C. LAUGA. 2 Sheets—Sheet 1.

# Separating and Cleaning Vegetable Fibers for Paper-Pulp.

No. 210,339. Patented Nov. 26, 1878.

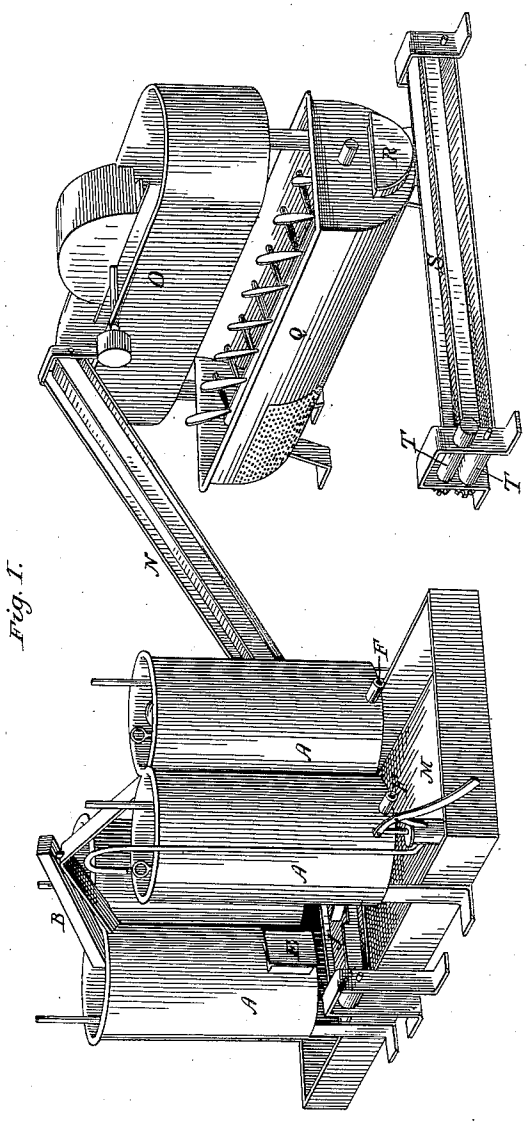



Fig. 1.

Attest:

Clarence Poole

R. K. Evans

Inventor:

Chas. Lauga

by A. N. Evans & Co

his attys

2 Sheets—Sheet 2.

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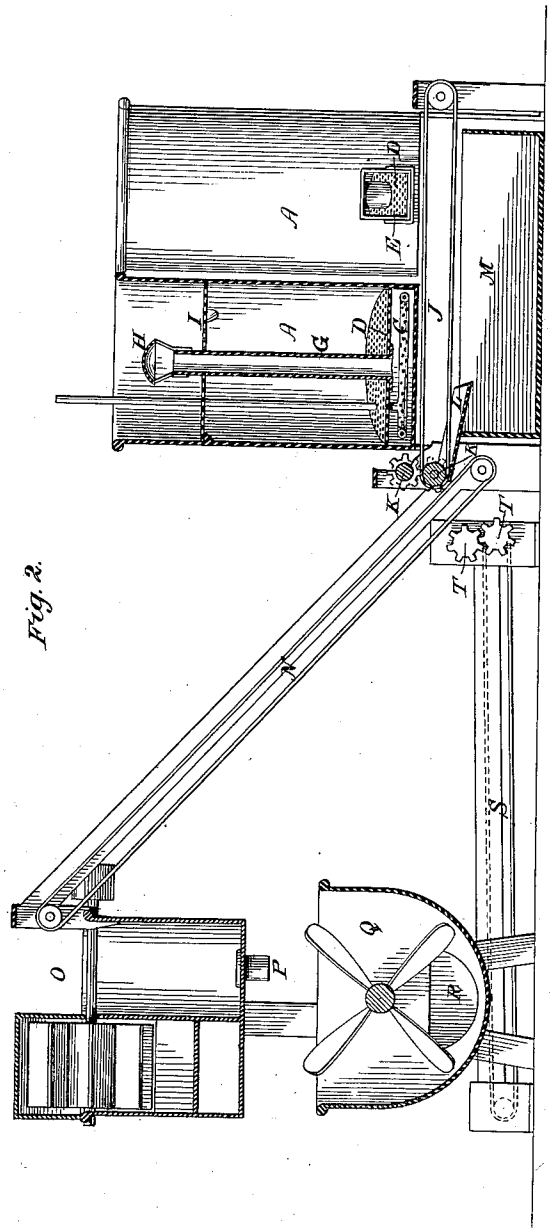



Fig. 2.

*Attest:*
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# UNITED STATES PATENT OFFICE.

CHARLES LAUGA, OF NEW ORLEANS, LOUISIANA, ASSIGNOR OF ONE-HALF HIS RIGHT TO CLEMENT B. AND GEORGE B. PENROSE, OF SAME PLACE.

## IMPROVEMENT IN SEPARATING AND CLEANING VEGETABLE FIBERS FOR PAPER-PULP.

Specification forming part of Letters Patent No. 210,339, dated November 26, 1878; application filed November 15, 1878.

*To all whom it may concern:*

Be it known that I, CHARLES LAUGA, of the city of New Orleans and State of Louisiana, have invented a new and useful Process and Apparatus for Separating and Cleansing Vegetable Fibers, especially those of sugar-cane, sorghum, and Indian corn, and converting the same into stock for the manufacture of paper and other similar products, which process and apparatus are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my apparatus. Fig. 2 is a vertical section through *x x*.

To enable others skilled in the art to make and use my invention, I will proceed to describe the exact manner in which I have carried it out.

My invention relates to that class of processes employed for removing all impurities from the fibers of fibrous plants, and reducing the pure fiber to the form of stock or pulp for the manufacture of paper, and of other products which may be made from the said stock; and it consists in the process of treatment herein described for producing the pulp from the crushed fiber; and, secondly, the novel apparatus used for carrying out the process.

In the drawings, A represents the tanks for the reception of the crude fiber as it comes from the crushing-mill. I have represented and prefer to use four of these tanks, conveniently arranged, as shown in Fig. 1. The fiber is conveyed to these tanks by the swinging or removable trough B, or by any other convenient means.

In the bottom of the tank A is secured a coil of perforated steam-pipe, C, which pipe is to be connected in the usual way to a conveniently-located steam-boiler, to furnish the necessary steam for cooking the fiber. Immediately above the coil of perforated steam-pipe I secure a perforated diaphragm or false bottom, D, inclining toward the door E in the side of the tank. This door is for the discharge of the fiber from the tank after the cooking process is completed, and by inclining the diaphragm D toward the lower edge of the door the discharge of the fiber from the tank A is greatly facilitated.

Another purpose of the perforated diaphragm D is to protect the perforated steam-pipe from the body of the crushed fiber within the tank, and to serve as a strainer and avoid obstructing the cock F, through which the liquid is drawn from the tank when the boiling process has been completed.

Through the center of the tank A, I place a pipe, G, open at both ends, the lower end passing through and slightly below the diaphragm D, and the upper end reaching nearly to the top of the tank. Above the upper end of the pipe I secure a cap, H, leaving an open space between the end of the pipe and the cap, for a purpose hereinafter described.

Another perforated diaphragm, I, is fitted into the upper portion of the tank A, and sliding readily on pipe G. The purpose of this diaphragm is to act as a weight on the top of the fiber in the tank, to prevent the fiber from being forced by the steam over the top of the tank, while at the same time the perforations allow of a free movement among the particles of the chemical solution.

During the process of cooking the fiber the pressure of the steam into the tank A will force the chemical mixture up through the pipe G and against its cap H, thus distributing the mixture at intervals over the fiber in the tank, and securing its complete action on the same.

When the cleansing and transformation of the fiber have been thoroughly effected, the fiber is withdrawn from the tank A through the door E, near the bottom of the tank, and falls upon the apron J and is passed through the rollers K K, whereby the chemical fluid remaining in the fiber is pressed out and is returned by spout L to the reservoir M, located below the tank A. From the apron J the fiber is transferred to carrier N, which carries it to the pulp-engine O, in which the fiber is reduced to pulp, bleached, and washed. From thence the fiber or pulp is passed through the opening P into the mixer and strainer Q. This mixer and strainer has a perforated section for draining and carrying off any remaining liquid or impurities, and through its longitudinal center a shaft provided with inclined stirrers or mixers, which feed forward the pulp to the discharge-opening R, where it falls on the endless apron S, and is carried between the

rollers T T, and, after sufficiently drying, is ready for the market as stock for the paper-manufacturer. By this manipulation of the crude fiber I am enabled to produce a pulp suited for the manufacture of a fine quality of paper.

The chemical mixture which I use is a saccharate of alkali, composed of water, saccharine, and any of the alkalies—preferably, potash and its combinations. The strength or specific density of the mixture must be determined by the nature of the fiber to be operated upon, and will be readily ascertained by a little experience in the preparation of the different fibers. I place in the tank A one gallon of the chemical mixture to every ten pounds of vegetable fiber; yet I do not confine myself to this exact proportion, as it may be varied. I then admit steam into the perforated steam-pipe in the bottom of the tank by any of the well-known means; and by means of this steam I boil the mass from two to ten hours, according to the nature of the fiber to be treated. When the fiber has been sufficiently cooked the chemical mixture is drawn off through cock F into the reservoir M, to be again pumped into the tanks for use.

The object of saccharine, in combination with alkali, is to assist in dissolving the vegetable gums and other foreign substances contained in the fiber, and also to prevent the alkali from having any injurious effect upon the fiber.

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

1. The process herein described for cleaning and preparing the fiber of fibrous plants and reducing it to pulp, the same consisting in boiling the fiber in the saccharate of alkali from two to ten hours, then pressing the fiber between rollers, next grinding in a pulp-mill, and subsequently mixing, draining, pressing, and drying, substantially as herein described.

2. The tank A, provided with the door E and cock F, and steam-pipe C, in combination with the open pipe G, provided with the cap H, and the perforated diaphragms D and I, when constructed to operate substantially as and for the purpose set forth.

3. The tank A, provided with the door E and cock F, and having the pipe G and diaphragms D and I, in combination with the apron J, rollers K K, carrier N, engine O, mixer Q, apron S, and rollers T T, when combined to operate substantially as and for the purpose set forth.

4. The tank A, provided with the door E and cock F, and having the pipe G, perforated steam-pipe C, and diaphragms D and I, in combination with the reservoir M and spout L, substantially as and for the purpose herein specified.

CHARLES LAUGA.

Witnesses:
LOUIS G. ELFER,
CHAS. L. MARTIN.