series of rollers in a cistern with caustic soda or caustic potash at from 40° to 50° of Twaddle's hydrometer at the common temperature of the atmosphere, the last two rollers being set so as to squeeze the excess of soda or potash back into the cistern. The cloth then passes over and under rollers placed in a series of cisterns charged at the commencement of the operation with water only, so that at the last cistern the alkali has nearly been all washed out of the cloth. When the cloth has either gone through the padding-machine or through the cisterns above described I wash the cloth in water, pass it through dilute sulphuric acid, and wash again in water.

When I adapt the invention to gray or unbleached cloth made from the fibrous materials

before mentioned, I first boil or steep the cloth in water, so as to have it thoroughly wet, and remove most of the water by the squeezers or hydro-extractor, and then pass the cloth through the soda or potash solution, &c., and proceed as before described.

I apply my invention in the same way to warps, either bleached or unbleached; but after passing through the cistern containing the alkali the warp is either passed through squeezers or through a hole in a metallic plate to remove the alkali, and then passed on through the water-cisterns, soured, and washed as above described.

When thread or hank yarn is operated on I immerse the thread or yarns in the alkali and then wring them out, as is usually done in sizing or dyeing them, and afterward wash, sour, and wash in water, as above described.

When I apply my invention to any fiber in the raw state, or before it is manufactured, I first boil it in water and then free it from most of its water by the hydro-extractor or a press. I then immerse it in the alkaline solution, and then remove the alkali by the hydro-extractor; or I press the alkali out with a press and then wash in water, sour in dilute sulphuric acid, wash again, then remove the water by a press or hydro-extractor, as above described.

When cloth made from vegetable fiber, cotton, flax, &c., has been subjected to the action of caustic soda or potash, as above described, by padding, immersion, or any other way, and then freed from the alkali by souring and washing, according to my said invention, the cloth will be found to have undergone certain changes and alterations and have acquired certain new and valuable properties. The most remarkable I here describe. It will have shrunk in its length and breadth, or have become less in its external dimensions, but thicker and closer, so that by the chemical action of caustic soda or potash I produce on cotton and other vegetable fabrics and fibers effects somewhat analogous to that which is produced on woolen by the process of fulling or milling. It will have acquired greater strength and firmness, each fiber requiring greater force to break it. It will also have become heavier than it was before it was acted on by the alkali,

if in both cases it be weighed at the temperature of 60° Fahrenheit, or under. It will also have acquired greatly augmented and improved powers of receiving colors in printing and dyeing.

The effects of the application of my invention to the vegetable fiber in any of its various stages before it is manufactured into cloth will be readily understood by reference to its effects upon cloth composed of such fibers.

Secondly. I employ sulphuric acid diluted to 105° Twaddle's hydrometer and at 60° Fahrenheit's thermometer, or under. I use this acid mixture instead of the caustic potash or soda and operate in all respects the same as when I use soda or potash, except the last souring, which is here unnecessary.

Thirdly. When I employ solution of chloride of zinc instead of soda or potash I use the solution at 145° Twaddle's hydrometer and 150° to 160° Fahrenheit's thermometer, and operate in all respects the same as when I use soda or potash.

When I operate on mixed fabrics partly of vegetable and partly of silk, woolen, or other animal fibers—such as delaines or jeans, &c.—I prefer the strength of the alkali not to be above 40° Twaddle's hydrometer and the heat not above 50° Fahrenheit, lest the animal fibers should be injured.

I may, in conclusion, remark that the description of the apparatus or machinery and the strength and temperature of the soda or potash, sulphuric acid, or chloride of zinc solution may be varied to a considerable extent and will produce proportionate effects without at all deviating from my invention. For instance, caustic potash or soda may be used even as low as 20° Twaddle's hydrometer and still give improved properties to cotton, &c., in receiving colors in printing and dyeing, particularly if the heat be low, for the lower the temperature the more effectively the soda or potash acts on the fibrous material above described. I therefore do not confine myself to any particular strength or temperature of the substances I employ; but the particular strength, heat, and process here described is what I have found the best and which I prefer.

I claim as of my invention—

The process of fulling cotton, linen, and other vegetable fibrous material, either in the fiber or in any stage of its manufacture, or either alone or mixed with silk, woolen, or other animal fibrous material, by means of astringent or styptic materials, as set forth.

JOHN MERCER.

Witnesses:

WM. KETCHEE,  
JOSEPH MARQUETTE.