

UNITED STATES PATENT OFFICE.

VIGGO DREWSSEN, OF NEW YORK, N. Y.

PROCESS OF MANUFACTURING PRODUCTS FROM CORNSTALKS, SUGAR-CANE, &c.

No. 853,943.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, VIGGO DREWSSEN, a citizen of the Kingdom of Norway, residing in the city of New York, in the county of Kings and State of New York, have invented a new and useful Process of Manufacturing Products from Cornstalks, Sugar-Cane, and Analogous Pithy Stalks, of which the following is a specification.

The difficulty in preparing fibrous material (cellulose), or other products suitable for the manufacture of paper from these pithy stalks lies in the different character of the different parts of the stalk. A corn stalk proper, namely without leaves or husks, for instance, consists of two parts which can be used by paper manufacturers, to wit, the outside shell and the pith. The shell has a character similar to wood and contains a high percentage of fibers, while the pith is spongy and consists principally of oblong cells. This is also true of the sugar cane. The shell when treated with chemical substances, such as caustic soda, or sulfurous acid and lime, yields a large proportion of fibers which are adapted for paper making and produce an opaque sheet of paper. The pith, on the other hand, when treated with the same substances disintegrates into cells and the sheet of paper derived therefrom is transparent and resembles imitation parchment paper. It has heretofore been supposed that this difference in character in the fibers of the shell and the cells of the pith required two separate cooking operations and that the former required a stronger solution and a longer time in cooking than the latter. It was also before thought that if the pith were cooked simultaneously with the shell in the same strength of the liquor and for the same length of time as are required for the disintegration of the fibers of the shell and their separation from the incrustaceous matter that the cells of the pith are practically destroyed and could not be utilized. I have discovered, however, that this is not always the case, and that by the use of proper means only a single operation of cooking is necessary for the entire stalk, shell and pith, and that both can be used either separately or together in making the desired paper by using the following method.

My invention is designed to effect the object last above described and an apparatus by which my invention can be pursued is illustrated in the accompanying drawing in

which similar letters of reference refer to similar parts throughout the several views.

The following is a description of my process. I first split and cut up the entire stalk into pieces. This exposes the pith lying within the shell. I then place these pieces of stalk in a digester, or rotary, containing the necessary chemical solution. Fifteen per cent of caustic soda, calculated from the bone dry weight of the stalk is efficient, though I do not confine myself either to this specific solution or this specific strength of the solution; nor do I confine myself to the specific length of cooking time and steam pressure given below. Cooking the stalks for six hours at a steam pressure of sixty pounds to a square inch has given satisfactory results. After cooking the pieces of stalk the pressure is blown off or partially blown off from the digester, or rotary, and the contents are run out into a draining vat. The dark colored liquor is allowed to run off and is washed out of the solid material and is saved to be used for special purposes which form no part of this invention. The solid washed materials consisting of the cooked fibers and pith cells are then thrown on a screen to separate from them any part which may not have been thoroughly cooked, and are then run into the beating engine, as it is termed in the art, provided with washers, or a similar machine. The washer or washers of this beating engine are covered with perforated metal sheets, or wire mesh, provided with openings large enough to allow the pith cells to pass through, but small enough to retain the fibrous material. The separation of the cellulose fibers from the pith cells is accomplished in the beater in which the washing of the solid materials is continued with clean water until the desired separation of the fibers and the pith cells has been effected. The fibrous material is then ready to be placed upon the wet machine in the ordinary manner. The water containing the pith cells that flows from the washer is, if it is thick enough, owing to the presence of a sufficient mass of pith cells, run directly on to the wet machine; but if it is not thick enough for this purpose the water containing the pith solution is run off from the washer into one or more settling tanks where the pith cells are allowed to settle. When they have settled enough in this tank to give the proper consistency familiar to those skilled in the art, the clean water is run off from the tank

and the pith cells are conveyed to a wet, or similar machine to collect them to be subsequently used either alone, or in conjunction with the fibrous portion, as it is well known to those skilled in the art.

Referring to the accompanying drawing, A represents the beating machine of a well known type in which B and B' are the washers and W is the beater, while C and C' are pipes running from the washer into the two settling tanks D and D'.

p and p' are pipes from which the clear water, after the pith cells have settled sufficiently, is run off from the settling tanks.

H is a pipe conveyer through which pith cells are pumped by means of pump E through pipe p'' up to the wet machine F, which it is unnecessary to describe more particularly as its construction is well known to those skilled in the art.

Settling tank D shows the water as it runs through the washer from the beater and containing the pith cells before they have settled; while the settling tank D' shows the pith cells after they have settled with the clear water lying above them.

Having thus described my invention, what I claim is,

1. The process of preparing materials for paper making from cornstalks, sugar cane and analogous pithy stalks, which consists in; (1) cooking said stalks continuously in a single cooking liquor which contains the ordinary chemical reagents used to produce cellulose from vegetable fibers for a sufficient length of time to separate the fibers of the shell and the pith cells from their incrustaceous matter; (2) separating the fibrous matter from the pith cells by washing and screening; (3) collecting the fibrous material and the pith cells, substantially as described.

2. The process of preparing materials for paper making from cornstalks, sugar cane and analogous pithy stalks, which consists in; (1) cooking said stalks continuously in a single cooking liquor containing a caustic alkali for a sufficient length of time to separate the fibers of the shell and the pith cells from their incrustaceous matter; (2) separating the fibrous matter from the pith cells by washing and screening; (3) collecting the fibrous material and the pith cells, substantially as described.

3. The process of preparing materials for paper making from cornstalks, sugar cane and analogous pithy stalks which consists in; (1) cooking said stalks continuously in a single cooking liquor, which contains the ordinary chemical reagents used to produce cellulose from vegetable fibers for a sufficient length of time to separate the fibers of the shell and the pith cells from their incrustaceous matter; (2) separating the fibrous matter from the pith cells by washing and screening; (3) allowing the pith cells to settle out of

the washing water in a settling tank; (4) collecting the fibrous material and the pith cells, substantially as described.

4. The process of preparing materials for paper making from cornstalks, sugar cane and analogous pithy stalks, which consists in; (1) cooking said stalks continuously in a single cooking liquor containing a caustic alkali for a sufficient length of time to separate the fibers of the shell and the pith cells from their incrustaceous matter; (2) separating the fibrous matter from the pith cells by washing and screening; (3) allowing the pith cells to settle out of the washing water in a settling tank; (4) collecting the fibrous material and the pith cells, substantially as described.

5. The process of preparing materials for paper making from cornstalks, sugar cane and analogous pithy stalks which consists in; (1) cutting or otherwise dividing the stalks into pieces; (2) cooking said stalks continuously in a single cooking liquor which contains the ordinary chemical reagents used to produce cellulose from vegetable fibers for a sufficient length of time to separate the fibers of the shell and the pith cells from their incrustaceous matter; (3) separating the fibrous matter from the pith cells by washing and screening; (4) collecting the fibrous material and the pith cells, substantially as described.

6. The process of preparing materials for paper making from cornstalks, sugar cane and analogous pithy stalks which consists in; (1) cutting or otherwise dividing the stalks into pieces; (2) cooking said stalks continuously in a single cooking liquor containing a caustic alkali for a sufficient length of time to separate the fibers of the shell and the pith cells from their incrustaceous matter; (3) separating the fibrous matter from the pith cells by washing and screening; (4) collecting the fibrous material and the pith cells, substantially as described.

7. The process of preparing materials for paper making from cornstalks, sugar cane and analogous pithy stalks which consists in; (1) cutting or otherwise dividing the stalk into pieces; (2) cooking said stalks continuously in a single cooking liquor which contains the ordinary chemical reagents used to produce cellulose from vegetable fibers for a sufficient length of time to separate the fibers of the shell and the pith cells from their incrustaceous matter; (3) separating the fibrous matter from the pith cells by washing and screening; (4) allowing the pith cells to settle out of the washing water in a settling tank; (5) collecting the fibrous material and the pith cells, substantially as described.

8. The process of preparing materials for paper making from cornstalks, sugar cane and analogous pithy stalks which consists in; (1) cutting or otherwise dividing the

stalk into pieces; (2) cooking said stalks continuously in a single cooking liquor containing a caustic alkali for a sufficient length of time to separate the fibers of the shell and the
5 pith cells from their incrustaceous matter; (3) separating the fibrous matter from the pith cells by washing and screening; (4) allowing the pith cells to settle out of the wash-

ing water in a settling tank; (5) collecting the fibrous material and the pith cells, substantially as described.

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Witnesses:

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