UNITED STATES PATENT OFFICE.

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PROCESS OF REFINING SULFITE WOOD-PULP FOR NITRATING OR SIMILAR PURPOSES.

1,283,114. Specification of Letters Patent. Patented Oct. 29, 1918.

No Drawing. Continuation of application Serial No. 220,848, filed March 6, 1918. This application filed June 19, 1918. Serial No. 240,801.

To all whom it may concern:

Be it known that I, VIGGO DREWSEN, a citizen of the United States, and resident of borough of Brooklyn, county of Kings, city and State of New York, have made a certain new and useful Invention Relating to Processes of Refining Sulfite Wood-Pulp for Nitrating or Similar Purposes, of which the following is a specification.

This invention relates especially to the refining or purification of wood pulp produced by the sulfite or acid or other chemical process from suitable wood, such as spruce, hemlock, fir or spruce balsam so as to secure a refined wood pulp of low caustic potash solubility and of such color and other properties as makes it suitable for the production of nitrated cellulose of various grades or other generally similar cellulose acetate or other cellulose compounds. The original sulfite pulp may be partially bleached with any suitable bleaching agents, such as bleaching powder, chlorin, water or gas and then after washing, the bleached pulp may be cooked under pressure in an alkaline or soda cooking liquor for two to four hours or so to convert and remove the undesirable colored or other components of the wood pulp. Thorough washing removes these undesirable hydrocellulose or oxycellulose compounds and the refined pulp, which may have a caustic potash solubility of less than seven per cent. may then be used for nitrating or the like or may be further bleached in some cases.

Sulfite wood pulp from such sources may with advantage be first bleached which may be effected, where the pulp is originally in the unbleached condition in which it is discharged from the digesters, by bleaching it with chlorin or bleaching powder. Five to fifteen per cent. or so of bleaching powder as compared to the dry weight of the unbleached wood pulp may be used for this purpose and the pulp bleached in a water solution thereof for about four to eight hours or until it is bleached to a yellowish color or to the usual light or whitish color for some purposes. The pulp is thoroughly washed to remove the bleaching powder and coloring matter, etc., and in some cases it is desirable to have the wood pulp in quite thoroughly bleached condition before submitting it to the caustic soda or alkaline refining treatment, since otherwise pulp of some grades might become undesirably or permanently stained so that it could not be easily and thoroughly bleached.

The bleached sulfite pulp is then subjected to a strong alkaline refining treatment as by boiling it under pressure for a suitable time in a water solution of sodium carbonate or sodium hydrate or other similar alkaline material capable of dissolving or removing from the pulp the undesirable oxy-cellulose, hydrocellulose or coloring matter. Caustic soda seems to give good results in this connection when some five to twelve per cent. or so of caustic soda as compared to the dry weight of the bleached sulfite pulp is used and a relatively dilute solution of the caustic soda is usually sufficient for this purpose, such as a three to eight per cent. water solution thereof. The bleached pulp may be cooked in this alkaline refining liquor for two to four hours or so in a digester at a pressure of, say, forty to one hundred pounds per square inch. This treatment dissolves or removes the undesirable oxycellulose and hydrocellulose components which are of course preferably thoroughly removed by repeated washing of the pulp after its removal from the digester. This refined pulp is usually sufficiently light colored to be used for most nitrocellulose purposes, although if desired, the pulp may be subjected to a further bleaching treatment with a water solution of bleaching powder for two or three hours which is usually sufficient to give a good white color to the refined pulp in this connection.

The refined bleached sulfite pulp has a low caustic potash solubility which may be reduced to five or six per cent. or so in this way, so that the refined sulfite pulp may thus be produced well within seven per cent. caustic potash solubility which is the present standard for cotton used for nitro-cellulose manufacture. This caustic potash solubility is of course determined by cooking the pulp for three hours under atmospheric pressure in a reflux condenser in a ten per cent. water solution of caustic potash, the pulp cooked in this way being then acidified with acetic acid and finally washed, dried and weighed; and the reduction in weight of the original dry pulp is the amount taken as the caustic potash solubility thereof.

This invention has been described in connection with a number of illustrative processes, orders of steps, materials, proportions, arrangements and methods of treatment and use, to the details of which disclosure the invention is not of course to be taken, since what is claimed as new and what is desired to be secured by Letters Patent is:

1. The process of refining sulfite wood pulp from spruce, hemlock, fir or balsam wood to render the same suitable for nitro-cellulose manufacture which comprises thoroughly bleaching the wood pulp from the digester for four to eight hours with a water solution of bleaching powder and washing the bleached pulp, subjecting the same to an alkaline refining treatment by boiling under pressure for several hours in a caustic soda water solution to dissolve and remove the oxy-cellulose and hydrocellulose components from the pulp, washing the refined pulp and bleaching the same with bleaching powder to decolorize the pulp while still keeping its caustic potash solubility below seven per cent.

2. The process of refining sulfite wood pulp to render it suitable for nitro-cellulose manufacture or the like which comprises bleaching and washing the wood pulp and subjecting the same to a strong alkaline refining treatment with an alkaline water solution to dissolve and remove oxy-cellulose or hydro-cellulose components and bleaching the refined pulp to decolorize the same while keeping down the caustic potash solubility of the pulp to about seven per cent.

3. The process of refining sulfite wood pulp from spruce, hemlock, fir or balsam wood to render the same suitable for nitro-cellulose manufacture or the like, which comprises bleaching the wood pulp and washing the bleached pulp, subjecting the same to a strong alkaline refining treatment by boiling under pressure for several hours in a water solution of alkaline refining material to dissolve and remove the oxy-cellulose or hydro-cellulose components from the pulp and washing the refined pulp and bleaching the same to produce pulp having a low caustic potash solubility.

4. The process of refining chemical wood pulp to render the same suitable for nitro-cellulose manufacture which comprises thoroughly bleaching the wood pulp from the digester for four to eight hours with a water solution of bleaching powder and washing the bleached pulp, subjecting the same to an alkaline refining treatment by boiling under pressure for several hours in a caustic soda water solution to dissolve and remove the oxy-cellulose and hydro-cellulose components from the pulp and keep its caustic potash solubility below about seven per cent.

5. The process of refining sulfite vegetable fiber pulp to render the same suitable for nitro-cellulose manufacture or the like, which comprises bleaching and washing the pulp, subjecting the same to an alkaline refining treatment by boiling under pressure for several hours in a water solution of alkali refining material to dissolve and remove the oxy-cellulose or hydro-cellulose components from the pulp and washing the refined pulp to produce pulp having a low caustic potash solubility.

6. The process of refining sulfite wood pulp to render it suitable for nitro-cellulose manufacture or the like which comprises bleaching and washing the wood pulp and subjecting the same to an alkaline refining treatment with an alkaline water solution to dissolve and remove oxy-cellulose or hydro-cellulose components and reduce the caustic potash solubility of the pulp.

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