

# UNITED STATES PATENT OFFICE.

STEPHEN M. ALLEN, OF WOBURN, MASSACHUSETTS.

IMPROVEMENT IN TREATING FLAX, &c., TO PRODUCE SHORT FIBER FOR SPINNING.

Specification forming part of Letters Patent No. 41,185, dated January 12, 1864.

*To all whom it may concern:*

Be it known that I, STEPHEN M. ALLEN, of Woburn, in the county of Middlesex and State of Massachusetts, have invented certain new and useful improvements in the treatment of flax, hemp, jute, china-grass, and other long-stapled vegetable fibrous matter to adapt it to being spun or woven in the same manner as and upon machinery fitted for the weaving and spinning of short-stapled fiber—such as cotton and wool—also to render it suitable for felting and paper-stock in the same way as substances heretofore more exclusively for that purpose used; and I hereby declare that the following is a full, clear, and exact description of the same.

The present invention relates to the reduction of the long-stapled fiber by a compound process—i. e., by a chemical and a mechanical process combined—the former to prepare the fiber so that it shall be in the best possible condition to be acted upon by machinery.

Former experiments resulted in many valuable discoveries and improvements, some of which were secured to me by Letters Patent of the United States. Subsequent experiments, however, disclosed certain defects, which it was my endeavor to remove. I have found, for instance, that when operating on a large scale according to the improvements patented to me on the 20th day of March, 1860, or when the fiber is first submitted to any of the known fermenting processes, the individual fibers, or “fibrils,” as I term them, cannot be fully and completely separated because of the gluten or albumen or other cementing matter contained in the plant not being entirely destroyed, but, being interspersed (in small quantities, it is true) throughout the whole mass of fiber, becomes fixed, resisting every means subsequently applied of removing it. This I have discovered is the true cause for the difficulty experienced in the producing from the fiber of flax, hemp, &c., of that fine, silky, and downy material, which would not only take the place of, but would excel, the finest cotton and wool.

The object of my invention therefore is to prepare from long-stapled vegetable fiber a fiber that may be spun and woven on short-stapled machinery, that shall be absolutely free from the gluten or albumen that cements the particles together.

To enable others to make and use my improvements, I shall now proceed to describe the manner in which the same is or may be carried into effect.

I take the fibers of flax, hemp, jute, china-grass, or other vegetable long fibrous substances of a similar character, either before or after they have been separated from their shives, and place them in a tank, vat, or some other suitable vessel prepared for the purpose, and steep the same in either cold or warm water (though I deem warm water the best) until the fiber ferments. I hasten the process of fermentation by the addition of wheat-bran, or some other substance, if need be, and after it has thus lain in a proper state of fermentation for from six to ten hours I take it out of the vats and rinse or wash the same in cold or preferably warm water. I then manipulate the fiber thoroughly by hand or by machinery, sometimes by pressing and squeezing the fiber through rollers and sometimes by pounding or by working the same by dash-wheels, so as to produce a desired effect of limberness. I then add warm alkalies or acids, the temperature of which may be raised or the strength of the solutions increased to accelerate their action on the fiber. The fiber may be bleached also, if need be, and washed preparatory to spinning, weaving, or felting. After the fiber has thus been treated I dry the same, and then pass it through some machine which will beat it severely or rub and scrape it. The latter may be effected by passing the fiber between two sliding or revolving surfaces, smooth like the horizontal bars in an ordinary cotton-beater, or serrated or pointed, as may best suit the condition of the fiber. The fiber thus prepared and cleaned is then subjected to the stranding and drawing process, as described and referred to in my previous patents, and is afterward combed or carded preparatory to spinning and weaving on the ordinary cotton and woolen machinery. It will be understood that the fiber may be mixed with fibers of a different derivation, or it may be spun and wove without admixture. The effect of fermenting the fiber thus is different from that of any other known process, and is very beneficial as regards the product, besides saving much time and expense in the preparation.

Fermentation under water, where it is not

exposed to the air, produces a quick decomposition of the albuminous and glutinous matter in the fiber, and, if not exposed too long in that state or allowed to become dry in the air before it is washed and thoroughly manipulated, the albumen or gluten is easily separated and cleaned out, while, if the fiber be suffered to dry in the air after fermentation has set in, as in the case of all dew-rotted fiber, as well as that of pool or vat rotting or steeping, where it is necessary to dry the same before extracting the glutinous substances, the particles of gluten become fixed on the fiber, and cannot thereafter be dissolved and separated from the fiber, but adhere to the same. If, therefore, the fiber is dried after fermentation and manipulation and washed and treated with alkaline and other solutions, as described, most of the gelatinous matter is removed before drying. If any remain after drying, the beating, rubbing, and scraping of the fiber, either with revolving scutching-rollers such as described in my patent for brake of the 30th day of June, 1863, or by serrated or corrugated rollers, or toothed cylinders suitable for the purpose, followed by the drawing or stranding operations, will certainly effect the removal of the remaining particles of gluten or albumen, rendering the fibril smooth and silky and suitable

for spinning, or weaving, or felting, or for paper-pulp of a superior quality.

Having thus described my invention, what I claim is—

1. The herein-described process of preparing vegetable long-stapled fiber to be reduced to suitable length for spinning and weaving on short-stapled machinery, and for other purposes, by submitting the fiber to the different operations of fermentation, washing, pressing, beating, &c., before drying the same, substantially as herein more fully set forth.

2. The herein-described process of converting vegetable long-stapled fiber into fiber of suitable length for weaving and spinning on short-stapled machinery by combining, with fermentation, washing, and other mechanical and chemical operations before drying, the stranding or reducing of the fiber mechanically after drying the same, substantially as herein set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

STEPHEN M. ALLEN.

Witnesses:

LEVI WILKINS,  
L. BURNETT.