

UNITED STATES PATENT OFFICE.

CHAS. HEATON, OF NEW YORK, N. Y.

IMPROVED PROCESS FOR DISINTEGRATING VEGETABLE FIBERS.

Specification forming part of Letters Patent No. 49,106, dated August 1, 1865.

To all whom it may concern:

Be it known that I, CHARLES HEATON, of the city, county, and State of New York, have invented a new method of treating vegetable fibrous materials for the purpose of separating the fibers from the gums and silica of the same; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to fully understand and use my invention.

It is well known that vegetable fibrous substances—such as hemp, straw, cane, reed, bamboo, or flax—when used for the manufacture of paper-pulp, felt, or textile fabrics, require to be subjected to the action of heat and moisture for the purpose of separating, utilizing, and softening the fibers. Various methods for separating these fibers have been patented. The application to the fibers of great heat in conjunction with alkali or other softening solutions is not new, nor is the application of great heat in conjunction with an explosion for the purpose of separating the fibers new. In all the various processes as heretofore practiced it is customary to treat the fibrous substance with great heat for a long time, varying from three to ten hours.

In carrying out my improvement I have discovered that great heat for a long time is not necessary to the successful treatment of vegetable fibers, and also that the use of alkaline solutions is not necessary in conjunction with great heat.

I have also discovered that the proper and necessary amount of heat, (which varies with different materials,) once developed and applied to the fibrous substances, produces the necessary change in them without a long-continued application thereof. As soon as the fibrous substance is under the influence of the necessary degree of heat the required effect is produced at once as well or better than if said substance is kept under the continued influence of the same heat for a long time.

I have also discovered that the application of heat of less intensity than the heat required will not produce the necessary effect, no matter how long continued, so well as a higher degree of heat instantaneously applied. In short, I discover when the right degree of heat is applied to the said fibrous substances the de-

sired change in the gums takes place almost instantly.

I also discover that the application of alkaline solutions in conjunction with great heat is not only unnecessary, but prejudicial, inasmuch as the color of the fibrous material treated is injured by such combination.

I have also discovered that, after the necessary heat has been applied to the material treated, alkaline solutions applied cold answer a better purpose than when applied in conjunction with heat.

I have also discovered that, after a separate successive application of heat and alkaline solution, a boiling of the fibrous substance in an open vessel without pressure is sufficient for softening the material and producing a clean, soft pulp, felt, or fiber.

My improvements are applicable to all vegetable fibrous substances, the treatment of one of which substances—namely, cane or bamboo—I will now proceed to describe. In the reduction of the bamboo to pulp for the manufacture of paper, felt, &c., the condition of the raw cane or bamboo, whether green or dry, may make it necessary to change the strength of chemicals and to vary the degrees of heat applied.

My process is as follows: I take the dry bamboo or cane in convenient-sized bundles and soak in water until the mass is saturated, usually from three to twelve hours. After soaking I place the mass in a boiler, retort, or other suitable receptacle, and apply heat through the medium of steam at a pressure of not less than fifty pounds per inch. (In some cases it is necessary to apply as great a pressure of steam as one hundred and eighty pounds per square inch, according to the condition of the material to be treated.) Fire or a hot-blast as a vehicle of heat, instead of steam, might be used if sufficient moisture was present to prevent carbonizing the materials. I prefer to use steam as the most convenient and easiest applied. After the heat has been applied and the material within the retort or other vessel has been brought under the influence of the heat, as shown by a gage placed on the vessel for that purpose, I cut off the supply of heat by allowing the steam-pressure gradually to subside. As soon as the heat has been re-

duced, I remove from the retort or vessel the material under treatment and place it in a solution of caustic alkali of the specific gravity of 2° Baumé, at a temperature of 90°. The alkaline solution, as well as its strength and temperature, may vary according to the condition of the material treated. I leave the material in this alkaline solution until it has become softened, when I remove it, having first strained off as much of the liquid as possible. I now pass the fibrous mass through a series of rollers or submit it to other mechanical pressure for the purpose of effecting a separation or a partial separation of the gums and silica, which have become softened by the preceding treatment. In passing it through rollers I cause the material to be heated or dried by making the rollers hot by circulating steam through them. After the material has passed through the rollers, as described, the gums which previously surrounded the fibers in a pasty or sticky condition have been mashed or flattened out so as no longer to surround, but simply to adhere to, the fibers. The action of the rollers is found not to injure the fiber, owing to the soft and yielding nature of the gums. The rollers being hot, the ma-

terial, after passing through the rollers, readily and rapidly dries, when the gums become brittle and can be readily shaken away from the fibers or beaten out in a willow or other equivalent device. I now take the fiber, which by the above-described process has become nearly or quite free from gums, and place it in a boiler or other receptacle, with a weak solution of alkali or other solvent, and boil the mass for the purpose of softening the material and removing any small portion of gum which may yet adhere to it, as well as to prepare it for bleaching. After being washed the mass is fit for use as pulp for the manufacture of paper, felt, or other fabric.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The process herein described of treating vegetable fiber by subjecting it for a short time to a high degree of heat without the presence of alkali, and afterward immersing it in an alkaline solution at a lower temperature.

CHAS. HEATON.

Witnesses:

M. M. LIVINGSTON,
C. L. TOPLIFF.