

Drigard & Castr
Abogados

Apartado 3692

Cra. 7 16-56
Bogotá - Colombia S.A.

Tel. Conm. 3802200
Tel./Fax: (57.1) 2827978
(57.1) 3802700

E.Mail:bricas@brigardycastro.com.co

Señores

**SUPERINTENDENCIA DE INDUSTRIA Y
DIVISION DE NUEVAS CREACIONES**

E. S. D.

SUPERINTENDENCIA Y COMERCIO
Radicacion: 02075739 00000004 Folios: 1
Fecha (ORD): 2004-06-10 16:27:52
Tramite: 011 PCT-PROVENT 378 FASE NACI 329 COMPLEMEN
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

REF: Expediente No. 02 075.739 - Solicitud de Patente Entrada en Fase Nacional - Corresp. a la Solicitud Internacional PCT/US01/06385 a favor de **KIMBERLY - CLARK WORLDWIDE, INC.**

Titulada: **MÉTODO PARA AGREGAR UN ADITIVO QUÍMICO ADSORBIBLE A PULPA DURANTE EL PROCESAMIENTO DE PULPA Y PRODUCTOS ELABORADOS MEDIANTE DICHO MÉTODO**

RAMIRO CASTRO DUQUE, vecino de Bogotá, portador de la tarjeta profesional No. 1003, obrando como apoderado de la sociedad **KIMBERLY - CLARK WORLDWIDE, INC.**, según lo acredita el documento de poder protocolizado en esa División bajo el número 17397, me permito **ACLARAR** que de acuerdo con los documentos allegados a la solicitud con nuestro escrito radicado el 10 de Abril de 2003, el Reporte de Examen Preliminar Internacional, la presente solicitud corresponde al Capítulo II del PCT.

De acuerdo con lo anterior, atentamente solicito se continúe el trámite de la presente solicitud teniendo en cuenta esta aclaración y realizando las anotaciones correspondientes.

De la señora jefe atentamente,



RAMIRO CASTRO DUQUE
C.C. No. 170.322 de Bogotá
Código 340
Cra 7 No. 16-56 Piso 9

Bogotá, Junio 10, 2004
CHP/MEV/har.

Drigard & Castro
Abogados

Apartado 3692

Cra. 7 16-56
Bogotá - Colombia S.A.

Tel. Conn. 3802200
Tel./Fax: (57.1) 2827976
(57.1) 3802700

E-Mail: bricas@brigardycastro.com.co

Señores

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISION DE NUEVAS CREACIONES

E. S. D.

103 9/18
Folios: 1
Radicación: 02075739 00000004
Fecha (ADM): 2004-06-10 16:27:52
Trámite: 011 PCT-PATENT 370 FASE NNCI 329 COMPLETEN
Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

REF: Expediente No. 02 075.739 - Solicitud de Patente Entrada en Fase Nacional - Corresp. a la Solicitud Internacional PCT/US01/06385 a favor de **KIMBERLY - CLARK WORLDWIDE, INC.**

Titulada: **MÉTODO PARA AGREGAR UN ADITIVO QUÍMICO ADSORBIBLE A PULPA DURANTE EL PROCESAMIENTO DE PULPA Y PRODUCTOS ELABORADOS MEDIANTE DICHO MÉTODO**

RAMIRO CASTRO DUQUE, vecino de Bogotá, portador de la tarjeta profesional No. 1003, obrando como apoderado de la sociedad **KIMBERLY - CLARK WORLDWIDE, INC.**, según lo acredita el documento de poder protocolizado en esa División bajo el número 17397, me permito **ACLARAR** que de acuerdo con los documentos allegados a la solicitud con nuestro escrito radicado el 10 de Abril de 2003, el Reporte de Examen Preliminar Internacional, la presente solicitud corresponde al Capítulo II del PCT.

De acuerdo con lo anterior, atentamente solicito se continúe el trámite de la presente solicitud teniendo en cuenta esta aclaración y realizando las anotaciones correspondientes.

De la señora jefe atentamente,



RAMIRO CASTRO DUQUE

C.C. No. 170.322 de Bogotá

Código 340

Cra 7 No. 16-56 Piso 9

Bogotá, Junio 10, 2004
CHP/MEV/hsr.

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No. 02-75739

**EL EXTRACTO DE LA PRESENTE SOLICITUD DE PATENTE DE INVENCION-
PCT FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No 536,
DE FECHA 30 DE ENERO DE 2004, EL TERMINO HABIL SEÑALADO POR LA
LEY EXPIRA EL 28 DE ABRIL DE 2004.**

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud calga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____

NO X _____

101 105

**SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISIÓN DE NUEVAS CREACIONES**

2020

Bogotá, D. C., 15 de junio de 2008

Doctor

RAMIRO CASTRO DUQUE

Representante **KIMBERLY –CLARK WORLDWIDE, INC.**

ASUNTO

Radicación No. **02-75739**

Trámite **002**

Evento **001**

Actuación **430**

Oficio

Folios **035**

06727

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica

1) Documentos estudiados:

- a) Para el presente estudio se tendrán en cuenta el capítulo descriptivo, comprendido en los folios 5 a 33 de la solicitud en estudio.
- b) Para el presente estudio se tendrán en cuenta los dibujos comprendidos en los folios 48 a 50 de la solicitud en estudio.
- c) Para el presente estudio se tendrá en cuenta el capítulo reivindicatorio que comprende 56 reivindicaciones en los folios 34 a 47 de la solicitud en estudio.
- d) Conforme lo establece los artículos 9, 10 y 11 de la decisión 486 de la Comisión de la Comunidad Andina, la presente solicitud en estudio fue presentada el 27 de agosto de 2002, y en el momento de la radicación se presentó como solicitud PCT que entra a Fase nacional y Si se reclama prioridad de la primera solicitud presentada en Estados Unidos US09/514740

2) Objeto de la Invención

- a) Las reivindicaciones 1 a 56 de la solicitud en estudio se refieren a
 - i) (1.-) Un método para la preparación de pulpa que comprende: a) crear un precipitado de fibras que comprende agua, fibras de pulpa que nunca se han secado y un aditivo químico adsorbible; b) transportar dicho precipitado de fibras que tiene dicho aditivo químico adsorbible hacia un aparato de formación de sustratos y formar un sustrato fibroso húmedo; y, c) secar dicho sustrato fibroso húmedo hasta una consistencia predeterminada formando así un sustrato fibroso seco que tiene desde entre alrededor de 10 hasta alrededor de 100 por ciento de retención de dicho aditivo químico adsorbible.

- ii) (16.-) Un método para agregar un químico adsorbible a la pulpa...
 - lii) (22.-) Un método para agregar un aditivo químico adsorbible a fibra de pulpa
 - iv) (38.-) Un método para agregar un químico adsorbible a pulpa...
 - v) (52.-) Un método para la preparación de pulpa
 - vi) (53.-) Un método para agregar un aditivo químico adsorbible a fibra de pulpa
 - vii) (54.-) Un método para agregar un aditivo químico adsorbible a fibra de pulpa
 - viii) (55.-) Un método para agregar un aditivo químico adsorbible a fibra de pulpa
 - ix) (56.-) Un método para agregar un aditivo químico adsorbible a fibra de pulpa
- b) Los anteriores procedimientos buscan mejorar la forma de producir papel.
- c) Según la Clasificación Internacional de Patentes, la codificación para esta solicitud corresponde a D 21 C 9/00

3) Claridad de la Solicitud

- a) El artículo 30 de la Decisión 486 de la Comisión de la Comunidad Andina establece que

"Las reivindicaciones definirán la materia que se desea proteger mediante la patente. Deben ser claras y concisas y estar enteramente sustentadas por la descripción. Las reivindicaciones podrán ser independientes o dependientes. Una reivindicación será independiente cuando defina la materia que se desea proteger sin referencia a otra reivindicación anterior. Una reivindicación será dependiente cuando defina la materia que se desea proteger refiriéndose a una reivindicación anterior. Una reivindicación será dependiente cuando defina la materia que se desea proteger refiriéndose a una reivindicación anterior.- Una reivindicación que se refiera a dos o más reivindicaciones anteriores se considerará reivindicación dependiente múltiple."

El capítulo reivindicatorio no es claro toda vez que:

- i) Frases ambiguas tales como 'alrededor de...' son inaceptables en un capítulo reivindicatorio por lo que deberán eliminarse.
- ii) No se precisa la materia sobre la cual se solicita protección. Como se explicará en el punto 4), la presente solicitud no posee unidad de invención, por lo que no está definida la materia sobre la cual se solicita protección.

- iii) La reivindicación 5 hace alusión a un suavizador (suavizante) de las reivindicaciones 1, 2 o 3. En dichas reivindicaciones nunca se menciona tal suavizante.
- iv) El título de la solicitud no se encuentra de acuerdo con lo que el solicitante desea proteger. Nótese como la reivindicación 1 se refiere es a un método de preparación de pulpa. Un "método de agregar un aditivo" es ilógica e incoherente.

De acuerdo a lo anterior, el capítulo reivindicatorio no cumple con el requisito de claridad de acuerdo a lo establecido en el Art. 30 de la Decisión 486.

4) Evaluación de la Unidad de Invención

El artículo 25 de la Decisión 486 de la Comisión de la Comunidad Andina establece

"La solicitud de patente sólo podrá comprender una invención o un grupo de invenciones relacionadas entre sí, de manera que conformen un único concepto inventivo"

La presente solicitud carece de unidad de invención toda vez que configura por lo menos nueve diferentes objetos. Aunque se dirigen a métodos de preparación de pulpa la definición de la materia que caracteriza a cada una de las reivindicaciones independientes es muy diferente entre sí. Esto permite afirmar que no se trata del mismo proceso. Todo el problema radica en configurar varias reivindicaciones independientes con materia diferente. El solicitante debe establecer una sola reivindicación independiente dirigida al proceso en la forma más simple de la solicitud de invención. Partiendo de allí establecer reivindicaciones dependientes que amplíen esa forma más simple hasta su forma más compleja.

De acuerdo a lo anterior, la presente solicitud no cumple con el requisito de unidad de invención de acuerdo al Art. 25 de la Decisión 486. De continuar con el impedimento, esta oficina procederá a estudiar solo el primer grupo de invenciones que conformen un único concepto inventivo.

5) Determinación del Estado de la Técnica

El artículo 16 de la Decisión 486 de la Comisión establece:

"El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización, comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida."

"Sólo para el efecto de la determinación de la novedad, también se considerará dentro del estado de la técnica, el contenido de una solicitud de patente en trámite ante la oficina nacional competente cuya fecha de presentación o de prioridad fuese anterior a la fecha de presentación o de prioridad de la solicitud de patente que se estuviese examinando, siempre que dicho contenido este incluido en la solicitud de fecha anterior cuando ella se publique o hubiese transcurrido el plazo previsto en el artículo 40."

Consultadas las bases de datos y los archivos con que cuenta la entidad, especialmente bajo las clasificaciones D 21 C 9/00 y las más cercanas a ellas, se encontró que antes del 28 de febrero de 2000 (fecha para determinar el estado de la técnica) habían sido publicados los documentos que se enumeran en la siguiente tabla los cuales se relacionan con producción de pulpa. De acuerdo con lo establecido en el artículo 16 se determinó el estado de la técnica y se encontró el siguiente antecedente:

Nº	Documento	Título	Fecha de Publicación
D1	EP 0 335 576	Pulp dewatering process	1989.10.04
D2	WO 9934057	Paper products and methods for applying chemical additives to cellulosic fibres	1999.07.08
D3	GB 1 407 134	Quaternary imidazoline derivatives and their use as surface active compounds for pulp slurry	1975.09.24
D4	JP 07189170	Softener for paper	1995.07.25
D5	JP 07189171	Softener for paper	1995.07.25
D6	EP 0 109 282	Paper and method for making it	1984.05.23
D7	EP 0 226 408	Methods for manufacture of paper products	1987.06.24
D8	EP 0 813 979	Soft layered tissues and method for making same	1994.02.17
D9	EP 0 843 184	Papermaking process and apparatus for use therewith	1995.03.15
D10	EP 0 772 716	Soft tissue paper from coarse cellulose fibers	1997.05.14
D11	EP 0 851 082	Absorbent paper and method for its manufacture	1998.07.01

6) Evaluación de los requisitos de patentabilidad

En cumplimiento con el artículo 14 de la Decisión 486 de la Comisión de la Comunidad Andina, se procedió a evaluar los requisitos de novedad, nivel inventivo y aplicación industrial con el fin de establecer la patentabilidad de la invención reivindicada en la solicitud en estudio.

a) Evaluación de la novedad y el del Nivel Inventivo

El art. 16 de la Decisión 486 de la Comisión de la Comunidad Andina establece:

"Una invención se considerará nueva cuando no está comprendida en el estado de la técnica." "El estado de la técnica comprenderá todo lo que haya sido accesible al público por una descripción escrita u oral, utilización comercialización o cualquier otro medio antes de la fecha de presentación de la solicitud de patente o, en su caso, de la prioridad reconocida."

El art. 18 de la Decisión 486 de la Comisión de la Comunidad Andina establece:

"Se considerará que una invención tiene nivel inventivo, si para una persona del oficio normalmente versada en el arte en la materia técnica correspondiente, esa invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica".

De acuerdo a lo observado, los documentos enumerados relacionan métodos para fabricar papel que contemplan un precipitado de fibras que comprende agua, fibras de pulpa y un aditivo químico que podría ser adsorbible; transportar dicho producto de fibras hacia un aparato de formación de sustratos y formar un sustrato fibroso húmedo; y, secar dicho sustrato fibroso húmedo hasta una consistencia predeterminada. En general lo revelado por el solicitante se encuentra o deriva fácilmente de la técnica usual.

111 p9

b) Resumen

En conclusión los requisitos de patentabilidad de la presente solicitud se podrían ver afectados así:

Nº	Documento	Reivindicaciones afectadas	Requisito que afecta
D1	EP 0 335 576	1 - 56	Novedad
			Nivel inventivo
D2	WO 9934057	1 - 56	Novedad
			Nivel inventivo
D3	GB 1 407 134	1 - 56	Novedad
			Nivel inventivo
D4	JP 07189170	1 - 56	Novedad
			Nivel inventivo
D5	JP 07189171	1 - 56	Novedad
			Nivel inventivo
D6	EP 0 109 282	1 - 56	Novedad
			Nivel inventivo
D7	EP 0 226 408	1 - 56	Novedad
			Nivel inventivo
D8	EP 0 613 979	1 - 56	Novedad
			Nivel inventivo
D9	EP 0 643 164	1 - 56	Novedad
			Nivel inventivo
D10	EP 0 772 716	1 - 56	Novedad
			Nivel inventivo
D11	EP 0 851 062	1 - 56	Novedad
			Nivel inventivo

7) Notificación

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que dentro del término de sesenta días contados a partir de la fecha de la notificación de la presente comunicación debe responder a la notificación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto por el numeral 5.2, literal e) del capítulo quinto del título primero de la Circular Única N° 10 de 2001


ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe División de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en la lista, de fecha

23 JUN. 2006

Concepto Técnico N°	EXAMINADOR TÉCNICO Código No.	EXAMINADOR JURÍDICO Código No.
965	202003	

EUROPEAN PATENT APPLICATION

Application number: 8520942.1

Int. Cl.⁴ D21C 9/18

Date of filing: 22.03.85

Priority: NL83.09 05 00744G Date of publication of application: 04.10.86/Revelation 8540 Designated Contracting States: AT BE CH DE ES FR GB IT LI NL SE	Applicant: ALLIED COLLOIDS LIMITED P.O. Box 90 Low Moor Bradford West Yorkshire, BD12 6JZ(GB) Inventor: Reed, Robert "Fountain" 81 Barn View Road Rotham (Huddersfield West Yorkshire)(GB) Representative: Lawrence, Peter Robin through the aid of GILL, GYMOND & BERRY 25-26 Chancery Lane London WC2A 1PL(GB)
--	---

Poly dewatering process.

Dry market pulp is made by dewatering a cellulosic suspension and dewatering it through a screen to form a pulp sheet which is then dried, and the productivity of the process is improved by adding a water soluble cellulosic polymer before the dewatering and treatment or other suitable longrange material after the dewatering.

Poly Dewatering Process

Paper or paper board is made by forming an aqueous cellulosic suspension (usually known as a fibre stock, dewatering the suspension to form a sheet, and drying the sheet. The dewatering and drying stages are designed such that the sheet has the desired properties for the final paper or paper board and as generally involves dewatering or other surface treatment to impart adequate smoothness and other performance properties to the sheet.

In order to optimise the process, it has for many years been standard practice to add various chemical additives to the suspension, and cellulosic polymers have been widely used for this purpose. Originally they were always natural or modified natural polymers, such as carboxylic starch, but synthetic cellulosic polymers have been widely used for many years. Their purpose is to act as retention aids under no dewatering aids and the polymer to enhance bonding regard to the finished product. A retention aid serves to retain fine fibres and fine filler particles in the sheet. A dewatering aid serves to increase the rate of drainage or to increase the rate of drying after drainage. These purposes can be mutually conflicting and as a large amount of effort has, in recent years, been put into ways of optimising drainage and dewatering.

The need to improve the quality of the final paper to avoid loss of fibre or filler fines (or because for environmental pollution reasons) and to optimise dewatering means that substantially every significant paper making process has, for many years, been equipped with one or more retention and dewatering aids.

The research has ways for improving these properties has led to the use of different materials in the same process, including the use of suspended addition of different materials. One such process is described in U.S. 4,388,130 and has been commercialised under the trade name Compaol (trade mark), and involves the addition of cellulosic starch followed by cellulosic acidic aids.

A particularly successful process has been commercialised under the trade name Hydrazol (trade mark) and is described in EP 838882. It involves the addition of a synthetic cellulosic polymer followed by dewatering of the suspension, followed by the addition of formic acid. It is of particular value in the production of the process.

The aqueous cellulosic suspensions that are used as the dewatering material in all these processes, and to which various retention aids and dewatering aids are then added, are in all instances made by pulping a fibrous cellulosic material, generally wood. The pulping involves comminution and suspension of the resultant fibres in water and it is generally necessary to wash and filter the pulp several times. The filtering is normally effected by drainage through a screen.

Screen action plate consist of elongated rolls that serve both as pulp and paper rolls, i.e., wood or other fibrous material is converted to a pulp which is subjected to various washing and filtering stages and is finally dewatered to a thick stock that is then dewatered to form the paper or paper board. In elongated rolls of this type, it is unnecessary to dry the pulp at any stage, since it has to be resuspended in water at the same mill. Accordingly the main objective is to ensure that the drainage occurs quickly during each washing and filtering stage, to provide adequate drainage rates without the addition of any drainage aid and to normally no addition of cellulosic polymers is made at the pulp end of an integrated mill, although retention and supplementary addition of cellulosic polymers are made at the paper end of the mill.

The more traditional method of making paper and board (and which is still used on a large scale worldwide) involves suspension of the pulp-making and paper-making facilities. Thus wood or other fibrous cellulosic material is converted in a pulp mill to a dry product generally known as "dry market pulp". This dry pulp is then used as the feedstock at a paper mill to make the aqueous cellulosic suspension that is dewatered to make the paper or paper board. For instance the dry pulp may first be dispersed in water to form a thick stock which is then dewatered to form a thin stock.

The pulping stages in the pulp mill can be generally similar to the pulping stages in an integrated mill but at the end of the washing stages it is customary to dewater the pulp and then thermally dry it. This dewatering is normally conducted on a machine known as a "top pulp machine".

It has, of course, been known for many years that the drainage in this and the preceding stages could possibly be enhanced by the addition of a drainage aid but, despite the addition of sophisticated dewatering and retention systems to paper mills, it has not been found useful to add any such systems to pulp mills. One reason is that drainage aids may tend to reduce retention and hence drainage is relatively fast in any event the disadvantage of reducing retention outweighs the advantage of accelerating drainage.

Conversely a retention aid is generally unnecessary since retention is satisfactory under normal drainage conditions. A further disadvantage of drainage aids is that they tend to increase the amount of treatment drying that is required. Thus they accelerate the drainage but they result in the wet sheet containing a larger amount of trapped water and an additional thermal drying is required.

- The present state of the art therefore is that there is widespread use of cationic synthetic polymers (alone or with other materials) in the paper making stages but there is substantially no use of cationic polymers in the pulp making stages because the application to that pulp stage of the paper making chemical technology is not cost effective and may even worsen, rather than improve, the pulp making process.
- Nevertheless it would, of course, be desirable to increase the rate of pulp production and, in particular to increase the rate of production of dry market pulp and/or to reduce the amount of thermal energy that is required before drying it.
- Despite the circumstances for many years of additive-free pulp making processes and of additive-including paper making processes, and despite all the state-of-the-art that went unpaid, including additives in a pulp making process, we have now found that one particular set of additives do give a considerable and beneficial improvement in the production of dry market pulp.
- In a pulp making process according to the invention, those cationic material is added to form an aqueous suspension of cationic material, the suspension is subjected to one or more shear stages, the sheared suspension is drained through a screen to form a pulp sheet and the pulp sheet is dried to form a dry market pulp, and a water soluble polymer is added to the suspension before the shear stage or before one of the shear stages and an inorganic material is added to the suspension after the shear stage. The polymer is one that promotes drainage of the suspension through the screen and is selected from cationic starch and substantially those synthetic cationic polymers. The inorganic material is selected from colloidal silicic acid and bentonite.
- The polymer can be cationic starch, as described in U.S. 4,383,193.
- Preferably, however, the polymer is a substantially linear synthetic cationic polymer. It should have a molecular weight of above 100,000, preferably above about 1 million and often above about 5 million for viscosity in the range 10 to 50 million or more.
- The polymer may be a polymer of one or more ethylenically unsaturated monomers, generally acrylic monomers, that contain at or include cationic monomer
- Subable cationic monomers are diallyl (orally allyl)acrylates or -acrylamides, other as acid salts or preferably, quaternary ammonium salts. The allyl groups may each contain one or two carbon atoms and the substituent groups may include one or eight carbon atoms. Particularly preferred are diallyldimethylammonium (orally allyldimethylammonium) acrylates and diallyl (orally allyl)vinyl-1,2-propyl (orally allyl)acrylates. These cationic monomers are preferably copolymerized with a non-ionic monomer preferably acrylonitrile. Other suitable cationic polymers are polyethylene imines, polyethylene glycidylmethacrylates, polyamines, polyacrylamides, polyvinylpyrrolidone polymers and homopolymers or copolymers, generally with acrylonitrile, of monomers such as diallyl dimethyl ammonium chloride.
- The preferred polymers have an intrinsic viscosity above 4 dl/g. Intrinsic viscosity limits are derived in standard manner from determination of solution viscosity by suspended level viscometer at solutions of 20 g in 1 liter NaCl buffered to pH about 7 using sodium phosphate.
- The polymer should be linear relative to the globular structure of cationic starch. It can be wholly linear or it can be slightly cross linked, as described in EP 333710. For instance it can be a branched product such as the polyethylene imine that is sold under the trade name Polystyrene 50.
- In general, the molecular weight and chemical type of the polymer should be selected such that the polymer will promote drainage of the suspension through the screen. In general this means that the polymer is one that would be suitable for use as a retention or drainage aid in the production of paper.
- The cationic polymer preferably has a relatively high charge density, for instance above 0.2, preferably at least 0.35, most preferably 0.4 to 0.8 or more, equivalents of cationic charges per kilogram of polymer.
- The inorganic material may be colloidal silicic acid that may be modified silicic acid as described in WO/88/00001, or may be other inorganic particulate material such as bentonite. Preferably the inorganic material has an extremely small particle size and thus should be of pigment size and preferably it is available in water.
- When the polymer is cationic starch, the use of colloidal silicic acid is often preferred. When the polymer is synthetic, the preferred materials are bentonites, that is to say bentonite-type clays such as the natural swelling clays known as sepiolites, attapulgites and, more preferably, smectonites. Suitable commercialities include Wyoming bentonite and Fullett Earth. The clays may or may not be chemically modified, e.g., by acid treatment to convert calcium bentonite to acid sodium bentonite.
- In general, the polymers and the bentonites should preferably be as described in EP 333685.
- It is important to add the bentonite or other effluent or other inorganic material after shearing, and to add the polymer before shearing. The pulp making process includes one or more shear stages, for instance shearing, mixing and pumping stages such as are typified by centrifuges, vortex chambers, fan pumps and

- mixing pumps. The polymer must be added before one of these and the bentonite or other inorganic material at a later stage. Generally the bentonite is added after the last shear stage and the polymer at some earlier stage, for instance just before the last shear stage. Thus the polymer may be added as the aqueous pulp leaves the particulate shear stage or approximately the final shear stage (for instance a centrifuge or fan pump) and the bentonite or other inorganic material may be added substantially at the head box for the drainage screen. Thus the bentonite may be added at the head box, or just prior to the head box, of the top pulp machine, accompanied by sufficient mixing to mix the bentonite throughout the pulp, generally without applying significant shear at this stage.
- The treatment prior to the top pulp machine can have two beneficial effects. First, it can increase the rate of drainage, second, and most important, the drained sheet can be easier to dry than when cationic polymer alone is used. As a result the pulp sheet can be passed through the driers more quickly (or a thicker sheet can be passed at the same rate) and thus it is possible to increase the production of the pulp mill and/or reduce the amount of thermal drying that is required, while producing a dry market pulp having suitable properties for normal paper making process. This pulp is in the form of solids, non-extruded, and sheet typically having a dry weight of 100 to 1000 g/m².
- The amount of polymer that has to be added will depend upon the nature of the pulp. It will normally be at least 0.0001% and usually is at least 0.01 or 0.02%. Although amounts above 0.1% are usually unnecessary larger amounts can be used typically 0.2% 0.3% or even up to, for instance, 0.5%. Preferred amounts are in the range 0.02 to 0.1% (200 to 1000 grams polymer per ton dry weight pulp).
- The amount of inorganic material will be selected according to the nature of the pulp and the amount and type of polymer and the type of inorganic material. Suitable amounts, especially when the inorganic material is bentonite, are generally above 0.02% and usually above 0.1%, but amounts above 0.5% are generally unnecessary. The preferred process runs from 1000 to 2000g bentonite per ton dry weight of pulp.
- The aqueous pulp in which the polymer is added will have been made by conventional methods from the wood or other feedstock. Defoliated waste may be used to provide some of it. For instance the waste may be defoliated and then subjected to grinding, chipping or hand pulping techniques, for instance to make a mechanical pulp, a thermomechanical pulp or a chemical pulp. The pulp may have been washed and drained and finished with water or other aqueous wash liquor prior to reaching the final drainage stage on the top pulp machine. The dry market pulp is generally free or substantially free of this, but it can be included if desired.
- After drainage through the screen of the top pulp machine, the resultant wet sheet is then subjected to drying in conventional manner for instance through a tunnel drier or over drying cylinders or both.
- By the invention it is possible easily to increase the production rate of dry market pulp, of course at other constant, by 10 to 20% or even up to 50% or more.
- The following are some examples.

Example 1

- A pulp mill is operated in conventional manner to produce chest-throne mechanical pulp by conventional techniques involving in pumping the pulp through a pump to the head box of a top pulp machine, the pulp then being drained through the screen of this machine and taken off the screen and directly dried to form the dry market pulp. When no polymeric or bentonite additives are included and the head box consistency is 1.45%, the mill operates at a speed of 51.1 metres per minute to produce 7.3 tonnes per hour of dried sheet weighing 580g/m² and having a dryness after the third press of 43.8%. The sheet demand is 0.6 tonnes per hour.
- In a process according to the invention, 700 grams per ton of a copolymer of 70% by weight acrylonitrile 30% by weight diethylmethacryl acrylate methyl chloride quaternary salt, intrinsic viscosity 10dl/g, is added just before the pump and 50g/m² bentonite is added at the head box. The consistency on the head box is 1.35%. The machine runs at a speed of 52.7 metres per minute and produces 8.1 tonnes per hour of dry market pulp at 670g/m² and having a dryness after the third press of 49%. The sheet demand is 0.6 tonnes per hour. Thus the process of the invention gives an improvement in production of about 20% whilst reducing sheet demand (per ton of pulp) and increasing dryness.
- When the process is repeated using half the amount of polymer the increased production is less, but is still more than 10% above the process in the absence of polymer and bentonite.

1/3

Example 2

To demonstrate the effect of varying the proportions of polymer and benzoin, a pulp of known fibre having a tensile value of 400 has a specified amount of polymer added to it, the mixture is subjected to high shear using for about one minute, benzoin is added and a standard volume of the pulp is subjected to a standard drainage reduction on a drainage tube using a standard siphone vice. The time is recorded in seconds. The value should be low.

The process is conducted using pulp A, which is a paraffin bleached chest-thruve mechanical pulp and pulp B, which is a bleached sulphite pulp. The process is conducted with polymer C which is a copolymer having tensile strength less than 8 in 100% of 70% by weight styrene and 30% by weight dimethylacrylamide/ acrylate copolymer with methyl methacrylate, and with polymer D which is formed from the same monomers in a weight ratio 70/30 and has tensile strength 8 to 15.

The results are shown in the following table in which the amount of polymer and benzoin that is added is given in light dry weight of pulp and the draining time is measured in seconds.

Pulp	Polymer	Benzoin	Draining Time
A	0	0	91
A	1C	2	45
A	1.5C	2	26
A	3C	2	18
A	3C	2	16
A	3C	0	45
A	3C	1	30
A	3C	1.5	18
A	3C	2.5	18
B	0	0	39
B	0.2D	2	29
B	0.3D	2	14
B	1.0D	2	14
B	1.0D	2	14
B	0.03	0.5	20
B	0.03	1	16
B	0.03	1.5	18
B	0.03	2.5	17

The benefit of the sequential addition of polymer and benzoin, relative to a process in which no addition is made or polymer only is made, is clearly apparent from this table.

Claims

1. A pulp-making process in which fibrous cellulosic material is pulped to form an aqueous suspension of cellulosic material, the suspension is subjected to one or more shear stages, the sheared suspension is drained through a screen to form a pulp sheet and the pulp sheet is dried to form a dry material pulp, characterized in that a water soluble polymer is added to the suspension before the shear stage or before one of the shear stages and an inorganic material is added to the suspension after the shear stage, and in which the polymer promotes drainage of the suspension through the screen and is selected from cellulosic starch and substantially linear synthetic cellulosic polymers, and the inorganic material is selected from colloidal silica and bentonite.
2. A process according to claim 1 in which the polymer is a cellulosic substantially linear synthetic polymer having a molecular weight of 200000.
3. A process according to claim 2 in which the polymer is selected from polyethylene imine, polyethylene glycolmethacrylate products, polyurethanes, polyvinylpyrrolidone formaldehyde polymers, polymers of diallyl dimethyl ammonium chloride and polymers of acrylic monomers comprising a cellulosic acrylic monomer.

4. A process according to claim 2 in which the polymer is a synthetic polymer having tensile strength above 400 and formed from acrylic monomers comprising diallylamine/acryloyl (male) -acrylate or acrylamide, as add or copolymer add.
5. A process according to any preceding claim in which the inorganic material is bentonite.
6. A process according to any preceding claim in which the one or more shear stages are selected from shearing, mixing and pumping stages comprising a continuous, a vortex cleaner, a line pump or a mixing pump.
7. A process according to any preceding claim in which the inorganic material is added to the suspension substantially immediately before the drainage through the screen.
8. A process according to any preceding claim in which the polymer is added to the suspension and is subjected to shearing, the sheared suspension is fed to the head box of a top pulp machine having a drainage screen, the inorganic material is added substantially at the head box, and the suspension is drained through the said screen to form the pulp sheet.
9. A process according to any preceding claim in which the polymer is added in an amount of from 0.01 to 0.5% and the inorganic material is added in an amount of from 0.05 to 0.5%, based on the dry weight of suspension.
10. A pulp-making process in which fibrous cellulosic material is pulped to form an aqueous suspension of cellulosic material, the suspension is subjected to one or more shear stages, selected from shearing, mixing and pumping stages comprising a continuous, a vortex cleaner, a line pump or a mixing pump and the sheared suspension is fed to the head box of a top pulp machine having a drainage screen, and the suspension is drained through the screen to form a pulp sheet and the sheet is dried to form dry material pulp, and in which 0.01 to 0.5% (dry weight) of a water soluble cellulosic polymer is added to the suspension before the first shear stage, said polymer being selected from polyethylene imine, polyethylene glycolmethacrylate products, polyurethanes, polyvinylpyrrolidone formaldehyde polymers, polymers of diallyl dimethyl ammonium chloride and polymers of acrylic monomers comprising a cellulosic acrylic monomer and 0.05 to 0.5% (dry weight) of bentonite is added to the suspension substantially at the head box.

PAPER PRODUCTS AND METHODS FOR APPLYING
CHEMICAL ADDITIVES TO CELLULOSIC FIBERS

Background of the Invention

The present invention relates generally to paper products. More particularly the invention concerns methods for applying chemical additives to cellulosic fibers and the paper products that can be obtained by the methods.

In the manufacture of paper products, it is often desirable to enhance physical and/or optical properties by the addition of chemical additives. Examples of properties that are developed or enhanced through the addition of chemical additives include but are not limited to dry strength, wet strength, cohesion, absorbency, opacity, brightness and color. During the papermaking process, chemical additives are commonly added to fiber slurries in the wet end, before the fibers are formed into a web, dewatered and dried. Traditionally wet end additives are added to a fiber slurry that is between 0.5 and 5 percent consistency. The slurry may then be further diluted in the papermaking process before a final dilution at the fan pump to the ultimate running consistency.

Wet end chemical addition has several advantages over typical spray drying or slush press chemical addition methods. For instance, wet end chemical addition provides a uniform distribution of chemical additives on the fiber surfaces. Additionally wet end chemical addition allows a selected fiber fraction to be treated with a specific chemical additive in order to enhance the performance of the paper and/or the effectiveness of the chemical additive. Further, wet end chemical addition enables multiple chemicals to be added to a fiber slurry either simultaneously or sequentially prior to formation of the paper web.

One difficulty associated with wet end chemical addition is that the water soluble or water dispersible chemical additives are suspended in water and are not completely adsorbed onto the cellulosic fibers. To improve adsorption of wet end additives, chemical additives are often modified with functional groups to impart an electrical charge when in water. The electrostatic attraction between charged additives and the electrically charged fiber surfaces aids in the deposition and retention of chemical additives onto the fibers. Nevertheless, the amount of chemical additive that can be retained in the wet end generally follows an adsorption curve exhibiting diminishing effectiveness, similar to that described by Langmuir. As a result, the adsorption of wet end soluble or water dispersible chemical additives may be significantly less than 100 percent, particularly when trying to achieve high chemical additive loading levels.

Consequently at any chemical addition level, and particularly at high addition levels, only a fraction of the chemical additive is retained on the fiber surface. The remaining fraction of the chemical additive remains dissolved or dispersed in the suspending water phase. These unadsorbed chemical additives can cause a number of problems in the papermaking process. The exact nature of the chemical additive will determine the specific problems that may arise, but a partial list of problems that may result from unadsorbed chemical additives includes: foam, deposits, contamination of other fiber streams, poor fiber retention on the machine, compromised chemical layer purity in multilayer products, dissolved solids build-up in the water system, interactions with other process chemicals, felt or fabric plugging, excessive adsorption or release on dryer surfaces, physical property variability in the finished product, and the like.

Therefore, what is lacking and needed in the art is a method for applying adsorbable chemical additives onto cellulosic fiber surfaces in the wet end of the papermaking process such that the amount of unadsorbed chemical additives in the process water is reduced or eliminated. The method minimizes the associated manufacturing and finished product quality problems that would otherwise occur.

Summary of the Invention

It has now been discovered that chemical additives can be adsorbed onto cellulosic papermaking fibers at high levels with a minimal amount of unadsorbed chemical additives present in the papermaking process water. This is accomplished by treating a fiber slurry with an excess of the chemical additive, allowing sufficient residence time for adsorption to occur, filtering the slurry to remove unadsorbed chemical additives, and redispersing the filtered pulp with fresh water. Because the filtrate from the filtering process contains unadsorbed chemical additive, it is not sent forward in the process with the chemically treated fibers. Rather, the filtrate may be sent to the sewer or reused in a processing step prior to the filtering step.

Hence in one aspect, the invention resides in a method for applying chemical additives to cellulosic fibers. The method comprises the steps of: creating a fiber slurry comprising water, cellulosic fibers, and an adsorbable chemical additive; dewatering the fiber slurry to remove unadsorbed chemical additive; and redispersing the fibers with fresh water. This method for processing cellulosic papermaking fibers enables chemical additives to be adsorbed by fibers while at the same time maintaining significantly lower levels of unadsorbed chemical additive in the water phase compared to traditional wet end chemical addition. Thus, higher concentrations of the chemical additive on the fiber

relative to the process water can be achieved as compared to what has been possible with prior methods.

For purposes of the present invention, the term "cellulosic" refers to papermaking fibers comprising an amorphous carbohydrate polymer in contrast to synthetic fibers.

5 The term "adsorbable" is used herein to refer to a chemical additive that can be adsorbed by the surface of a cellulosic fiber in the absence of any chemical reaction involving the chemical additive and the cellulosic fiber. The term "undesorbed" refers to any portion of the chemical additive that is not adsorbed by the fiber and thus remains suspended in the process water. The term "fresh water" is used herein to refer to water
10 that is substantially free of the undesorbed chemical additive. Most desirably, the fresh water is completely free of the chemical additive.

The fiber slurry is desirably deaerated to increase the consistency of the fiber slurry to about 20 percent or greater and particularly to about 30 percent or greater in order to remove the majority of the water containing the undesorbed chemical additive.

15 The fibers are thereafter redispersed, desirably to decrease the consistency of the fiber slurry to a level suitable for papermaking, to about 20 percent or less, and more particularly to about 5 percent or less, such as about 3 to about 6 percent.

The present method allows for the production of fiber furnish that are useful for making paper products, and particularly layered paper products. Thus, another aspect of the invention resides in a fiber furnish that has a higher chemical additive loading than could otherwise be achieved in combination with the relatively low level of undesorbed chemical additive in the water. This is because chemical additive loading via traditional wet end addition is often limited by the level of undesorbed chemical and its associated processing difficulties such as foam, deposits, chemical interactions, felt plugging,
20 excessive dryer adhesion or release or a variety of paper physical property control issues caused by the presence of undesorbed chemical in the water.

In one embodiment, a fiber furnish of the present invention comprises water cellulosic fibers, and an adsorbable chemical additive. The amount of chemical additive adsorbed onto the fibers is about 2 kilograms per metric ton or greater and the amount
30 of undesorbed chemical additive in the water is between 0 and about 20 percent of the amount of chemical additive adsorbed onto the fibers. In particularly desirable embodiments, the amount of adsorbed chemical additive is about 3 kilograms ton or greater, particularly about 4 kilograms ton or greater and more particularly about 5 kilograms ton or greater. Moreover, the amount of undesorbed chemical additive in the water is between 0 and about 15 percent, particularly between 0 and about 10 percent,
35

and more particularly between 6 and about 7 percent, of the amount of adsorbed chemical additive.

Another aspect of the invention resides in a method for making chemically treated paper products. The method comprises the steps of: creating a first fiber slurry
5 comprising water cellulosic fibers, and an adsorbable chemical additive; creating a second fiber slurry that is substantially free of the adsorbable chemical additive; dewatering the first fiber slurry to remove undesorbed chemical additive; redispersing the fibers in the first fiber slurry with fresh water and forming a paper product using a layered headbox, the first fiber slurry supplied to a first headbox layer and the second fiber slurry
10 supplied to a second headbox layer.

In another embodiment, a method for making a paper product comprises the steps of: creating a fiber slurry comprising water cellulosic fibers and a first adsorbable chemical additive; dewatering the fiber slurry to a consistency of about 20 percent or greater; passing the dewatered fiber slurry through a dispenser to mechanically work the fibers; diluting the fiber slurry with fresh water that is substantially free of the first chemical additive to a consistency of about 5 percent or less, adding a second adsorbable chemical additive comprising a debonding agent or a softening agent to the fiber slurry; dewatering the fiber slurry to a consistency of about 20 percent or greater; diluting the fiber slurry with fresh water that is substantially free of the second chemical
15 additive to a consistency of about 5 percent or less; and forming a paper product from the fiber slurry. The first chemical additive may comprise, for example, a bonding agent to decrease the amount of lint from the product.

The present invention is particularly useful for adding chemical additives such as softening agents and debonding agents to the outer layer furnish in a three layer paper
20 product. In particular tissue products, for example, the center layer is adapted to provide strength development and control. The present invention allows the softening agents and debonding agents to be applied to the outer layers while minimizing contamination of the center strength layer.

Hence, another aspect of the invention resides in paper products formed from
30 fibers that have been chemically treated to minimize the amount of residual, undesorbed chemical additives in the process water. These paper products exhibit high chemical "purity" on the fiber fraction that has been treated using the present method and offer the ability to achieve excellent chemical layer purity when using a stratified headbox and/or the ability to achieve fiber specific chemical treatment in papers made from blends of two
35 or more fiber types. The term "paper" is used herein to broadly include writing, printing,

wrapping, sanitary, and industrial papers, newspaper, linerboard, tissue, napkins, napkins, towels, or the like.

The chemical additives that can be used in conjunction with the present invention include: dry strength aids, wet strength aids, softening agents, debonding agents, absorbency aids, sizing agents, dyes, optical brighteners, chemical bleaches, opacifiers, 5 dryer additive chemicals, and the like. Additional forms of chemical additives may include: pigments, emulsifiers, humectants, waxes, bactericides, buffers, soaps, fluoropolymers, color control materials and dyes, surfactants, perfumes, deodorants, vegetable and mineral oils, humectants, sizing agents, superabsorbents, surfactants, mold inhibitors, UV blockers, antibiotic agents, lotions, fragrances, preservatives, also-very extract, vitamin E, or the like. Suitable chemical additives are absorbable by the cellulosic papermaking fibers and are water soluble or water dispersible.

The term "softening agent" refers to any chemical additive that can be incorporated into paper products such as tissue to provide improved tactile feel. These 15 chemicals can also act as debonding agents or can act solely to improve the surface characteristics of tissue, such as by reducing the coefficient of friction between the tissue surface and the hand.

The term "debonding agent" refers to any chemical that can be incorporated into paper products such as tissue to prevent or disrupt interfiber or intrafiber hydrogen 20 bonding. Depending on the nature of the chemical, debonding agents may also act as softening agents. In contrast, the term "bonding agent" refers to any chemical that can be incorporated into tissue to increase or enhance the level of interfiber or intrafiber bonding in the sheet. The increased bonding can be either ionic, hydrogen or covalent in nature.

The term "water soluble" refers to solids or liquids that will form a solution in 25 water and the term "water dispersible" refers to solids or liquids of colloidal size or larger that can be dispersed into an aqueous medium.

The method for applying chemical additives to papermaking fibers may be used in a wide variety of papermaking operations, including wet pressing and creped or uncreped throughdrying operations. By way of illustration, various tissue making processes are 30 disclosed in U.S. Patent 5,887,836 issued September 16, 1997 to B. A. Engel et al. and U.S. Patent 5,887,961 issued March 4, 1997 to T. E. Farrington, Jr. et al. which are incorporated herein by reference.

The method may also be used in alternative processes, including: chemically pre-treating pulp in a pulp mill before a dry lap machine or crush beler adding chemical 35 additives in sequence to reduce interactions; removing chemical additives from a fiber

slurry (incubating acidic components, sizing or soft ring formulations) after a chemical additive has been added to facilitate the removal process; or the like.

Many fiber types may be used for the present invention including hardwood or softwood, straw, flax, millwired wood from flax, abaca, hemp, kenaf, bagasse, cotton, 5 reed, and the like. All known papermaking fibers may be used, including bleached and unbleached fibers, fibers of natural origin (including wood fiber and other cellulosic fibers, cellulose derivatives, and chemically altered or crosslinked fibers), some component portion of synthetic fibers (synthetic papermaking fibers include certain forms of fibers made from polypropylene, acrylic, aramide, acetate, and the like) virgin and recovered or recycled fibers, hardwood and softwood, and fibers that have been mechanically pulped (e.g., groundwood), chemically pulped (including but not limited to the kraft and sulfate pulping processes), thermomechanically pulped, chemithermomechanically pulped, and the like. Mixtures of any subset of the above mentioned or related fiber 10 classes may be used. The fibers can be prepared in a multiplicity of ways known to be advantageous in the art. Useful methods of preparing fibers include dispersion to impart cut and improved drying properties, such as disclosed in U.S. Patents 5,348,820 issued September 20, 1994 and 5,501,788 issued March 26, 1998, both to M. A. Hammers et al. and U.S. Patent 5,888,132 issued August 12, 1997 to Farrington, Jr. et al.

A single headbox or a plurality of headboxes may be used. The headbox or 20 headboxes may be modified to permit production of a multilayered structure from a single headbox jet in the formation of a web. In particular embodiments, the web is produced with a stratified or layered headbox to preferentially deposit shorter fibers on one side of the web for improved softness, with relatively longer fibers on the other side of the web or in an interior layer of a web having three or more layers. The web is desirably formed on an endless loop of continuous forming fabric which permits drainage of the liquid and partial dewatering of the web. Multiple embryonic webs from multiple headboxes may be 25 coaxed or mechanically or chemically joined in the moist state to create a single web having multiple layers.

Numerous features and advantages of the present invention will appear from the following description. In the description, reference is made to the accompanying drawings which illustrate preferred embodiments of the invention. Such embodiments do not represent the full scope of the invention. Reference should therefore be made to the claims herein for interpreting the full scope of the invention.

116

After a sufficient residence time, the fiber slurry is transferred through suitable conduits 27 and a pump 28 to a belt press 34 or other suitable dewatering device. Undissolved chemical additives in the water are removed with the press filtrate 32 during the pressing operation and stored in the first dilution water chest 44. The contents of the first dilution water chest may be used as either paper make-up water or dilution water or may be discarded. The dewatering device 34 suitably increases the fiber consistency of the slurry to about 20 percent or greater and particularly about 30 percent or greater.

The thickened fiber slurry 30 is then transported through suitable conduits 34 to the disperser 46 for mechanical treatment of the fibers. Dispersers suitable for use in the present method are disclosed in U.S. Patents 5,348,820 issued September 20, 1994 and 5,501,768 issued March 28, 1996, both to M. A. Hermans et al., which are incorporated herein by reference.

After dispersing, the fiber slurry is transported via conduits 50 to the second stock chest 12. A second chemical additive or second group of chemical additives 52 are supplied from a reservoir 53 and added to the fiber slurry 20 in the second stock chest 12 while under agitation 18. Additionally, the fiber slurry may optionally be diluted with filtrate 56 from a source described hereinafter. The fiber consistency of the slurry is suitably decreased to about 20 percent or lower and particularly about 5 percent or lower such as about 3 to about 5 percent. In particular embodiments, the second chemical additive 52 comprises a softening agent and/or a debonding agent, and the fiber slurry is not subjected to high shear refining forces such as those generated in a disperser once the softening and/or debonding agent is added to the fiber slurry.

After a sufficient residence time to permit absorption of the second chemical additive the fiber slurry 20 is transferred from the second stock chest 12 through suitable conduits 58 and a pump 59 to the second dewatering device 42. Undissolved portions of the second chemical additive 52 in the water are removed with the press filtrate 68 during the pressing operation and stored in the second dilution water chest 46. The contents of the second dilution water chest may be added to the second stock chest 12 as described above or may be discarded. The second dewatering device 42 suitably increases the fiber consistency of the slurry to about 20 percent or greater and particularly about 30 percent or greater.

The thickened fiber slurry 20 is then transported through conduits 58 to the third stock chest 48. The fiber slurry is then re-diluted with fresh water 36 from a suitable reservoir 38 and optionally agitated using a mixing device 16. The fiber consistency of the slurry is suitably decreased to about 20 percent or lower and particularly about 5

percent or lower such as about 3 to about 5 percent. The fiber slurry may then be removed from the third stock chest through suitable conduits 57 and a pump 38 for subsequent processing 38. Alternatively the fiber slurry may be returned to the second stock chest 12 for repeated application of the second chemical additive 52.

One suitable process 38 for making paper products from the fiber slurries 20 of Figures 1 or 2 is the uncreped throughdrying method depicted in Figure 3. The uncreped throughdrying method is also disclosed in U.S. Patent 5,056,132 issued August 12, 1987 to Farrington, Jr. et al. which is incorporated herein by reference. A twin wire former having a tapered papermaking headbox 60 injects or deposits a stream from the fiber slurry 20 onto the forming fabric 62 to form a solid web 64. The web is then transferred to fabric 66, which serves to support and carry the newly-formed wet web downstream in the process as the web is partially dewatered to a consistency of about 10 dry weight percent. Additional dewatering of the wet web can be carried out, such as by vacuum suction, while the wet web is supported by the forming fabric.

The wet web is then transferred from the forming fabric 66 to a transfer fabric 70 traveling at a slower speed than the forming fabric in order to impart increased MD stretch into the web. A liao transfer is carried out to avoid compression of the wet web, preferably with the assistance of a vacuum shoe 72. The transfer fabric can be a fabric having impression knuckles or it can be a smoother fabric such as Asten 664, 637, 638, 659 or Albany 64M. If the transfer fabric is of the impression knuckle type described herein, it can be utilized to impart some of the same properties as the throughdrying fabric and can enhance the effect when coupled with a throughdrying fabric also having the impression knuckles. When a transfer fabric having impression knuckles is used to achieve the desired CD stretch properties, it provides the flexibility to optionally use a different throughdrying fabric, such as one that has a decorative weave pattern, to provide additional desirable properties not otherwise obtainable.

The web is then transferred from the transfer fabric to a throughdrying fabric 74 with the aid of a vacuum transfer roll 76 or a vacuum transfer shoe. The throughdrying fabric can be traveling at about the same speed or a different speed relative to the transfer fabric. If desired, the throughdrying fabric can be run at a slower speed to further enhance MD stretch. Transfer is preferably carried out with vacuum assistance to ensure deformation of the sheet to conform to the throughdrying fabric, thus yielding desired bulk, flexibility, CD stretch and appearance. The throughdrying fabric is preferably of the impression knuckle type.

The level of vacuum used for the web transfer can be from about 2 to about 15 inches (about 75 to about 380 millimeters) of mercury preferably about 10 to about 15 inches (about 254 to about 380 millimeters) of mercury. The vacuum alone (negative pressure) can be supplemented or replaced by the use of positive pressure from the opposite side of the web to blow the web onto the next fabric in addition to or as a replacement for sucking it onto the next fabric with vacuum. Also, a vacuum roll or rolls can be used to replace the vacuum sheet(s).

Specific embodiments and modes of operation relating to the forming fabric, transfer fabric, rush transfer transfer sheet, fabric positioning, and vacuum levels are disclosed in U.S. Patent 5,087,936 issued September 18, 1987 to S. A. Engel et al. and U.S. Patent 5,057,551 issued March 4, 1987 to T. E. Farrington, Jr. et al. which are incorporated herein by reference.

While supported by the throughdrying fabric, the web is first dried to a consistency of about 84 percent or greater by the throughdrier 80 and thereafter transferred to a carrier fabric 82. The dried basement is transported to the reel 84 using carrier fabric 82 and an optional carrier fabric 86. An optional pressurized turning roll 88 can be used to facilitate transfer of the web from carrier fabric 82 to fabric 86. Suitable carrier fabrics for this purpose are Albany International 64M or 64M and Auten 650 or 657 all of which are relatively smooth fabrics having a fine pattern. The roll of tissue may then be colandered, etc., surface treated with emollient or softening agents, embossed, or the like in subsequent operations to produce the final product form.

EXAMPLES

The following examples serve to illustrate possible approaches pertaining to the present invention. The particular amounts, proportions, compositions and parameters are meant to be exemplary and are not intended to specifically limit the scope of the invention.

Example 1 (Continued)

For this example, a softening/absorbing agent was added during production of a multi-fiber three-layer tissue using a conventional, sulfonate chemical addition method. The furnish used for the outer two layers comprised 70% Eucalyptus fibers, 20% tissue base and 1% recycled fiber corestock. The outer layer furnish components were blended at the pulper. After repulping, the furnish was transferred to a chest and treated with a bonding agent, Parac 631NC which is commercially available from Cylac Industries, Inc.

at a charge of 1 kg./metric ton. After allowing the slurry to mix for 20 minutes, the furnish was thickened to greater than 30% consistency using a dewatering press and treated in a disperser to break out to the fibers. The disperser was operated with a power input of 50 kilowatts and an exit stock temperature of about 180°F. After dispersing, the fibers were stored in a high density chest until needed during tissue manufacturing.

At the time of manufacturing the outer layer furnish, consisting of the dispersed Eucalyptus/bark/corestock blend, was diluted to 3.5% consistency in a chest using the fibers from the earlier thickening process. A softening/absorbing agent, C-6082 which is commercially available from Wipac Corp. was added to this furnish at a rate of 6.5 kg./metric ton at the machine chest sulfonate recirculation loop. This sulfonate feeds the fan pumps for both outer layers of a three-layer tissue sheet.

The center layer furnish comprised 100% northern bleached softwood kraft fibers. This furnish was refined at an energy input of 2 horsepower dryweight ton for dry strength development. Parac 631NC was also added to this furnish at a charge of 6.5 kg./metric ton to achieve wet tensile strength control. Dry strength control was achieved by varying the ratio of center layer to outer layer furnish.

A non-ply uncreped through air dried tissue was produced using a pilot tissue machine. This same tissue machine was used for Examples 1-4. The machine contains a 3 layer furnish, of which the outer layers contained the same furnish (70% Eucalyptus, 20% bark, 1% corestock) and the center layer was 100% softwood fiber. The resulting three-layered sheet structure was formed on a twin-wire, suction form roll, former. The speed of the forming fabrics was 2280 feet per minute (fpm). The newly-formed web was then dewatered to a consistency of about 25-27 percent using vacuum suction lines below the forming fabric before being transferred to the transfer fabric, which was traveling 1800 feet per minute (25% rush transfer). A vacuum sheet pulling about 10 inches of mercury vacuum was used to transfer the web to the transfer fabric. The web was then transferred to a throughdrying fabric traveling at a speed of about 1800 fpm. The web was carried over a pair of Honeycomb throughdryers operating at temperatures of about 328°F and dried to final dryness of about 84-86 percent consistency.

The air dry basis weight of the sheet was 27.5 gm. The final fiber ratio in the sheet was 32% softwood fiber (in center layer) and 68% Eucalyptus/bark/corestock blend (outer layers). The final strength of the tissue was 800 grams per 3 inch width (geometric mean tensile strength).

118

12

Example 2

For this example, the improved chemical addition method shown in Figure 1 was used to treat a furnish with a softening/bonding agent. The treated furnish was then used as the outer layer furnish in a multi-layer three-layer tissue structure. Because the improved chemical addition method removes most non-retained softening/bonding agent from the water phase during tissue forming, the resultant product can be produced at equivalent tensile strength, higher softenable/bonded content and a lower softened fiber content than a tissue made with the identical softening agent using the conventional chemical addition method described in Example 1

In Example 2, the furnish used for the outer two layers comprised 70% Eucalyptus fibers, 20% tissue broke and 1% recycled fiber content. During the stock preparation phase, the outer layer furnish was blended during repulping and placed in a stock chest at 3.5% consistency. The furnish was then treated with a bonding agent, Parex 631NC from Cytec Industries, Inc., at a dosage of 1 kg./metric ton. After allowing the slurry to mix for 20 minutes, a softening/bonding agent, C-6082 from Wilson Corp. was added at a dosage of 7.5 kg. of active chemical/metric ton of fiber. After an additional 20 minutes of mixing time, the slurry was deaerated using a belt press to approximately 32% consistency. The filtrate from the deaerating process was used as pulper make-up water for subsequent batches but not sent forward in the stock preparation or deaerating process. The thickened pulp was then passed through a disperser with a power input of 80 kilowatts and a stock temperature of about 180° F to impart curl to the fibers. After the dispersing operation, the stock was placed in a high density storage chest until needed during tissue manufacturing.

A one-ply uncreped, through air dried tissue was made using a three layered handbox, as described in Example 1. The furnish for the outer two layers comprised the chemically treated 32% consistency Eucalyptus/broke/recycled furnish blend, which had been re-diluted to 3% consistency with fresh water in a chest under agitation. The center layer consisted of 100% softened fibers refined at an energy input of 2 horsepower dryweight/ton, to which 8.8 kg./metric ton of Parex 631NC was added for wet strength control. Finished product dry strength control was achieved by adjusting the ratio of center layer and outer layer furnish in the sheet.

The air dry basis weight of the sheet was 27.8 gsm. The final fiber ratio in the sheet was 17% softened fiber (in center layer) and 83% Eucalyptus/broke/recycled blend (outer layers). The final strength of the tissue was 682 grams per 3 inch width (geometric mean tensile strength).

Example 3

For this example, the improved chemical addition method shown in Figure 2 was used to first treat a furnish with a bonding agent, mechanically modify the fibers using a disperser and then treat the furnish with a softening/bonding agent. The chemically treated furnish was used as one furnish in a multi-layer three-layered tissue structure. Because the improved chemical addition method removes most non-retained softening/bonding agent from the water phase during tissue forming, the resultant product was much stronger (at equal fiber composition) than a tissue made with similar softening agent using the conventional chemical addition method described in Example 1

In addition, because the softenable/bonded is not present on the furnish during the dispersing operation, there is a more efficient transfer of energy to the fibers. This results in a higher level of debonding than demonstrated in Example 2 due to the fiber curl properties imparted during dispersing.

In Example 3, the furnish used for the outer two layers comprised 70% Eucalyptus fibers, 20% tissue broke and 1% recycled fiber content. During the stock preparation phase, the outer layer furnish was blended during repulping and placed in a stock chest at 3.5% consistency. The furnish was then treated with a bonding agent, Parex 631NC from Cytec Industries, Inc., at a dosage of 1 kg./metric ton. After allowing the slurry to mix for 20 minutes, the furnish was deaerated using a belt thickening press to greater than 30% consistency. The thickened pulp was then passed through a disperser with a power input of 80 kilowatts and a stock temperature of about 180° F to impart curl to the fibers. The high consistency dispersed pulp was then stored in a chest until sufficient quantities could be produced.

In order to treat the furnish with a second chemical additive, the high consistency pulp was then diluted to 3.5% consistency with a combination of fresh water and thickener filtrate (containing unadsorbed softening/bonding agent, as shown in Figure 2). The furnish was next treated with 7.5 kg./metric ton of a softening/bonding agent, C-6082 from Wilson Corp., and allowed to mix for 20 minutes. The furnish was then deaerated using a belt press to approximately 32% consistency. The filtrate from the deaerating process was used as partial dilution water for the high consistency stock dilution step, as previously mentioned. After the second thickening operation, the stock was placed in a high density storage chest until needed during tissue manufacturing.

A one-ply uncreped, through air dried tissue was made using a three layered handbox, as described in Example 1. The furnish for the outer two layers comprised the chemically treated 32% consistency Eucalyptus/broke/recycled furnish blend, which had

is an m-dial d to 3% consistency with fresh water in a sheet under agitation. The center layer comprised 100% softwood fibers refined at an energy input of 2 horsepower degumetric ton, to which 5.8 kg./metric ton of Parex 691NC was added for wet strength control. Finished product dry strength control was achieved by adjusting the ratio of center layer and outer layer furnish in the sheet.

The air dry basis weight of the sheet was 27.5 gsm. The final fiber ratio in the sheet was 24% softwood fiber (in center layer) and 76% Eucalyptus/Arabis/corstock blend (outer layers). The final strength of the tissue was 808 grams per 3 inch width (geometric mean tensile strength).

Example 4

This example is similar to Example 3, except that 16 kg./metric ton of C-6082 softwood debonder was added to the outer layer furnish (instead of 7.5 kg./metric ton in Example 3). Because the improved chemical addition method has removed most non-retained softening/bonding agent from the water phase during tissue formation, the resultant product contains 55% more softening/bonding agent than the product described in Example 1, at equivalent tensile strength and fiber composition.

The stock preparation and tissue manufacturing procedures were identical to Example 3. The air dry basis weight of the sheet was 27.5 gsm. The final fiber ratio in the sheet was 31% softwood fiber (in center layer) and 69% Eucalyptus/Arabis/corstock blend (outer layers). The final strength of the tissue was 795 grams per 3 inch width (geometric mean tensile strength).

The results shown in Table 1 below indicate that a layered tissue sheet can be made with a geometric mean tensile strength of about 800 grams per 3 inch width (795 grams per 3 inch width), under the processing conditions described in Example 4, that contains 31% softwood fiber and 5.8 kg./metric ton of retained C-6082 softwood debonder by using the improved chemical addition method. When using the conventional chemical addition method described in Example 1 and otherwise identical manufacturing conditions, a layered tissue sheet with a geometric mean tensile strength of 800 g./3" width contains 32% softwood fiber but only 3.8 kg./metric ton of retained C-6082 softwood debonder. The reason for this difference in retained C-6082 at equivalent tissue strength, it is hypothesized, is because the debonding characteristics of the unadsorbed C-6082 in the conventional chemical addition method compromises the strength of wetpoint of the softwood fibers in the center layer. As a result, more softwood fiber is needed to achieve the same finished product tensile strength.

By using the improved chemical addition method, tissue fiberchemistry combinations can be produced at target strength levels that could not otherwise be made using conventional chemical addition methods. In Examples 2-4, the tissues were manufactured with generally constant basis weight and strength by adjusting the relative amounts of softwood and hardwood. Of course, various alternatives are possible such as maintaining generally constant strength and softwood/hardwood proportion and adjusting the basis weight.

TABLE 1

Example 1-4

Example	Strength			Debonder	
	g./3"	% Center Layer	% Outer Layer	Add-on	Retained
1	800	32	68	4.4	3.8
2	802	17	83	6.2	4.8
3	808	34	76	5.7	3.8
4	795	31	69	16.4	5.8

In Table 1 "Strength" refers to the geometric mean tensile strength which is calculated for purposes of the present invention according to the formula:

$$\sqrt{(MD \text{ tensile})(CD \text{ tensile})}$$
 The "MD tensile" strength of a tissue sample is the conventional measure, known to those skilled in the art, of load per sample width at the point of failure when a tissue web is stressed in the machine direction. Likewise, "CD tensile" strength is the analogous measure taken in the cross-machine direction. MD and CD tensile strength are measured using an Instron tensile tester using a 3-inch jaw width, a jaw span of 4 inches, and a crosshead speed of 10 inches per minute. Prior to testing the sample is maintained under TAPPI conditions (78°F, 50% relative humidity) for 4 hours before testing. Tensile strength is reported in units of grams per 3 inch width (at the failure point).

The % Center Layer and % Outer Layer refer to the weight percent of fibers in the appropriate layers.

The Debonder Add-on reflects the chemical additive that is added to the furnish in kg./metric ton of the entire sheet. This is calculated based on the add-on level to the outer layer furnish and the amount of the outer layer furnish in the final sheet.

12

WO 900487 PCT/US89/0487

The Debond r Retained reflects the amount of chemical additive adsorbed onto the tissue. The Debond Retained can be determined using the following procedure suitable for indoxaline-based chemical additives such as Wilco C-6082 that is added to the tissue. The procedure is for use for the p-reared add-on, which has been converted to 5 1g./mole (multiplied by 10) in Table 1. In general, a sample of the tissue is weighed and extracted in a sealed container for a given amount time on a ballist shaker at ambient conditions. After the extraction, the tissue is removed and the extract allowed to settle. The extract is then analyzed by ultraviolet spectrometer. After the percent extracted is calculated, the add-on percent can be determined by reference to an add-on correlation curve that is generated as described below.

The following equipment and chemicals are used: pipets, 1, 3, 5, 10 and 100 mL, volumetric flasks, 100 and 1000 mL, sealed containers, e.g. specimen cups; a ballist shaker such as an orbital ballist shaker (Lab Line Orbital Shaker Model No. 3900, Lab Line Instruments, Inc.); an ultraviolet spectrometer (Hewlett Packard Model 8451A Diode Array Spectrophotometer Hewlett Packard); methanol, reagent grade; indoxaline, standard such as Wilco C-6082; beakers, 30 mL, and control tissues that differ from the tissue being tested only by the absence of the chemical additive being tested.

A stock standard indoxaline solution (1000 ppm active) is prepared: Weigh 0.1250 grams of C-6082 (90% active) into a 100mL beaker transfer quantitatively to a 20 100mL flask with methanol; and dilute to mark with methanol and invert several times.

Standard indoxaline solutions (10, 30, 50, 100 ppm) are prepared: Into four 100 mL volumetric flasks, add 1, 3, 5, and 10 mL of the 1000 ppm stock standard indoxaline solution; and dilute to mark with methanol. The standards are 10, 30, 50 and 100 ppm, respectively.

25 Generate a Standard Solution Curve: With the UV spectrophotometer set at 238 nm wavelength, reference the instrument using a methanol sample. Read the absorbance of the standard solutions (10, 30, 50 and 100 ppm), then plot a curve of the concentration versus absorbance. Generate a first-order equation of the data.

Spiking solutions (1000 and 5000ppm) are prepared: Weigh out 1.250 and 6.250 30 grams of C-6082 into 80 mL beakers; transfer quantitatively to a 1000 mL flask with distilled water shake well and allow to dissolve before diluting to mark. If excessive foaming occurs, fill to the stem of the flask and add a small amount of methanol to eliminate the foam and dilute to mark then invert several times. This makes a 1000 ppm and 5000 ppm spiking solutions.

WO 900487 PCT/US89/0487 12/

Generate an Add-On Correlation Curve: A minimum of three replicates should be performed for each level of add-on and for blanks. There should be at least four levels of add-on to generate a curve. Spiking solutions should be made with distilled water so that the spiked sample can be dried in a 60 degree Celsius oven.

5 Weigh out 5.00 grams of control tissue into a specimen container. For four levels, three replicates, and blanks, prepare 15 samples. A typical curve would be 0.1, 0.3, 0.8 and 1.0% C-6082 add-on based on the weight of the tissue.

Spiking samples with spiking solution and dry for 48 hours in a 60 degree Celsius oven. Use volumetric pipettes. Example:

10

Add-on Level	Volume of Spiking Solution for 5.00 gram tissue	
	1000ppm	5000ppm
Blank	0 mL	0 mL
0.1%	5 mL	—
0.3%	15 mL	—
0.8%	—	5 mL
1.0%	—	10 mL

20 Add 100 mL of methanol using a pipet and seal the containers. Place in a ballist shaker and extract for 16 hours. Remove tissue and allow the extract to settle. With a transfer pipette, remove supernatant and fill a spectrophotometer cuvette. Measure the absorbance at 238nm wavelength using the UV spectrometer. A 1 to 10 dilution may be required to stay within the standard curve. Blanks should be read with and without the dilution. Subtract the mean absorbance readings from the blanks. Use the 1/10 dilution blank readings for 1/10 dilution samples and no dilution blank readings for the no dilution samples.

25 The percent extracted is then calculated from the ppm reading from the standard curve (indoxaline) as follows:

30 % Extracted (no dilution) = ppm reading X 0.1 X 100/5000.
% Extracted (1/10 dilution) = ppm reading X 0.1 X 10 X 100/5000.
Construct an Add-on Correlation curve with the percent extracted values (y-axis) versus the corresponding add-on level (x-axis). Select the best fitting curve (first or second order).

12/

Sample Analysis: Weigh out 5.00 grams sample in a specimen container and add 100 mL of methanol. Place on the shaker and extract for 1/2 hour. Remove the tissue and allow to settle. Read the extracts at 230nm wavelength and subtract the mean blank absorbance reading. Calculate the ppm from the standard curve and then calculate the percent extracted value. Using the Add-on correlation curve, calculate the percent add-on with the percent extracted value.

Iridoxidine has a peak absorbance at 230nm wavelength. While blank tissue extracts do not have this peak absorbance at 230nm, it does have some absorbance that interferes with the quantitation. Blanks are quite reproducible and can be subtracted for the determination. It is important that the weight of the sample, volume of methanol, and the extraction time be kept constant. An add-on correlation curve should be generated for different tissue samples, because various chemicals used in the tissue process can affect the binding of the Iridoxidine thus affecting the recovery. Percent add-on also affects the percent recovery using various levels of add-on in constructing the correlation curve helps to determine the add-on value.

Example 2

To better illustrate the ability for the improved chemical addition method to remove undesorbed chemicals from the furnish of a papermaking process, a laboratory scale experiment was conducted. The objective of this experiment was to demonstrate how much undesorbed chemical is present in systems that do not use the improved addition method and compare this to systems in which the same amount of chemical is added using the improved method. The furnish used in this experiment was 100% Eucalyptus fibers. The chemical additive used was C-6082, a cationic polyacrylamide commercially available from Witco Corp. The addition levels were 0.5% and 1.0% active debander on dry fiber.

0.5% Addition Experiment, Run 1

During the experiment, 1800 grams of a 2.5% consistency fiber slurry (45 g. dry fiber) were agitated using a mechanical stirrer. To the fiber slurry under agitation, the appropriate amount of C-6082 chemical was added in the form of a 1% active solution. The volume of 1% active C-6082 required for a 0.5% loading was 22.5 mL. After agitation for 15 minutes, 600 mL of slurry was removed and spread out on a plate to dry at room temperature under a hood. This sample will be referred to as 1A.

122

Run 2

The remaining 1200 grams of slurry were filtered using a Whatman 4 filter paper and Buchner funnel apparatus. This filtration step simulates the dewatering step of the improved chemical addition method shown in Figure 1. The filter pad (at approximately 25% consistency) was split into two sections of approximately equal mass. One section was placed in the hood to dry at room temperature. This sample will be referred to as 2A.

Run 3

The other half of the filter pad (approximately 600 g.) was redispersed to 2.5% consistency using distilled water. The slurry was mechanically agitated for 15 minutes and then filtered using a Whatman 4 filter paper and Buchner funnel apparatus. This filtration step simulates the dewatering that occurs in the forming and vacuum dewatering zones of a tissue machine. The filter pad was placed in a hood to dry at room temperature. This sample will be referred to as 3A.

1.0% Addition Experiment

Steps 1 - 3 were repeated using a 1.0% addition level of C-6082. The corresponding samples were coded 1B, 2B and 3B.

All samples were analyzed for C-6082 content using a methanol extraction followed by UV spectrophotometric analysis at 230nm and comparison of the absorbance to a known calibration curve. The results are shown in the table below:

		Sample No.					
		1A	2A	3A	1B	2B	3B
25	C-6082 Content (%)	0.51	0.30	0.28	1.05	0.75	0.86

The results demonstrate the impact of using the improved chemical addition method on reducing the amount of undesorbed debander in the furnish. Comparing the C-6082 content of samples 1A and 2A shows that 41% of the chemical is not retained sufficiently onto the fibers and is removed during dewatering. If the conventional stubbox chemical addition method is used this undesorbed chemical is free in the furnish to contaminate other fiber streams and cause the processing problems previously described. Comparing the C-6082 content of samples 2A and 3A, however shows that only an additional 6% of the retained C-6082 is removed during a second dewatering step, which simulates sheet formation on a tissue machine.

122

When the C-0022 content of the 1B, 2B and 3B samples are compared it can be shown that 30% of the original 1.0% chemical loading is removed during the first dewatering step, but only an additional 7% of the retained C-0022 is removed during the second dewatering step.

It is believed that this simulation of the improved chemical addition method demonstrates the ability to significantly reduce the amount of undesirable chemical additive in the water of a paper manufacturing process while maintaining high chemical retention levels on the fiber fraction.

The foregoing detailed description has been for the purpose of illustration. Thus, a number of modifications and changes may be made without departing from the spirit and scope of the present invention. For instance, alternative or optional features described as part of one embodiment can be used to yield another embodiment. Additionally two named components could represent portions of the same structure. Further various alternative process and equipment arrangements may be employed, particularly with respect to the stock preparation, handling, forming fabrics, web transfers, creping and drying. Therefore, the invention should not be limited by the specific embodiments described, but only by the claims and all equivalents thereof.

123

Claims

We claim:

1. A method comprising:
creating a fiber slurry comprising water, cellulosic fibers, and an adsorbable chemical additive;
dewatering the fiber slurry to remove undesirable chemical additive and redispersing the fibers with fresh water
2. A method comprising:
creating a first fiber slurry comprising water, cellulosic fibers, and an adsorbable chemical additive;
creating a second fiber slurry that is substantially free of the adsorbable chemical additive;
dewatering the first fiber slurry to remove undesirable chemical additive;
redispersing the fibers in the first fiber slurry with fresh water and forming a paper product using a layered handbox, the first fiber slurry supplied to a first handbox layer and the second fiber slurry supplied to a second handbox layer
3. The method of claim 1 wherein creating a fiber slurry comprises adding the adsorbable chemical additive to an aqueous solution comprising the water and cellulosic fibers.
4. The method of claim 1 or 2, wherein the chemical additive is added to a slurry of water and cellulosic fibers in an amount of about 5 kilograms per metric ton or greater
5. The method of claim 1 or 2, wherein dewatering increases the consistency of the fiber slurry to about 30 percent or greater
6. The method of claim 1 or 2, wherein redispersing the fibers decreases the consistency of the fiber slurry to about 8 percent or lower
7. The method of claim 1 or 2 further comprising maintaining the removed undesirable chemical additive separate from the fiber slurry

123

WO 99/0487PCT/US98/0254

8. The method of claim 1 or 2, wherein the fresh water is completely free of unadsorbed chemical additive.

9. The method of claim 1 or 2, wherein sufficient residence time is provided after the chemical additive is added to allow for adsorption.

10. The method of claim 1 or 2, wherein the removed unadsorbed chemical additive is removed in a processing step prior to dewatering the fiber slurry.

11. The method of claim 1 or 2, wherein the adsorbable chemical additive comprises a debonding agent.

12. The method of claim 1 or 2, wherein the adsorbable chemical additive comprises a softening agent.

13. The method of claim 1 or 2, wherein the chemical additive comprises a debonding agent or softening agent and the fiber slurry is not subjected to high shear mixing forces once the chemical additive is added to the fiber slurry.

14. The method of claim 1 or 2, wherein the redispersed fiber slurry is treated with a second adsorbable chemical additive, dewatered a second time to remove unadsorbed chemical additives and redispersed a second time.

15. The method of claim 14, wherein the second chemical additive comprises a softening agent.

16. The method of claim 14, wherein the second chemical additive comprises a debonding agent.

17. The method of claim 1 further comprising forming a paper product comprising a plurality of layers, with one but not all of the layers being formed from the fiber slurry containing the adsorbable chemical additive.

18. A method comprising:

WO 99/0487PCT/US98/0254124

creating a fiber slurry comprising water cellulosic fibers and a first adsorbable chemical additive;

dewatering the fiber slurry to a consistency of about 20 percent or greater;

passing the dewatered fiber slurry through a dispenser to mechanically work the fibers;

diluting the fiber slurry with fresh water that is substantially free of the first chemical additive to a consistency of about 5 percent or less;

adding a second adsorbable chemical additive comprising a debonding agent or a softening agent to the fiber slurry;

dewatering the fiber slurry to a consistency of about 20 percent or greater;

diluting the fiber slurry with fresh water that is substantially free of the second chemical additive to a consistency of about 5 percent or less, and

forming a paper product from the fiber slurry

19. The method of claim 18, wherein the first chemical additive comprises a bonding agent.

20. A fiber furnish produced using the method described in claim 1 wherein the amount of chemical additive adsorbed onto the fibers is about 2 kilograms per metric ton or greater and the amount of unadsorbed chemical additive in the water is between 0 and about 20 percent of the amount of chemical additive adsorbed onto the fibers.

21. A fiber furnish comprising water cellulosic fibers, and an adsorbable chemical additive, wherein the amount of chemical additive adsorbed onto the fibers is about 2 kilograms per metric ton or greater and the amount of unadsorbed chemical additive in the water is between 0 and about 20 percent of the amount of chemical additive adsorbed onto the fibers.

22. The fiber furnish of claim 20 or 21 wherein the amount of chemical additive adsorbed onto the fibers is about 3 kilograms per metric ton or greater

23. The fiber furnish of claim 22, wherein the amount of chemical additive adsorbed onto the fibers is about 4 kilograms per metric ton or greater

126

125

24. The fiber furnish of claim 22 where in the amount of chemical additive adsorbed onto the fibers is about 5 kilograms per metric ton or greater
25. The fiber furnish of claim 20 or 21 wherein the amount of undesorbed chemical additive in the water is between 0 and about 15 percent of the amount of chemical additive adsorbed onto the fibers.
26. The fiber furnish of claim 25, wherein the amount of undesorbed chemical additive in the water is between 0 and about 10 percent of the amount of chemical additive adsorbed onto the fibers.
27. The fiber furnish of claim 25, wherein the amount of undesorbed chemical additive in the water is between 0 and about 7 percent of the amount of chemical additive adsorbed onto the fibers.
28. The furnish of claim 20 or 21 wherein the chemical additive is selected from the group comprising softening agents, debonding agents, dry strength agents, wet strength agents and opacifying agents.
29. A paper product made from the furnish of claim 21
30. A paper product made using the method of claim 1
31. A paper product comprising a plurality of unitary layers, the paper product made using the method of claim 2.
32. The paper product of claim 29 or 30, having a chemical additive retention of about 4 kilograms per metric ton or greater
33. The paper product of claim 32, having a chemical additive retention of about 5 kilograms per metric ton or greater
34. The paper product of claim 31 comprising a center layer consisting essentially of softwood fibers and two outer layers comprising about 70 percent or greater hardwood fibers.

35. The paper product of claim 29 or 30, wherein the paper product is a layered tissue.

127

126

WO 99/4957

1 / 3

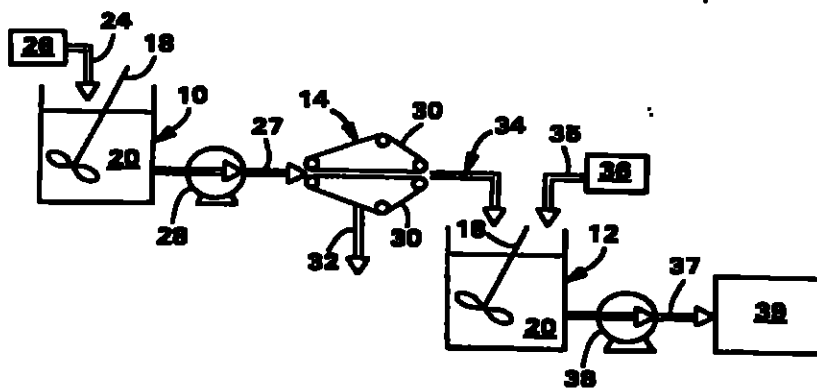


FIG. 1

FIG. 1

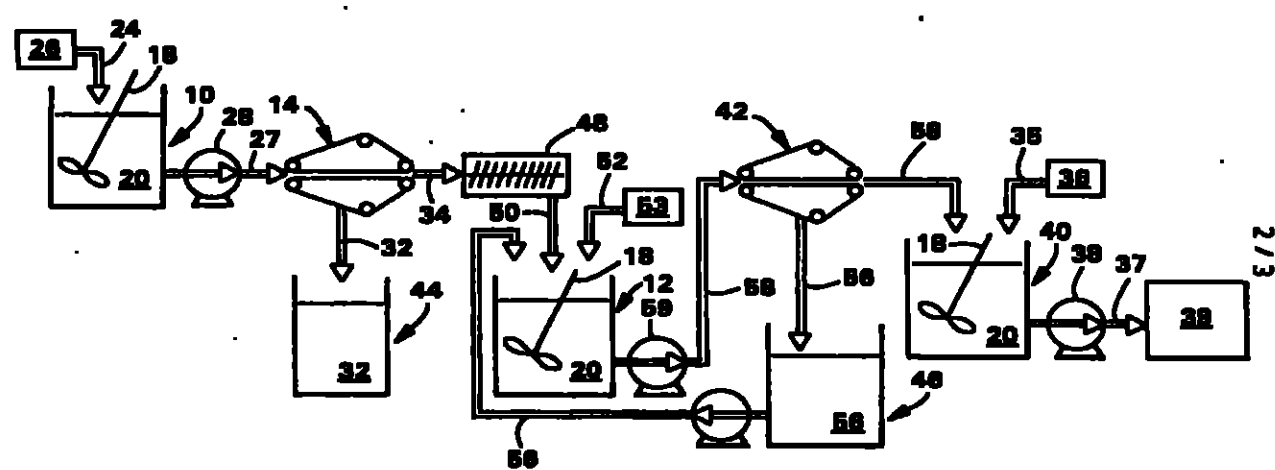


FIG. 2

WO 99/4957

2 / 3

FIG. 2

127

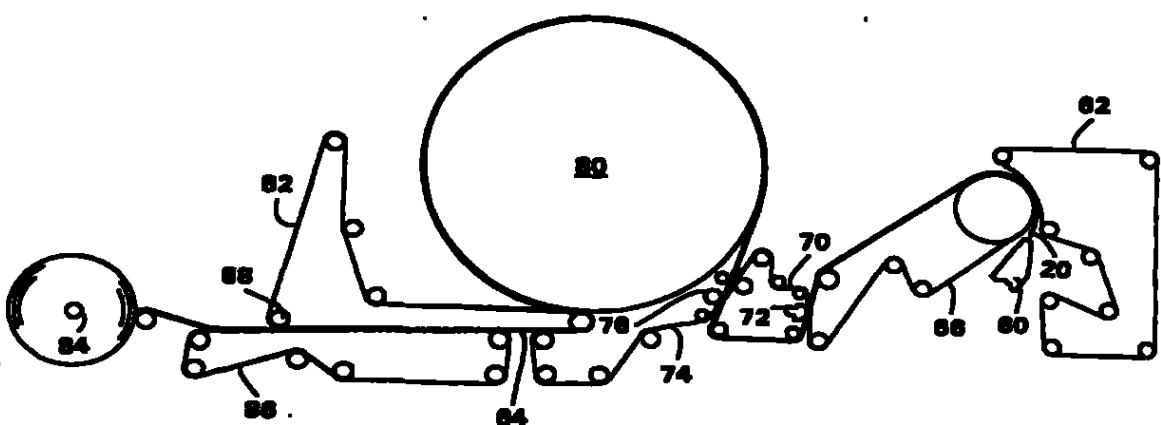


FIG. 3

[illegible]

(2) Application No. 13464/79 (24) Filed 21 March 1979
 (3) Complete Specification published 14 Sept. 1975
 (4) Int. Cl.⁷ C07D 233/74 // B2H2 1/2
 (5) Index at abstract
 C1C 121 246 247 250 253 257 261 269 280 287
 327 343 347 350 361 364 365 367 380 387 394
 429 438 439 453 458 463 482 486 570 779
 H2B 352 37K
 D2B 361 590 51A
 (7) Invention by KOHJIROU KAKIMOTO, HIRAKAWA, OSAKI,
 TAKESHI KURIKI, YOSHIOYO KAWAI,
 TOSHIYUKI MATSUI and SHUNJI KAWA

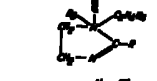
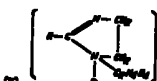
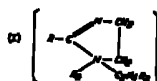


50 QUATERNARY ENDOGENOUS DERIVATIVES AND THEIR USE AS SURFACE ACTIVE COMPOUNDS FOR SURFING

(71) We, HONOLULU PAPER COMPANY LIMITED, a corporation duly organized under the laws of Japan and existing at No. 12-8, Ohta 3-chome, Chuo-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and for the following manner:-

This invention relates to the production of fatty pulp with suitable for use in sanitary napkins and disposable diapers, more particularly to surface-active components which serve to render the foamed pulp web product highly resistant and moisture-

According to the literature, there is provided a water-soluble compound for improving micro-emulsions and surfactants to help wet products which comprise an herbicidal active ingredient one of the following formulae:



where R is an alkyl or alkenyl group containing 15 to 21 carbon atoms;
R₁ is -CH₃, -C₂H₅, -C₃H₇(CH₃) or -C₄H₉(CH₃);
R₂ is -CH₃, -C₂H₅, -C₃H₇(CH₃) or -C₄H₉(CH₃).



(R and R₂ are the same as above);
R₁ is —OH or —OR (R is the same as above);
R₂ is —C₂H₄OH or —C₂H₄OR;
R₂ is the same as R₁ or —C₂H₄OCOCOR₁;
X is a halogen atom, —NO₂, —CH₂SO₂, or —C₆H₄.

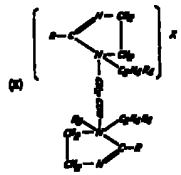
[illegible]

The material disclosed in Japanese Patent Publication No. 44-30321 is directed to the use of a type of amide-type azobenzene azo dye. However, these azobenzene compounds enable the dye and the azobenzene component in color-type azobenzene dyes to be used in various types of large amounts. Japanese Patent Publication No. 44-30422 teaches the use of azobenzene compounds which are very effective for selectively etching surfaces in conducting the etching work. However, these azobenzene compounds are not used in the etching work. In contrast, the azobenzene compounds used in the etching work are not used in the etching work.

For purposes of this invention, some typical azobenzene compounds having the following structure are used for the production of etching water (etchant) containing azobenzene compounds in the etching work.

The azobenzene compounds used in the etching work are used in the etching work and in the etching work.

[illegible]



where R is an alkyl or alkenyl group containing 12 to 22 carbon atoms;
 R is $-CH_2-$, $-CH_2-$, $-CH_2CH_2-$ or $-CH_2CH_2CH_2-$;
 R is $-CH_2-$, $-CH_2CH_2-$ (R is the same as above) or



(R and R are the same as above);
 R is $-CH_2-$ or $-CH_2CH_2-$ (R is the same as above);
 R is $-CH_2CH_2-$ or $-CH_2CH_2CH_2-$;
 R is the same as R, or $-CH_2CH_2CH_2COOCH_3$;
 R is a hydrogen atom, $-CH_3$, $-CH_2CH_3$, or $-CH_2CH_2CH_3$ and
 n is an integer of 1 or 2;
 2. A method for producing fully poly-alkene or alkene suitable for use as an emulsion
 stabilizer and dispersant, which comprises forming an emulsion of alkene into a
 stable and dispersible alkene emulsion by adding an emulsifier into the
 alkene and dispersing the alkene into the emulsion, characterized in
 that the alkene is a compound of a compound as defined in claim 1 having an alkyl
 group in which the alkyl group is a fully poly-alkene having both random-branching and
 regularity in the poly-alkene;
 3. A compound as defined in claim 1 and having a pH value of 4 to 6;
 4. A compound as defined in claim 1 and substantially as herein described with
 reference to the specific embodiments;
 5. A compound according to claim 1 and substantially as herein described with
 reference to the specific embodiments.

For the Applicants,
 G. F. HENDERSON & CO.,
 17, Market Street,
 177, Queen Street,
 Brighton, Sussex, BN1 3BB.

Printed for the Stationery Office by the Central Press, London and
 Published by the Patent Office, 25 Southampton Row, London, WC1R 3DU, under
 which name any application may be made.

131

134
132

PATENT ABSTRACTS OF JAPAN

(11) Publication number 07189170 A

(43) Date of publication of application: 25.07 94

(51) Int. Cl. D21H 17/07
D21H 17/14

(21) Application number 06336483

(71) Applicant KAO CORP

(22) Date of filing: 28.12.93

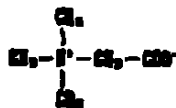
(72) Inventor YAKAHASHI HIROMICHI

(64) SOFTENER FOR PAPER

(67) Abstract

PURPOSE. To obtain a softener for papers containing pyrrolidonecarboxylic acid or its salt under a specific balance and capable of imparting softness and moisture retention to papers.

CONSTITUTION. A softener for papers capable of imparting softness and elasticity to papers is obtained by compounding 1-100 pts.wt. of pyrrolidonecarboxylic acid or its salt (a sodium or potassium salt) under a balance of the formula optionally in combination with e.g. a known tertiary ammonium salt. The obtained softener is added to a pulp slurry e.g. during a paper making process to obtain a paper product exhibiting moisture retention and soft feeling while keeping hygroscopicity and strength of papers.



COPYRIGHT (C)1995,JPO

133
133



PATENT ABSTRACTS OF JAPAN

(11) Publication number 07189171 A

(43) Date of publication of application: 25.07.98

(51) Int. Cl. D21H 17/07 D21H 17/14		
(21) Application number 08338484	(71) Applicant	KAO CORP
(22) Date of filing: 28.12.93	(72) Inventor	TAKAHASHI HIROMICHI

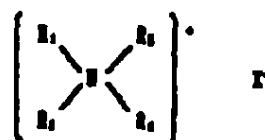
(54) SOFTENER FOR PAPER

COPYRIGHT (C)1995,JPO

(57) Abstract

PURPOSE. To obtain a softener composed of a quaternary ammonium salt containing a specific group, a specific fatty acid and an esterified compound of pentaerythritol in specific ratios and capable of imparting softness and elasticity to papers.

CONSTITUTION. This softener for paper capable of imparting softness, water absorption and further elasticity to paper without deteriorating water absorption and strength of the paper by dispersing a mixture of (A) a quaternary ammonium salt having one or two of a 10-24C alkyl, alkenyl, or β -hydroxyalkyl in a molecule, (B) a 8-24C straight chain saturated or unsaturated fatty acid or its salt (e.g. capric acid, lauric acid, myristic acid, stearic acid or a hardened tallow fatty acid) and (C) an ester of a 10-24C fatty acid with pentaerythritol in weight ratios of 0.0001-0.4 in B/A and 0.01-0.5 in C/A and in the total amount of A, B and C components of 3-25wt.%, in water. Further the quaternary ammonium salt is expressed by the formula (R_1 and R_2 are each 10-24C alkyl, etc. R_3 and R_4 are each 1-3C alkyl, etc. X is a halogen, etc.).



126
134

①  **Europäisches Patentamt**
European Patent Office
Office européen des brevets

⑦ Publication number **0 109 282 A2**

⑩ **EUROPEAN PATENT APPLICATION**

② Application number **83308805.7**
Date of filing **11.11.83**
⑥ Int. Cl.³ **D 21 F 11/04**

③ Priority 18.11.82 GB 8328239 18.07.83 GB 8318934	⑦ Applicant WHATMAN REEVE ANGEL PLC, Springfield Hill, Maidstone Kent ME14 2LE (GB)
④ Date of publication of application 23.08.84 Bulletin 84/21	⑧ Inventor Bernard, Michael John, 24 Edwardale, Maidstone Kent (GB) Inventor Georgie, Nigel John, 23 Marlow Copse, Woburnville Charlham Kent (GB) Inventor Elliot, Ian Terry, 628 Abercrombie Clatham Apartments, Savannah Georgia (US)
⑤ Designated Contracting States AT BE CH DE FR GB IT LI LU NL SE	⑨ Representative Harrison, David Christopher et al, NEWBURN ELLIS & CO 2/3 Cursitor Street, London EC4A 3DG (GB)

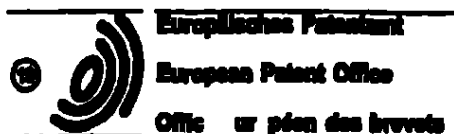
⑫ **Paper and method of making it.**

⑬ A paper is a unitary structure but has more than one layer. The layers are of respective different fibres. The paper is made by applying a second slurry to a first slurry at a time when both layers have a consistency which is primarily liquid but the first is less liquid than the second. The second slurry is applied to the first so as to provide a disturbance at an interface between the surfaces of the layers. This application of the second slurry is carried out under predetermined conditions of angle, distance, rate and consistency having regard to the conditions of the first slurry when the second slurry is applied so as to control the extent of disturbance in the interface between the layers and hence the degree of intermingling and interlinking in the interface region. This ensures the bonding together of the layers irrespective of the nature of the material of the slurries.
The process allows the strength of the paper at the interface to be at least as great as that in either of the two layers. Thus this is particularly suitable for forming a battery separator having a density gradient across it.

109 282 A2

EP

137
135



Publication number 0 226 408 B1

EUROPEAN PATENT SPECIFICATION

Date of publication of patent specification
24.07.91 Bulletin 91/30

Int. Cl.⁷ D21F 11/08

Application number 86389493.5

Date of filing 05.12.86

Methods for manufacture of paper products.

Priority 09.12.86 US 800004

Proprietor PAPER CHEMISTRY
LABORATORY, INC.
Stonsleigh Avenue
Carmel New York 10512 (US)

Date of publication of application
24.08.87 Bulletin 87/28

Inventor Peaslee, John G.
Stonsleigh Avenue
Carmel New York 10512 (US)
Inventor Reichen, Maria S.
280 Church Street
White Plains New York 10603 (US)

Publication of the grant of the patent
24.07.91 Bulletin 91/30

Designated Contracting States
AT CH DE ES FR GB IT LI NL SE

Representative Woodward, John Calvin et al
VENNER SHEPLEY & CO. 300 City Road
London EC1Y 2QA (GB)

References cited
US-A- 3 374 880

EP 0 226 408 B1

Note Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 92(1) European patent convention).

138
136



Publication number 0 613 979 A1

EUROPEAN PATENT APPLICATION

Application number 94400347.4 Int. cl.⁸, D21F 11/14, D21F 11/04
Date of filing 17.02.94

Priority 02.03.93 US 25000 Date of publication of application 07.09.94 Bulletin 94/36 Designated Contracting States BE DE ES FR GB IT NL SE Applicant KIMBERLY-CLARK CORPORATION 401 North Lake Street Menasha Wisconsin 54957-0340 (US) Inventor Edwards, Steven Lawrence 8630 Tri County Road Fremont, Wisconsin 54940 (US) Inventor Allen, Peter John 2212 Old Creek Lane Fullerton, California 92631 (US) Inventor Runkel, Oliver Paul 823 Schwartz Street Green Bay, Wisconsin 54302 (US)	Representative Sauvage, René Cabinet Sauvage 100 bis, avenue de Saint-Mandé F-75012 Paris (FR)
---	--

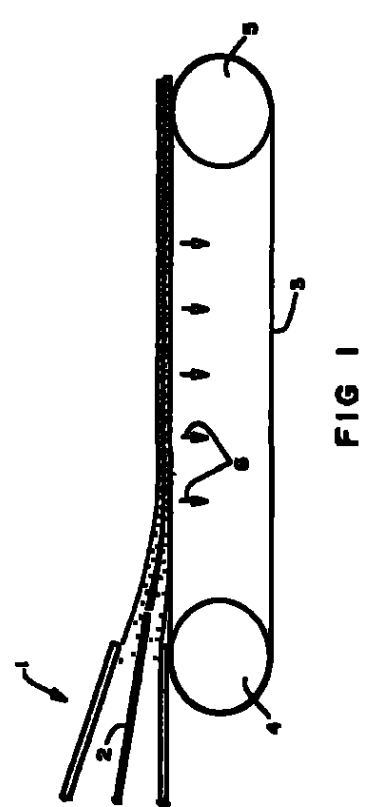
Soft layered tissues and method for making same.

The formation of paper webs useful for facial tissue, bath tissue, paper towels or the like is substantially improved by forming the web in layers in which the second-formed layer has a consistency which is significantly less than the consistency of the first-formed layer.

The web is formed in layers by using a layered headbox (1) wherein first and second stock layers are separated by a headbox divider (2).

The resulting improvement in formation provides a significant improvement in softness, particularly for wet-pressed tissues, while reducing the degree to which fibers protrude from the surface of the tissue.

This also reduces the tendency of the web to lint.



EP 0 613 979 A1

Jouve, 18, rue Saint-Denis, 75001 PARIS

139
137

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11) EP 0 643 164 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent
20.11.1997 Bulletin 1997/48

(51) Int. Cl.⁶ D21F 1/66

(21) Application number 94305838.6

(22) Date of filing: 11.08.1994

(54) Papermaking process and apparatus for use therewith
Verfahren zur Herstellung von Papier und damit verwendete Vorrichtung
Procédé de fabrication du papier et appareil fulfilling

(64) Designated Contracting States. AT BE CH DE DK ES FR IT LI NL PT SE (30) Priority 27.08.1993 GB 9317817 (43) Date of publication of application. 16.03.1995 Bulletin 1995/11 (73) Proprietor The Wiggins Teape Group Limited Basingstoke Hampshire RG21 2EE (GB) (72) Inventor Harris, Colin Austin Hybridge, Devon. PL21 0AR (GB)	(74) Representative: Norris, Richard John Intellectual Property Department, Arjo Wiggins Appleton plc, Butler's Court, Wotton Road Beaconsfield, Buckinghamshire HP9 1RT (GB) (56) References cited: WO-A-87/03023 • DATABASE WPI, n 91-079108, Darwent Publications Ltd, London, GB, & SE-A-8802087 (ABB ATOM) "The entire abstract" • DATABASE WPI, n 94-239403, Darwent Publications Ltd, London, GB, & JP-A-6173183 (MITSUBISHI PAPER MILLS) "The entire abstract"
---	---

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art 99(1) European Patent Convention)

EP 0 643 164 B1

138

(10)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11) EP 0 772 716 B1

(12) EUROPEAN PATENT SPECIFICATION

- (45) Date of publication and mention of the grant of the patent
20.03.2002 Bulletin 2002/12

(51) Int Cl⁷ D21H 15/02, D21H 21/24, D21H 17/07, D21H 17/59, D21H 17/06, A61K 7/00
- (21) Application number 98928932.2

(86) International application number PCT/US98/08741
- (22) Date of filing: 12.07.1995

(87) International publication number WO 98/04434 (15.02.1998 Gazette 1998/08)

(54) SOFT TISSUE PAPER FROM COARSE CELLULOSE FIBERS
AUS RAUHEN ZELLSTOFFFASERN HERGESTELLTES SANFTES TISSUEPAPIER
PAPIER TISSU OBTENU A PARTIR DE FIBRES DE CELLULOSE GROSSIERES

(84) Designated Contracting States: DE GB (30) Priority 29.07.1994 US 282331 (43) Date of publication of application 14.08.1997 Bulletin 1997/20 (73) Proprietor THE PROCTER & GAMBLE COMPANY Cincinnati, Ohio 45302 (US) (72) Inventors: - VINSON, Kenneth, Douglas Cincinnati, OH 45215 (US) - DEASON, Howard, Thomas Hamilton, OH 45011 (US)	(74) Representative. Hirsch, Urs Thomas et al Procter & Gamble European Service GmbH, Subbächer Strasse 40-50 65924 Schwalbach am Taunus (DE) (56) References cited: EP-A- 0 347 163 WO-A-93/21383 WO-A-94/05886 WO-A-95/00702 US-A- 5 240 582 US-A- 5 409 572 • "Handbook for Pulp & Paper Technologists" by Gary A. SMOOK (2nd Edition, Angus Wilde Publications), pages 17-19
---	--

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European Patent Convention)

EP 0 772 716 B1

44T
139

(19)



Europäisch Patentamt
European Patent Office
Office européen des brevets



(11) EP 0 851 062 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
01.07.1998 Bulletin 1998/27

(51) Int. CL⁶ D21H 21/22

(21) Application number 97310448.2

(22) Date of filing: 22.12.1997

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE
Designated Extension States:
AL LT LV MK RO SI

- Burrier, Byron E.
Neenah, WI 54956 (US)
- Ostrowski, Henry S.
Appleton, WI 54915 (US)
- Post, Elroy W.
Oshkosh, WI 54904 (US)
- Propp, Jacob H.
Oshkosh, WI 54901 (US)

(30) Priority 22.12.1996 US 770929
08.05.1997 US 851657

(71) Applicant: Fort James Corporation
Richmond, Virginia 23219 (US)

(74) Representative: Cropp, John Anthony David et al
MATHYS & SQUIRE
100 Gray's Inn Road
London, WC1X 8AL (GB)

(72) Inventors:
• Orlan, Philippe T
Appleton, WI 54911 (US)

(54) Absorbent paper and method for its manufacture

(57) A process for the manufacture of a hydrophilic, humectant, soft, pliant single-ply or multi-ply absorbent papers are prepared by a process comprising:

providing a moving foraminous support,
providing a headbox;

said moving foraminous support adapted to form a nascent web by depositing furnish upon said foraminous support;

providing wet pressing means operatively connected to said moving foraminous support to receive said nascent web and for dewatering of said nascent web by overall compaction thereof and providing a Yankee dryer operatively connected to said wet pressing means and adapted to receive and dry the nascent web;
supplying a furnish to said headbox comprising: cellulosic papermaking fiber consisting essentially of recycle fiber hardwood fiber softwood fiber and mixtures thereof; and optionally up to 50% synthetic fibers and adding a softener which has a melting range of about 0°-40°C wherein the softener com-

prises an imidazoline moiety formulated in organic compounds selected from the group consisting of alkoxylated aliphatic polyols, alkoxylated aliphatic diols, aliphatic polyols, aliphatic diols and a mixture of these compounds, wherein the process of adding the softener is controlled to retain a ratio of the average particle size of dispersed softener to the average fiber diameter in the range of about 0.01 to 15 percent forming a nascent web by depositing said furnish on said moving foraminous support; wet pressing said nascent web; transferring said nascent web to said Yankee dryer, adhering said web to said Yankee, creping said web from said Yankee; recovering a creped, dried absorbent paper product having a serpentine configuration in the form of a hydrophilic, humectant soft, pliant, single-ply or multi-ply napkin, towel, bathroom tissue, or facial tissue. These products are suitably also prepared using through air drying methods with or without the use of a Yankee dryer and the products exhibit a unique combination of properties designed to appeal to consumer preferences. In many applications, these products need not be creped, and in that case they do not have the serpentine configuration

EP 0 851 062 A2

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

140

RADICACIÓN 2-75739

EDICTO No 17448

**LA SECRETARÍA GENERAL AD-HOC
HACE SABER**

Que esta Superintendencia profirió Resolución No 28191 de 28-OCT-2006. Que el contenido de la parte resolutive es como sigue El Superintendente de Industria y Comercio

RESUELVE

ARTICULO PRIMERO Negar el privilegio de patente de invención para la solicitud

correspondiente a METODO PARA AGREGAR UN ADITIVO QUIMICO ADSORBIBLE A PULPA DURANTE EL PROCESAMIENTO DE PULPA Y PRODUCTOS ELABORADOS MEDIANTE DICHO METODO* que entró en fase nacional en virtud del Tratado de Cooperación en Materia de Patentes (PCT).

ARTICULO SEGUNDO Notificar personalmente el contenido de la presente resolución al doctor Ramiro Castro Duque o a quien haga sus veces, en su calidad de apoderado de Kimberly - Clark Worldwide, Inc. entregándole copia de la misma advirtiéndole que contra ella procede el recurso de reposición interpuesto ante el Superintendente de Industria y Comercio al momento de la notificación o dentro de los 5 días hábiles siguientes a ella

NOTIFÍQUESE Y CUMPLASE
Dada en Bogotá D.C. a los

28 OCT 2006

EL SUPERINTENDENTE DE INDUSTRIA Y COMERCIO


JAIME AUGUSTO ESCOBAR

Para notificar a los interesados, se fija el presente EDICTO en lugar visible al público en la SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO por el término de (10) diez días hábiles contados a partir de las 8.30 a.m de hoy

Secretaría General Ad-Hoc 10-NOV-2006 Este edicto se desliza hoy 24-NOV-2006 a las cinco (5:00 p.m)
Secretaría General Ad-Hoc
EDICTO No 17448