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MANUFACTURE OF WOOD PULP

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2 Claims. (Cl. 162—76)

It is known to prepare paper pulps by submitting wood under the form of chips or shavings to a partial cooking operation by means of solutions of neutral sodium sulphite to which there is sometimes added sodium carbonate, under various operating conditions of temperature, pressure and time, in order to dissolve the incrusting substances of the wood, and thereafter to submit the cooked wood material to a mechanical disintegrating operation. The pulps thus obtained are noticeably coloured, but they may be used for the manufacture of cardboard, packing paper, etc. These pulps are however inappropriate for manufacturing white paper (as for instance printing paper or newsprint) since they would then require an expensive bleaching treatment, or they would have to be used in association with a large quantity of very white pulp.

It has already been proposed to use these so-called semi-chemical processes in connection with wood from deciduous trees which is not appropriate for treatment by the conventional grinding method, in order to obtain inexpensive high yield pulps for use in the manufacture of printing paper, newsprint and the like. But the pulps thus obtained are generally unsatisfactory. They are not sufficiently strong owing to the cooking conditions. They are noticeably coloured and they therefore require a powerful and expensive chemical bleaching treatment. They fail to give the soft character considered as desirable for printing papers.

An object of this invention is to provide a process which will permit of obtaining from wood from deciduous trees, even in the form of a non-homogeneous mixture, a pulp suitable for the manufacture of printing paper, newsprint and the like, which pulp should fulfill the following conditions:

(1) It should be white enough to be used without any additional bleaching operation.

(2) The yield of its preparation should be between 75% and 90% of the original wood material.

(3) It should be formed of fully separated and substantially unbroken fibres for ensuring good paper making qualities.

In accordance with this invention in a pulp preparing process comprising the step of softening wood by cooking with sodium sulphite and of thereafter submitting the treated wood to a disintegrating operation, the cooking liquor comprises sodium hydrosulphite and oxalate ions (preferably in the form of sodium oxalate). The hydrosulphite reduces some of the coloured constituents of the wood which are thus rendered water soluble and eliminated, whereby the whiteness of the pulp finally obtained is improved. The oxalate ions inhibit the tannic substances which are always present in wood from deciduous trees and which react with traces of heavy metals contained in the wood to yield products of substantially black colour. The oxalate ions also partially reduce or inhibit the metallic salts of the wood.

It is further of advantage to add to the cooking liquor some other agents having an action on the metallic salts

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of the wood such as tripolyphosphates, various chelating agents, and finally wetting agents.

The wood material to be treated is preferably impregnated with the cooking liquor before the cooking operation, the concentration of the impregnating liquor being such that the wood may retain in its mass at least the whole quantity of reagents required for its own treatment. In this manner during the cooking operation at an elevated temperature the whole mass of the wood material is already in contact with the appropriate quantity of reagents, without having to rely on phenomena of diffusion or of osmosis from a cooking bath for insuring access of the said reagents to the innermost portions of the wood chips.

Owing to this particular impregnation of the wood to be treated, the cooking bath mainly serves as a heating fluid and it is therefore possible, to effect the cooking operation by means of a relatively diluted solution (as for instance three to six times more diluted than the impregnating liquor). This cooking solution may have the same composition as the impregnating liquor, but it is also possible to use a solution only containing sodium sulphite, the sodium hydrosulphite and the oxalate ions of the impregnating liquor retained within the wood chips being sufficient for effecting proper treatment of the material. It is further possible to effect the cooking operation by means of the spent solution bath from a preceding operation since, owing to the fact that in practice the impregnating step is effected with a liquor having a concentration slightly in excess of the exact value required, the residual solution still contains a sufficient quantity of reagents for ensuring a further cooking operation.

Alternatively the cooking treatment of the impregnated wood material may be effected by means of steam, without any kind of liquid. In such a case the cooking liquor is only constituted by the impregnating liquor retained in the wood chips and of course the concentration of this liquor should be such that the quantity of reagents thus present in the wood material be substantially in excess of the exact quantity required for avoiding any possible insufficient treatment of the wood particles.

In any case the duration of the cooking operation is preferably limited to two hours at a temperature of 145° C., or to half an hour at a temperature of 155 to 160° C.

The cooking liquor is preferably alkaline at the beginning of the cooking operation (pH between 8 and 10) and slightly acid or neutral at the end thereof (pH between 5 and 7). When the quantity of reagents in the initial cooking liquor is such that the final pH is between 6 and 7, the pulp thus prepared is strong but papers manufactured therefrom are relatively hard and impermeable. With a final pH in the vicinity of 5, the paper is softer and more permeable. It is thus possible to modify at will the characteristics of the pulp. The alkalinity of the cooking liquor may be increased, when necessary and more particularly when the said liquor is obtained by re-cycling the residual solution, by an addition of sodium carbonate or of caustic soda, in the known manner.

The following examples will permit a better understanding of the invention:

Example I.—Wood from several varieties of deciduous trees is cut into shavings in the usual manner. These shavings are impregnated by suction and hydrostatic pressure with a liquor containing 8% of sodium sulphite, 1% of sodium hydrosulphite and .5% of sodium oxalate. The impregnated shavings are then cooked in a lye containing 2% of sodium sulphite at a temperature of 145° C. for two hours.

The treated shavings are thereafter disintegrated. The wood pulp thus obtained is particularly appropriate for the manufacture of printing paper and of news print.

Example II.—The wood material is treated as in Ex-

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ample I, but by effecting the cooking operation by means of the residual solution from the said Example I. The results obtained remain substantially the same.

Example III.—Wood shavings from deciduous trees are impregnated with a liquor containing 12% of sodium sulphite, 1.5% of sodium hydrosulphite and .75% of sodium oxalate. The impregnated shavings are drained and directly treated by steam under pressure at 145° C. for two hours. The treated shavings are then ground as in Example I.

Example IV.—The wood material is treated as in Example III, but it is heated at a temperature between 155 and 160° C. for only half an hour.

Example V.—The wood material is treated as in Examples I and/or II, but with an addition of sodium carbonate to the impregnating liquor for increasing the initial pH value of the latter. The characteristics of the paper pulp finally obtained are slightly affected by the final pH value of the lye, which value may be varied at will by the addition of sodium carbonate.

I claim:

1. A semi-chemical process for the manufacture of pulp from unselected and untreated deciduous wood, which consists in cooking the wood material with a sodium sulphite solution containing a small percentage of sodium hydrosulphite and of sodium oxalate under such conditions that the final pH value of the solution is comprised between 5 and 7, and in thereafter mechanically reducing to pulp the cooked material.

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2. A semi-chemical process for the manufacture of pulp from unselected and untreated deciduous wood, which consists in impregnating the wood material with a concentrated sodium sulphite solution containing a small percentage of sodium hydrosulphite and of sodium oxalate, and in cooking the impregnated wood in a dilute sodium sulphite solution under such conditions that the final pH value of the solution is comprised between 5 and 7, and in thereafter mechanically reducing to pulp the cooked material.

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