

# UNITED STATES PATENT OFFICE.

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## REMOVING SILK FROM WOOL-STOCK.

SPECIFICATION forming part of Letters Patent No. 549,532, dated November 12, 1895.

Application filed October 4, 1894. Serial No. 524,898. (No specimens.)

*To all whom it may concern:*

Be it known that we, GEORGE M. RICE, 2d, and ALFRED L. RICE, citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Treating Mixed Wool-Stock for Separation of Fibers, of which the following is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of our present invention is to effect separation of fibers in mixed wool-stock, mill-waste, rags, cloth-cuttings, and similar material containing silk threads or fiber, together with vegetable fibers, as cotton, hemp, ramie, &c., combined with the wool fiber, for the recovery of the wool free from silk, as well as from vegetable fiber; also, to provide a method for the removal of silk fiber and the recovery of wool fiber adapted for employment and practicable working in connection with or supplemental to previously-practiced methods for destroying cotton or vegetable fibers.

In our process the mixed fibrous material is first subjected to the action of a carbonizer—that is, some chemical agent of a nature destructive to vegetable fibers—such, for instance, as chlorin, hydrochloric acid, sulfuric acid, or compounds that will produce in their reactions chlorin or either or both of the acids above named as equivalents in their action upon the vegetable fibers.

The carbonizing agents or chemicals can be applied to the mixed fibrous material by inclosing such material within a container or chamber and introducing thereinto the chlorin, or hydrochloric acid, or sulfuric acid in the form of gas generated or brought into contact with the mixed fiber stock, as heretofore practiced, or in any efficient manner that will cause the chemicals to impregnate the fibers and give disintegrating action upon the cotton or vegetable matter contained in the mixed stock, but not in a degree of strength sufficient to materially injure the wool fiber.

In Letters Patent Nos. 205,139, 239,622, and 235,170 we have described means or chemical agents for destroying vegetable fiber, which means and processes can, if desired, be em-

ployed for this primary treatment or impregnation of the fiber; or any other means can be used that will give equivalent operation in the thorough application to and combination with the fibers of the acid, chlorin, or chemical agent. This primary treatment, continued some fifteen minutes, more or less, effects the carbonization or destruction of the vegetable fibers and impregnates all of the stock with the chemical agent. Subsequent to or following this primary treatment or impregnating operation the mixed material is placed within a suitable receptacle, vat, or kettle, and there boiled for about thirty minutes, more or less, immersed in a dilute acid liquor, which liquor can be formed with either hydrochloric acid or sulfuric acid, diluted with water to a strength of, say, from one and one-half to twelve per cent., by weight, of acid in the water. The percentage of acid in the liquor is varied for different sorts of stock, a greater percentage of strength being desirable for treating hard woven rags or cloth-cuttings than for open, shoddied, or picked stock. This boiling of the stock in acid solution after the primary chemical action and destruction of the vegetable fibers acts upon the silk fibers contained in the stock, changing their condition and rendering the same disintegrable, so that their substance can be subsequently pulverized and eliminated by attrition and dusting out.

For the boiling operation to effect the decomposition of silk fibers, it is sometimes desirable to use a liquor composed of two or more acids—as, for instance, chlorid of sodium treated with sulfuric acid to effect partial decomposition. To prepare such liquor we dissolve common salt in a small quantity of water, add sulfuric acid, and allow it to act for a certain length of time to liberate hydrochloric acid, but not until the salt is totally decomposed. This concentrated liquor then contains free hydrochloric acid, free sulfuric acid, sulfate of soda, and chlorid of sodium. This liquor when used is diluted by the addition of water to the strength desired, or so as to make a moderately-weak solution containing, preferably, about one and one-half to twelve per cent. of acid, in which the primarily-treated wool-stock is immersed and boiled.

A liquor composed as above stated may be formed by combining in their commercial form sulfuric acid, hydrochloric acid, and sodium chlorid (or other suitable chlorid, such as chlorid of potassium or chlorid of calcium) in proper proportions for producing a liquor of strength about as above described. The chlorids in this liquor are not absolutely essential to the attainment of a successful result in the elimination of the silk fibers, but in some instances serve as a palliative to mitigate the severity of action of the acids upon the wool fibers, so as to leave such wool fibers more soft or pliable, and in general working the chlorids can, as desired, be employed or omitted.

After boiling the wool-stock it is removed from the vat or kettle, then washed and dried, and then passed through a dusting operation. This frees the wool from the disintegrated and pulverized vegetable fiber and silk fiber, which passes off as dust.

We claim as our invention and desire to secure by Letters Patent—

1. In the art of separating mixed fibers for the recovery of wool, the process which consists in first destroying or carbonizing the contained vegetable matter or fibers by subjecting the mixed stock to the action of, or

impregnation with, a chemical agent, such as chlorin; and subsequently rendering the silk fibers disintegrable by immersing and boiling such primarily treated stock in a dilute acid liquor composed of water containing from one and one-half to twelve per cent. of acid, substantially as specified.

2. In the art of separating mixed fibers for the recovery of wool fibers free from vegetable fibers and silk fibers, the process of eliminating silk fibers therefrom; which consists in first destroying or carbonizing the contained vegetable fibers by subjecting the mixed stock to the action of, or impregnation with, a chemical agent, such as chlorin; then immersing and boiling such treated stock in a dilute acid liquor consisting of water containing sulfuric acid, hydrochloric acid and sodium chlorid in proportions substantially as specified, and subsequently expelling the disintegrated fibers from the wool fibers by washing, drying and dusting the stock.

Witness our hands this 3d day of October, A. D. 1894.

GEORGE M. RICE, 2d.  
ALFRED L. RICE.

Witnesses:

CHAS. H. BURLEIGH,  
ELLA P. BLENUS.