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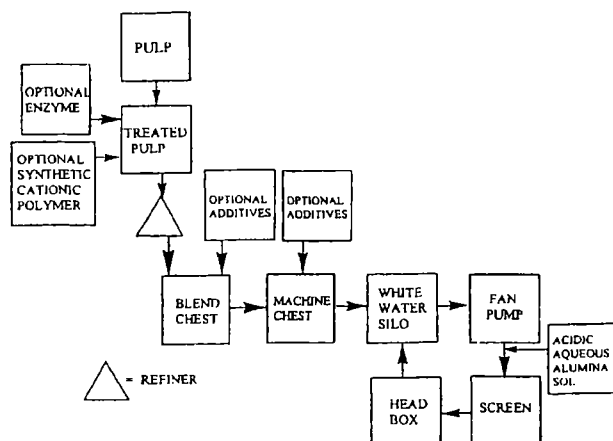
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(54) Title: PAPERMAKING PULP AND FLOCCULANT COMPRISING ACIDIC AQUEOUS ALUMINA SOL



(57) Abstract: Methods of making paper or paperboard are described. According to one of the methods, an acidic aqueous alumina sol is introduced to a papermaking pulp to form a treated pulp having improved retention properties. The acidic aqueous alumina sol preferably has a pH of from about 3 to about 6. The sol preferably contains elongate secondary particles which are elongated from about 50 nm to about 300 nm in only one plane and formed by edge-to-edge coagulation of rectangular plate like primary particles having a length on one side of from about 10 nm to about 30 nm when observed through an electron microscope. The pulp may also be treated with at least one coagulant, at least one flocculant, at least one cationic starch, at least one cellulytic enzyme, at least one biocide, and/or other conventional papermaking pulp additives. The resulting pulp is formed into a sheet of pulp and then drained to form a paper or paperboard. Other papermaking processes are also described as is a papermaking apparatus for carrying out the methods. Paper and paperboard containing dried pulp that has been treated with an acidic aqueous alumina sol are also described. Methods to flocculate particulate materials in a dispersion are also described.



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WO 01/88265 A3