INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE2021/050715

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.

International application No.
PCT/SE2021/050715

Continuation of: second sheet

International Patent Classification (IPC)

D21H 27/00 (2006.01)
D21H 11/12 (2006.01)
A47K 10/00 (2006.01)
A47K 10/16 (2006.01)
D21H 27/38 (2006.01)

US	20180142419	A1	24/05/2018	US	10337147	B2	02/07/2019
US	20200232166	A1	23/07/2020	AU	2017400674	A1	05/09/2019
				BR	112019014276	A2	03/03/2020
				GB	2574744	A	18/12/2019
				KR	20190116335	A	14/10/2019
				MX	2019008742	A	02/10/2019
				US	20210292973	A1	23/09/2021
				US	11053643	B2	06/07/2021
				WO	2018156109	A1	30/08/2018
US	20130071678	A1	21/03/2013	AU	2012311164	B2	22/01/2015
				BR	112014005592	A2	21/03/2017
				CA	2847064	A1	28/03/2013
				CN	103814173	B	02/03/2016
				CO	6910179	A2	31/03/2014
				EP	2758593	B1	20/03/2019
				KR	101497884	B1	02/03/2015
				KR	20140068073	A	05/06/2014
				MX	2014002400	A	05/06/2014
				MX	337233	B	18/02/2016
				SA	112330828	B1	06/12/2015
				TW	I577855	B	11/04/2017
				TW	201319358	A	16/05/2013
				US	8524374	B2	03/09/2013
				US	9410291	B2	09/08/2016
				US	20160069029	A1	10/03/2016
				US	20140284010	A1	25/09/2014
				US	20130299107	A1	14/11/2013
				US	9222224	B2	29/12/2015
				US	8778505	B2	15/07/2014
				WO	2013041986	A2	28/03/2013
US	20190100878	A1	04/04/2019	AU	2015397128	B2	16/07/2020
				BR	112017024038	A2	24/07/2018
				EP	3302200	A4	16/01/2019
				ES	2838799	T3	02/07/2021
				KR	20180013965	A	07/02/2018
				MX	2017014274	A	20/04/2018
				US	20180135249	A1	17/05/2018
				US	10519601	B2	31/12/2019
				US	10145066	B2	04/12/2018
				WO	2016195627	A1	08/12/2016
US	10428465	B2	01/10/2019	NONE			

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US	20180135248	A1	17/05/2018	AU	2015397129	B2	04/03/2021
				MX	2017014267	A	20/04/2018
				US	10132036	B2	20/11/2018
				WO	2016195629	A1	08/12/2016
US	20180142421	A1	24/05/2018	US	10337149	B2	02/07/2019
				US	20190264395	A1	29/08/2019
				US	10526752	B2	07/01/2020
				US	20200102705	A1	02/04/2020
				US	10947673	B2	16/03/2021
				US	20210156093	A1	27/05/2021

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
CM16255M7-WO-JC		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2023/017660	6 April 2023 (06-04-2023)	8 April 2022 (08-04-2022)

Applicant

THE PROCTER & GAMBLE COMPANY

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language,** the international search was carried out on the basis of:
      [X] the international application in the language in which it was filed
      [ ] a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. [ ] This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. [ ] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. [ ] **Certain claims were found unsearchable** (See Box No. II)

3. [ ] **Unity of invention is lacking** (see Box No III)

4. With regard to the **title,**
   [X] the text is approved as submitted by the applicant
   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   [X] the text is approved as submitted by the applicant
   [ ] the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings,**
   a. the figure of the **drawings** to be published with the abstract is Figure No. 1A
      [X] as suggested by the applicant
      [ ] as selected by this Authority, because the applicant failed to suggest a figure
      [ ] as selected by this Authority, because this figure better characterizes the invention
   b. [ ] none of the figures is to be published with the abstract

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2023/017660

A. CLASSIFICATION OF SUBJECT MATTER

INV. D21H11/12 D21H27/00

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D21H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009/297781 A1 (HUSS RICHARD D [US] ET AL) 3 December 2009 (2009-12-03) table 8 paragraph [0098] claim 1	1-14
X	US 2021/332531 A1 (BAILEY WILLIAM ELLIS [US] ET AL) 28 October 2021 (2021-10-28) paragraph [0258]; claims 1,14	1-14
X	US 2022/010495 A1 (BAILEY WILLIAM ELLIS [US] ET AL) 13 January 2022 (2022-01-13) paragraph [0178]; claims 1-4	1-14

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 June 2023

Date of mailing of the international search report

20/06/2023

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Ponsaud, Philippe

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2023/017660

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009297781 A1	03-12-2009	CA 2725378 A1	17-12-2009
		EP 2281084 A2	09-02-2011
		US 2009297781 A1	03-12-2009
		WO 2009151544 A2	17-12-2009
US 2021332531 A1	28-10-2021	NONE	
US 2022010495 A1	13-01-2022	NONE	

Information on Search Strategy - Pilot phase (see OJ 2015, A86)
The type of information contained in this sheet may change during the pilot for improving the usefulness of this new service.

Application Number

PCT/US2023/017660

TITLE: THE TITLE IS AS PROVIDED ON PAGE 1 OF THE DESCRIPTION

APPLICANT: THE PROCTER & GAMBLE COMPANY

IPC CLASSIFICATION: D21H11/12, D21H27/00

EXAMINER: Ponsaud, Philippe

CONSULTED DATABASES: WPI

CLASSIFICATION SYMBOLS DEFINING EXTENT OF THE SEARCH:

IPC:

CPC: D21H11/12, D21H27/002

FI/F-TERMS:

KEYWORDS OR OTHER ELEMENTS FEATURING THE INVENTION:

EPO FORM P04A42

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2023/017660	06.04.2023	08.04.2022

International Patent Classification (IPC) or both national classification and IPC
INV. D21H11/12 D21H27/00

Applicant
THE PROCTER & GAMBLE COMPANY

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465	see form PCT/ISA/210	Ponsaud, Philippe Telephone No. -0

Form PCT/ISA/237 (Cover Sheet) (July 2022)

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

   a. ☐ forming part of the international application as filed.

   b. ☐ furnished subsequent to the international filing date for the purposes of international search (Rule 13*ter*.1(a)),

      ☐ accompanied by a statement to the effect that the sequence listing does not go beyond the disclosure in the international application as filed.

4. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established to the extent that a meaningful opinion could be formed without a WIPO Standard ST.26 compliant sequence listing.

5. Additional comments:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	2-14
	No:	Claims	1
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-14
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Point VIII

1 Claim 1 is not clear since the "reslushing" step is not defined in the claim and this term has no precisely recorgnized technical meaning.

2 Claim 1 is further unclear since the nature of the paper pulp is not defined, nor is defined the grammage of the paper and the step of creating zones of differential densities and how they are characterized.

Point V

3 Reference is made to the following documents:

D1 US 2009/297781 A1 (HUSS RICHARD D [US] ET AL) 3 December 2009 (2009-12-03)

D2 US 2021/332531 A1 (BAILEY WILLIAM ELLIS [US] ET AL) 28 October 2021 (2021-10-28)

D3 US 2022/010495 A1 (BAILEY WILLIAM ELLIS [US] ET AL) 13 January 2022 (2022-01-13)

4 Independent claim 1

Document D1 discloses a method (see claim 1) comprising froming a cellulosic tissue web made of slushed pulp made of reslushed pulp (see table 8) and further comprising embossing (see claim 1 of D1) and hence creatzing zones of different densities and creping (see claim 1 of D1). It is further disclosed at §98 that the pulp may include non-wood fibers.

Thus the subject-matter of present claim 1 is not novel over D1 (Art. 33(2) PCT).

Document D2 discloses a method of manufacturing a tissue web, comprising providing a pulp furnish comprising non-wood pulp fibers (see claims 1+14), forming a web, embossing and creping (see §258).

Document D3 discloses (see claims 1-4 and §178) a method of manufacturing a tissue product, comprising forming a web from a pulp furnish comprising non-wood fibers, embodding and creping said web.

The sole difference of present claim 1 over D2 or D3 is that the pulp is reslushed.

There is however no surprising and unexpected technical effect deriving from this distinguishing feature, which appears in fact to represent an obvious process feature in the field of paper making.

Thus the subject-matter of claim 1 is not inventive over any of D2 or D3 combined with the common general knowledge (Art. 33(3) PCT).

5 Dependent claims

The remaining dependent claims do not appear to be inventive over any of D1 to D3 combined with the common general knowledge since they contain only usual features, which are arrived at by the person skilled in the art through routine optimization work. Moreover, in view of the description, no surprising and unexpected technical effect results from these claims when taken in isolation.

Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO/ISA)

General information

For all international applications, the competent International Searching Authority **(ISA)** will establish an international search report **(ISR)** accompanied by a written opinion of the International Searching Authority **(WO/ISA)**. The **WO/ISA** may be responded to by

- filing informal comments with the **International Bureau of WIPO (IB)** (where no demand for international preliminary examination **(demand)** is filed**)**
- filing amendments under Art. 19 PCT (this can be done whether or not a **demand** is filed**)**
- filing amendments under Art. 34 PCT and/or formal observations in response to objections raised in the **WO/ISA** (where a **demand** *is* actually filed)

This document explains these possibilities.

Filing informal comments

After receipt of the **ISR and WO/ISA,** the applicant may file informal comments on the **WO/ISA, directly with the IB** (see International Search and Preliminary Examination Guidelines 2.15). These will be communicated to the designated/elected Offices, together with the International Preliminary Report on Patentability **(IPRP)** at 30 months from the priority date.

Amending claims under Art. 19 PCT

The applicant may file **amended claims** under Art. 19 PCT, **directly with the IB** by the later of the following dates:

- 2 months from the date of mailing of the **ISR** and the **WO/ISA**
- 16 months from the priority date

However, any such amendment received by the **IB** after the expiration of the applicable time limit shall be **considered to have been received on time** by the **IB**, if it reaches it **before** the technical preparations for international publication have been completed (the 15th day prior to the date of publication, see PCT Applicant's Guide, International Phase, 9.013).

For further information, please see Rule 46 PCT as well as form PCT/ISA/220.

Please also note that, when filing amended claims under Art. 19 PCT, such amendments shall be **accompanied by a letter** identifying the amendments made and also the basis for the amendments in the application as originally filed (Rule 46.5(b) PCT). Where a **demand** is filed, failure to comply with this requirement may result in the amendments being ignored in the International Preliminary Examination Report **(IPER)**, see Rule 70.2(c-*bis*) PCT.

Filing a demand for international preliminary examination

In principle, the **WO/ISA** will be considered to be the written opinion of the International Preliminary Examining Authority (**IPEA**). Where the **WO/ISA** issued by the **EPO** as **ISA** gives a positive opinion on the international application and the invention to which it relates, filing a **demand** with the **EPO** as **IPEA** would normally be unnecessary, since a positive IPRP would anyway be established by the IB based on the WO/ISA (see also further below).

If the applicant wishes to file a **demand** (for example, to allow him to argue his case in international preliminary examination with regard to objections raised in a negative **WO/ISA** before the **IPEA** issues an **IPER**), this must be done before expiration of **3 months after the date of mailing of the ISR and WO/ISA** or **22 months after priority date,** whichever expires later (Rule 54*bis* PCT). Amendments under Art. 34 PCT can be filed with the IPEA, normally at the same time as filing the demand (Rule 66.1(b) PCT) or within the time limit set for reply to any written opinion issued during international preliminary examination by the **IPEA**.

If a **demand** is filed at the **EPO** as **IPEA** and no comments/amendments have been received by the time the **EPO** starts drawing up the **IPER** (Rule 66.4*bis* PCT), the **WO/ISA** will be transformed by the **IPEA** into an **IPER** (also called the **IPRP (Chapter II)** which would merely reflect the content of the **WO/ISA** (OJ 10/2011, 532). The **demand** can still be withdrawn (Art. 37 PCT).

Please also note that, when filing amendments under Art. 34 PCT, such amendments shall be accompanied by a letter which identifies the amendments made and also the basis for the amendments in the application as originally filed (Rule 66.8(a) PCT). Failure to comply with this requirement may result in the amendments being ignored in the **IPER (IPRP (Chapter II))**, see Rule 70.2(c-*bis*) PCT.

Filing a request for supplementary international search

The applicant may, with the **IB**, file a request for **supplementary international search** under Rule 45*bis*.1 PCT. The present **ISR** and **WO/ISA** may also be taken into account in the execution of that supplementary international search, provided that these are available to the Authority charged with this task before it starts the supplementary search (Rule 45*bis*.5 PCT).

This kind of request **cannot be filed specifying the ISA** who did the **international search**.

More information on this topic can be found in the **PCT Applicant's Guide**, Chapter 8 (http://www.wipo.int/pct/en/guide/ip08.html).

End of the international phase

Where no **demand** is filed, at the end of the international phase, the **IB** will transform the **WO/ISA** into the IPRP (PCT Chapter I) (Rule 44*bis* PCT), which will then be transmitted together with possible informal comments to the designated Offices. Where a demand is filed, the **WO/ISA** is not transformed into an **IPRP (Chapter I)** by the **IB**, but rather the **IPEA** will establish an **IPER**, (the IPER is the same as the IPRP (PCT Chapter II), see Rule 70.15 PCT).

PATENT SPECIFICATION (11) 1 374 198

1 374 198

(21) Application No. 29795/72 (22) Filed 26 June 1972

(44) Complete Specification published 20 Nov. 1974

(51) International Classification D01B 1/10//D21C 3/02

(52) Index at acceptance
D1F 36A 36BX
D2W 1 2 3A2A

(72) Inventor ALFRED MAX HURTER

(54) PROCESS AND APPARATUS FOR USE IN MAKING RAW FIBRE, AND FOR MAKING PULP, FROM AGAVE PLANTS

(71) We, STADLER HURTER LIMITED, a Company organized and existing under the laws of Canada, of 1501 St. Catherine Street West, Montreal 107, Province of Quebec, Canada, 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 by the following statement:—

This invention relates to a method and apparatus for making raw fibres from plants of the agaves family, and, to a method and apparatus for making pulp from such fibres.

Plants of the agaves family, particularly the species known as sisalana or sisal, are now used to produce rope or cord. The rope or cord is produced by spinning what is known as "line fibre" obtained from the leaves of the sisal plant. "Line fibre" is obtained by mechanically separating the fibre bundle in the leaves from the pith and epidermal material and then drying and separating the fibre bundles into individual fibres.

The production of pulp from sisal rope or cord by methods and apparatus similar to those used in pulping rags is known. The method involved usually consists of charging ordinary digesters with cut or uncut sisal line fibre, tow or old ropes, cooking the material with caustic soda, and breaking, washing and bleaching the cooked fibres in beaters. Usually only hypochlorite is used in the bleaching. Normally, the pulp produced does not require any screening. While the pulp produced is a commercially acceptable high grade of pulp, it is expensive since only the line fibre or tow of the sisal plant, or old ropes or cordage are used.

The production of pulp from the sisal plant is also possible without the expensive, intermediate step of line fibre production for making rope. Both the leaves and the bole of the sisal plant are pressed, then subjected to caustic cooking, refining, and screening to provide acceptable pulp. Such a method is described in Patent Specification No. 1,107,038. The process, however, is still expensive since special cooking and screening techniques are required to remove the pith and epidermal waste material from the leaf and bole fibres to a degree sufficient to provide acceptable high grade pulp. The process also results in a disproportionately large production percentage of intermediate and low grade pulp.

It is an object of the present invention to provide a method and an apparatus for making raw fibres from agaves plants or hybrids thereof, and particularly sisal plants, as well as the provision of a method and apparatus for making pulp from such raw fibres, such pulp being commercially acceptable pulp which can be made at high, continuous, production rates and at costs competitive with the production costs of making pulp from other more commonly used plants.

According to one aspect of the present invention, there is provided a method of making raw fibre from plants of the agaves family and/or hybrids thereof, which method includes the step of chopping or shredding the leaves and if desired, the boles of the plants into short sections and substantially separating the skin, pith and waste material from the raw fibre in the short sections, wherein the leaves are chopped or shredded in a direction substantially perpendicular to their longitudinal axis.

According to a second aspect of the invention, there is provided a method of making pulp from the plants of the agaves family and/or hybrids thereof, which method comprises the steps of feeding fibres made

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by the method according to said first aspect into a digestor to convert the fibres into pulp.

The sisal leaves and/or boles are chopped or shredded into sections of predetermined length by means of a drum-type shredder. The leaves may be chopped or shredded into sections of 0.5 to 2.0 inches in length. The sections are then fed into a refiner wich loosens or separates the epidermal material, the pith, and other waste material from the raw fibres in the sections. The output from the refiner is then screened to substantially complete separation of the cut raw fibres from the waste material; such separation may be carried out within 8 hours of chopping or shredding the leaves.

The screened, cut raw fibres can then be dried and stored, or may be fed directly into a digester where they are cooked to provide a pulp product. The cut raw fibres, after refining and screening, have a low bulk density which can make it difficult to feed the fibres into a continuous digester at a desired production rate. To feed the fibres more easily, at desired production rates, it is desirable that they be "wilted" prior to feeding into the digester. By "wilting" it is meant the softening of the raw fibre by wetting or soaking the raw fibres with a suitable liquid and/or steam so as to raise the bulk density. The liquid can, for example, comprise liquids used in the digesting process.

After cooking the cut raw fibres in the continuous digester, the resulting pulp product is washed, screened and bleached. The bleaching process preferably comprises chlorination, caustic extraction and two stages of chlorine dioxide treatment. Following bleaching, the pulp can be mechanically cleaned, preferably by centrifugal cleaners.

According to a third aspect of the present invention, there is provided apparatus for making raw fibre from plants of the agaves family and/or hybrids thereof, which apparatus includes means operable to chop or shred the leaves in a direction substantially perpendicular to their longitudinal axis, and if desired the boles, of the plants into short sections, the cutting means comprising a roller having blades extending radially therefrom, recesses in the roller adjacent each blade for receiving leaves to be cut, and an anvil adjacent said roller for supporting the leaves as they are cut; a refining device operable to cut or shred the leaf sections into pieces of leaf; and a screening device operable to substantially separate skin, pith and waste material in said pieces from the raw fibres thereof. In accordance with a fourth aspect of the present invention, there is provided apparatus for making pulp from plants of the agaves family and/or hybrids thereof, which apparatus comprises the apparatus in accordance with the third aspect of the present invention; and a digestor for cooking the fibres to convert the fibres into pulp. The apparatus can also include means for adding liquid and/or steam to the raw fibre prior to feeding it into the digestor means so as to increase its bulk density. The refining device may include juxtaposed discs having serrations on their opposing surfaces, said discs being arranged for relative rotation one with respect to the other, whilst the screening device may include a plurality of screens of a flattened U-shape cross-section, said screens being arranged to vibrate with elliptical motion such that raw fibres collected on a said screen bounce along the screen and are thrown off at the end. The apparatus may include a further refining device and a further screening device for further separation of raw fibres from the remainded of the leaf sections. A washing means, which may be defined by a water bath, may be disposed intermediate the refining and screening devices.

The invention will now be described by way of example with reference to the accompanying drawing in which:

The Figure shows schematically the method steps and apparatus in accordance with the invention.

Referring to the drawing, raw fibre is obtained from a plant of the genus agaves or hybrids thereof. The leaves of these plants are of sabre shape and have a final length of up to four feet and a width at their widest point of about 4.5-5.0 inches and a thickness of $\frac{1}{4}$" to 1". The leaves have a dry weight of about 15%, the other 85% being water. Of the 15% dry weight about 9% is non-fibrous. These leaves can be chopped into sections along their length by a cutter A as shown in the Figure. The cutter "A" comprises a roller 1 with blades 2, extending from the curved surface thereof. The roller 1 contains recesses 3, adjacent each blade and forced feed belts 4 and an anvil 5 is situated adjacent the roller 1.

The leaves are cut such that about 85% of the leaf sections are less than 2.5 inches in length and 100% are less than 4.0 inches in length, preferably each section being about 0.5-2.0 inches in length.

Single leaves, loose bundles or bundles of leaves tied together are cut substantially perpendicular to the longitudinal axis of the leaves. The boles of the plant can be cut, by suitable means, (not shown) into sections having substantially the same length as the leaf sections as well. If boles are used however, they must be used with leaves and to provide acceptable pulp, and should not constitute more than 23% by weight of the

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bole-leaf mixture. The leaves and boles may be harvested manually or by machine.

The cut sections are then force fed into a refiner B, for example by screw extrusion. The refiner B shreds the sections substantially separating or loosening the skin, pith and waste material from the raw raw fibre. The refiner may comprise two vertically or horizontally disposed discs 6, 7 positioned with a very small separation between them, the opposed faces of the discs being serrated. The leaf sections are fed between the faces through an axial bore in one of the discs and the teeth 8, 9 on the serrated faces shred the sections into small pieces with the relative movement of the discs. One only of the discs may rotate, the other remaining stationary, or both may rotate at different speeds, in the same direction or they may rotate in different directions. Disc clearances should be 20 to 125 thousandth of an inch. The disc 7 can be moved as indicated by the arrow 10 to alter the clearance between the discs 6 and 7.

Water may be added during the refining process through line 20. The 85% water already present in the leaves is sufficient for the refining process but water can be added sufficiently to dilute the leaves such that the raw fibre comprises about 1% of the mixture.

The shredded leaves are delivered radially from between the discs 6 and 7 and pass into a bath of water C, which serves to further separate and wash the raw fibre and other material. The mixture then flows onto a screening apparatus "D" comprising a partially water flooded screen 11 over a bath 12 and showers 13 and 14 which introduce water into the apparatus "D" to ensure that the screen 11 remains flooded. By a flooded screen, it is meant that the level of the water is above part of the screen surface. This is to ensure orientation of the raw fibre which would otherwise pass through the screen. The water and other material pass through the screen leaving the raw fibres on the screen. The screen 11 has a flattened U-shape cross section and vibrates with elliptical motion. The raw fibres collected on the screen 11 bounce along the screen 11 until they are thrown off at one end. In the case of leaves and/or boles originally cut into sections of 1/2 to 2.0 inches in length, the screen may have holes of the order of 1/4 to 3/16 inches which allow the passage of the waste material but not the raw fibre.

A number of screens can be used, the number depending on the amount of leaves being passed through the process per unit time.

In some cases, it will be desirable to repeat the refining and screening processes a number of times depending on the cleanliness of raw fibre required, since not all of the non-fibrous material may be removed during the first refining and screening process. Thus, the leaf sections may pass first to a primary refiner followed by a primary screening apparatus after which they are passed to a secondary refiner and screening apparatus. The first screening process removes about 80% of the 9% non-fibrous material in the leaves, and the second screening process removes substantially all of the remainder.

In the case where further refining and screening is carried out, the serrated discs of the subsequent refiners are successively further apart for less attrition in the refining action.

According to the above process, approximately 5-6 lbs. of raw fibre can be obtained from 100lbs. of leaves (wet weight) while existing decorticating methods recover only 3 to 4-1/2 lbs. of line fibre.

The process also provides a continuous and fast conversion of leaves and boles of the agaves family into raw fibre. This is important since the process for converting these leaves to raw fibre should not take longer than 8 hours due to the fermentation of the leaf, which commences when it is cut into sections.

The raw fibre from the screening apparatus "D" can be stored or alternatively they may go directly to a continuous digester "E".

The raw sisal fiber after refining and screening, has a very low bulk density which may make it difficult to feed the fibres to a continuous digester at a high production rate. Therefore, the raw fibre being fed to the digester can be subjected to a wilting step. In this step, liquid is added to the raw fibre in a wilting chamber in order to increase the bulk density. The liquid can be that used in the digesting process and/or steam. The liquid can be added by suitable spray means 15 located over the conveying means 16 carrying the fibres to the digester "E".

It is preferable that the fibres be cooked in the continuous digester by an alkanline pulping process. After cooking, the resulting pulp fibres have a length of about 1 to 3 mm. and a length to diameter ratio of about 180:1. After cooking, the pulp may be washed and screened by suitable washing and screening means 17 and the pulp is then preferably bleached by suitable bleaching means 18. The bleaching may comprise a sequence using chlorination, caustic extraction and two stages of chlorine dioxide. After bleaching, the bleached pulp can be subjected to a mechanical cleaning step. Preferably, the pulp is cleaned by centrifugal cleaners 19.

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The operation of the apparatus and the process according to the invention are illustrated with reference to the following example which is in no way intended to limit the scope of the invention.

A bundle of sisal plant leaves was fed at a rate of 20 tons per hour into a recess 3 in the roller 1 of a cutter "A" in which the roller was 36 inches in diameter and rotated at a speed of about 400-500 rpm. The rate of feed of the bundle of leaves on conveyor 4 and the speed of rotation of the cutter "A" were adjusted such that when the leaves were contained in a recess 3 and were supported by the anvil 5, a blade 2 cut through the bundle, producing a leaf section 1.5 to 2 inches in length, the cut leaf section being thrown from the recess 3 onto a conveyor as the roller 1 rotated. The leaf sections from the cutter "A" were then fed into a refiner "B" comprising a stationary disc 6 and a rotatable disc 7, the discs being approximately 36 inches in diameter and having a clearance of about 0.020 inches. The rotable disc 7 was rotated at a speed of 900-1800 rpm and the relative movement of the teeth on the two discs shred the leaf sections into small pieces. The mixture in the refiner "B" was diluted with water which was introduced at a rate of 0.9 U.S. gallons per minute per lb. of green leaves. The refiner "B" converted 20 oven dry tons of whole chopped leaves per hour to raw sisal fibre. The resultant material flowed into a water bath "C" in which the material was washed to produce a further separation of the fibres from the waste material and the resultant mixture flowed into a screening apparatus "D", comprising three water flooded screens each 6 feet long and 4 feet wide having perforations of 3/16 inches in diameter. The screens were vibrated at a rate of 1000-1800 vibrations per minute to produce separation of the raw fibre. In this stage water was introduced at a rate of 8 U.S. gallons per minute per lb. of leaves, and 9.0 tons of dry raw fibres at 20% fibre consistency were produced. The resultant raw fibre mixture was passed to a secondary refiner similar to the primary refiner but with a disc clearance of 0.048 inches. The mixture in the secondary refiner was diluted with water at a rate of 0.9 U.S. gallons per minute per lb. of O.D. material and the resultant mixture was washed in water and passed to a secondary screening apparatus into which water was introduced at a rate of 6 U.S. gallons per minute per lb. of raw fibre. The secondary screening apparatus was identical with the primary screening apparatus.

8.0 tons of dry solids of 20% consistency were passed from the secondary screening apparatus to a digester "E" for conversion to pulp.

WHAT WE CLAIM IS:—

1. A method of making raw fibre from plants of the agaves family and/or hybrids thereof, which method includes the step of chopping or shredding the leaves and if desired, the boles of the plants into short sections and substantially separating the skin, pith and waste material from the raw fibre in the short sections, wherein the leaves are chopped or shredded in a direction substantially perpendicular to their longitudinal axis.

2. A method of making pulp from plants of the agaves family and/or hybrids thereof, which method includes the step of feeding fibres made by a method as claimed in Claim 1 into a digestor to convert the fibres into pulp.

3. A method as claimed in Claims 1 or 2 including the step of substantially separating the skin, pith, and waste material from the fibres by first refining the cut sections and then screening the refiner output.

4. A method as claimed in Claim 2 or Claim 3 when appendant to Claim 2 including the step of wilting the fibres prior to feeding them into the digestor.

5. A method as claimed in any one of the preceding claims including the step of separating the skin, pith, and waste material from the fibres within 8 hours of chopping or shredding the leaves.

6. A method as claimed in any one of the preceding claims wherein the leaves are chopped or shredded into sections of 0.5 to 2.0 inches in length.

7. A method as claimed in any one of Claims 3 to 6 including the step of passing the output from the refiner into a water bath to wash the output.

8. A method as claimed in any one of Claims 3 to 6 including the step of passing the screening output to a second refiner and a second screening device to further separate the raw fibres.

9. A method as claimed in any one of the preceding claims wherein the boles do not exceed, by weight, 23% of the weight of any bole-leaf mixture.

10. A method of making pulp from plants of the agaves family and/or hybrids thereof, the method being substantially as herein described with reference to the accompanying drawing.

11. Pulp from plants of the agaves family and/or hybrids thereof when produced by a method as claimed in any one of Claims 2 to 10.

12. Apparatus for making raw fibre from plants of the agaves family and/or

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hybrids thereof, which apparatus includes means operable to chop or shred the leaves in a direction substantially perpendicular to their longitudinal axis, and if desired the boles, of the plants into short sections, the cutting means comprising a roller having blades extending radially therefrom, recesses in the roller adjacent each blade for receiving leaves to be cut, and an anvil adjacent said roller for supporting the leaves as they are cut; a refining device operable to cut or shred the leaf sections into pieces of leaf; and a screening device operable to substantially separate skin, pith and waste material in said pieces from the raw fibres thereof.

13. Apparatus for making pulp from plants of the agaves family and/or hybrids thereof, which apparatus comprises apparatus as claimed in Claim 12; and a digestor for cooking the fibres to convert the fibres into pulp.

14. Apparatus as claimed in Claim 13 including means for adding liquid to the raw fibre prior to feeding them into said digestor so as to increase their bulk density.

15. Apparatus as claimed in any one of Claims 12 to 14 wherein said device comprises juxtaposed discs having serrations on their opposing surfaces, said discs being arranged for relative rotation one with respect to the other.

16. Apparatus as claimed in any one of Claims 12 to 15 wherein said screening device comprises a plurality of screens of a flattened U-shape cross-section, said screens being arranged to vibrate with elliptical motion such that raw fibres collected on a said screen bounce along the screen and are thrown off at the end.

17. Apparatus as claimed in any one of Claims 12 to 16 which includes a further refining device and a further screening device for further separation of raw fibres from the remainder of the leaf sections.

18. Apparatus as claimed in any one of Claims 12 to 17 including a washing means intermediate said refining and screening devices.

19. Apparatus as claimed in Claim 18 wherein said washing means is a water bath.

20. Apparatus for making pulp from plants of the agaves family and/or hybrids thereof, the apparatus being substantially as herein described with reference to, and as shown in, the accompanying drawing.

For the Applicants:

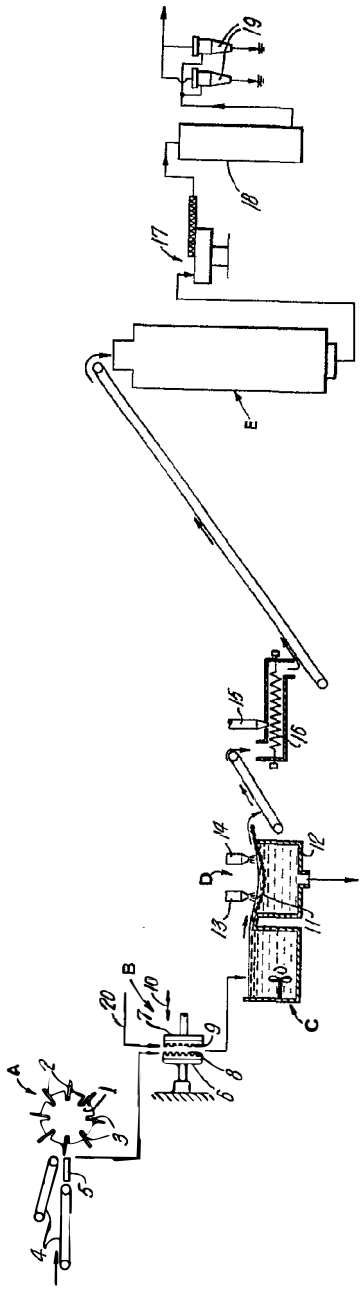
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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*



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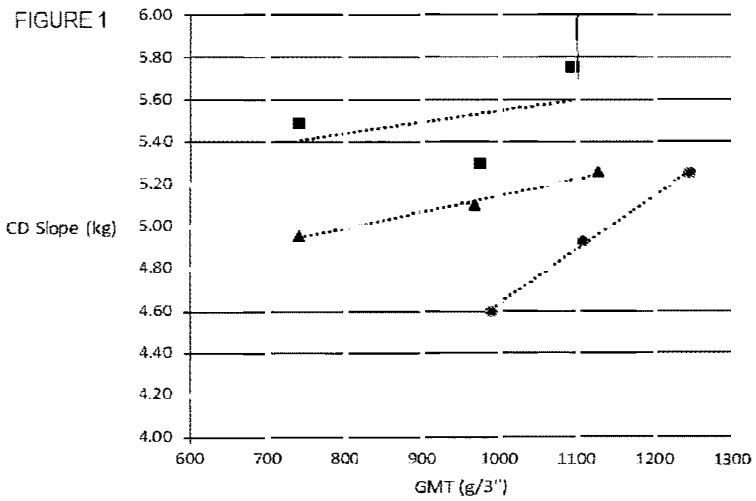
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(54) Title of the Invention: **Layered tissue comprising non-wood fibers**
Abstract Title: **Layered tissue comprising non-wood fibers**

(57) The present invention provides multi-layered tissue webs, and tissue products comprising the same, the multi-layered webs comprising wood fibers and non-wood cellulosic fibers where the non-wood cellulosic fibers are selectively deposited in one or more outer layers of the multi-layered web. Surprisingly disposing non-wood cellulosic fibers in the outer layers, even in relatively modest amounts, alters the machine and/or cross-machine direction properties of the resulting web, such that MD:CD tensile ratio may be reduced.

FIGURE 1



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(54)【発明の名称】　柔軟なクレープ紙及びその製造方法

(57)【要約】
【構成】　非木材パルプの少なくとも１種を木材パルプに少なくとも５重量％（対抄紙原料）配合し、クレープ処理したことを特徴とするクレープ紙。
【効果】　本発明によればクレープ紙のクレープ表面が滑らかでシルクライクな感触を与えることにより、柔軟性が著しく向上し、しかも強度、嵩を低下するどころかむしろ増加し、柔軟剤等では得られなかった効果をもたらす。

【特許請求の範囲】

【請求項１】　非木材パルプの少なくとも１種を木材パルプに少なくとも５重量％（対抄紙原料）配合し、クレープ処理したことを特徴とするクレープ紙．

【請求項２】　前記非木材パルプの繊維粗度が16mg/100m未満である請求項１に記載のクレープ紙．

【請求項３】　非木材パルプの平均繊維長が 2.5mm以上であり、繊維粗度が16mg/100m未満である請求項１に記載のクレープ紙．

【請求項４】　非木材パルプの平均繊維長が 1.1mm以上～ 2.5mm未満であり、繊維粗度が12mg/100m未満である請求項１に記載のクレープ紙．

【請求項５】　非木材パルプの平均繊維長が 1.1mm未満であり、繊維粗度が８mg/100m未満である請求項１に記載のクレープ紙．

【請求項６】　全抄紙原料パルプの繊維粗度が６mg/100m以上～16mg/100m未満である請求項１から５までのいずれか１項に記載のクレープ紙．

【請求項７】　非木材パルプの配合％（対抄紙原料）が５～80重量％である請求項１から６までのいずれか１項に記載のクレープ紙．

【請求項８】　非木材パルプの配合％（対抄紙原料）が10～50重量％である請求項１から６までのいずれか１項に記載のクレープ紙．

【請求項９】　非木材パルプがサンヘンプ、ケナフ、サイザル麻、アバカ、エスパルト、竹、ワラのいずれか１種または１種以上から得られたパルプである請求項１から８までのいずれか１項に記載のクレープ紙．

【請求項１０】　クレープ処理後の坪量が５～60g／m^2 のフェイシャルティシューである請求項１から９までのいずれか１項に記載のクレープ紙．

【請求項１１】　クレープ処理後の坪量が５～60g／m^2 のトイレットティシューである請求項１から９までのいずれか１項に記載のクレープ紙．

【請求項１２】　クレープ処理後の坪量が５～60g／m^2 のペーパータオルである請求項１から９までのいずれか１項に記載のクレープ紙．

【請求項１３】　非木材パルプの少なくとも１種以上を木材パルプに少なくとも５重量％（対抄紙原料）配合し、クレープ処理することを特徴とするクレープ紙の製造方法．

【請求項１４】　非木材パルプの繊維粗度が16mg/100m未満である請求項13に記載のクレープ紙の製造方法．

【請求項１５】　非木材パルプがサンヘンプ、ケフナ、サイザル麻、アバカ、エスパルト、竹、ワラから得られたパルプである請求項13または14に記載のクレープ紙の製造方法．

【請求項１６】　抄紙時に分散剤を添加する、請求項13から15までのいずれか１項に記載の製造方法．

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明はフェイシャルティシュー、トイレットティシュー、ペーパータオルなどのクレープ処理された柔軟性に優れたクレープ紙、及びその製造方法に関する。

【０００２】

【従来の技術】従来、ティシューペーパーなどの柔軟性を高める手段として、柔軟剤をパルプスラリーに添加する方法やクレープ処理前の湿紙またはクレープ処理後の乾燥シートにスプレー塗布する方法や印刷方式による塗工方法がすでに知られている．

【０００３】前者の方法では、柔軟剤にカチオン系界面活性剤が主に使用される。カチオン系界面活性剤の代表例として四級アンモニウム塩、アミン塩などが挙げられる．

【０００４】後者の方法では、カチオン系界面活性剤に加えてアニオン界面活性剤やノニオン界面活性剤も使用される．

【０００５】しかし、いずれの方法に於いても、柔軟剤の使用により柔軟性が向上するのは柔軟剤が界面活性剤であるがゆえに、共通したメカニズムによるものであり、また種々の問題を伴う．これらを以下に記述する．カチオン系界面活性剤を例にすると、親水基であるカチオン基がパルプ繊維表面に吸着し、親油基が外側に向かって配列する．ミクロ的にこの親油基が繊維間に存在すると繊維間の摩擦抵抗が減少し、マクロ的にシートにぬめり感を与えることにより柔らかく感じられる．しかし、繊維間の親油基は繊維間の水素結合を阻害し、強度低下を引き起こす．またこの親油基が繊維表面に存在するために吸水性は悪くなる．

【０００６】以上のように柔軟効果が発揮されるがそれに伴い強度、及び吸水性の低下を招き、ティシューペーパーなどにとって重大な欠陥となる．さらに、強度の低下により、紙粉の増加を引き起こし、実用上好ましくない。

【０００７】一方、柔軟剤などの薬品を使用しないで触感を増大させる方法が特開平2-9222 号公報で開示されている．これは特定のデニール、繊維長をもつポリエステル繊維を木材パルプに混抄する方法であるが、ポリエステル繊維は水素結合能力がないので混抄する場合、バンイダーを必要とする．このバインダーの使用によりある程度柔軟性は損なわれる．また当該繊維は疎水性のため、吸水性を必要とするティシューペーパーなどには不向きである．

【０００８】さらに、木材パルプ 100%で針葉樹パルプ、広葉樹パルプの配合比率の変更による方法やティシューペーパーに適したパルフの厳選による方法があるが、十分な柔軟性の向上は達成できないのが現状である．以上のように柔軟性を向上させる方法はあるが、いずれも上述のような種々の欠点を有している．

【０００９】
【発明が解決しようとする課題】本発明者らはこれらの問題に鑑み、鋭意研究の結果、強度や吸水性の低下を伴わないどころかむしろ増加させ、更にある場合には嵩の増加をもたらし、柔軟性を著しく向上したクレープ紙、及びその製造方法を発明するに至った。
【００１０】
【課題を解決するための手段】即ち、本発明は非木材パルプの少なくとも１種を少なくとも５重量％（対抄紙原料）、木材パルプに配合したことを特徴とするクレープ紙、及びその製造方法を提供するものである
【００１１】
【作用】一般に非木材パルプとは、木材繊維以外の繊維質から得られるパルプをさし、木材以外の植物繊維からなるパルプに限定される場合が多い。本発明における非木材パルプもこの定義に含まれるものである。
【００１２】本発明の方法により製造されるクレープ紙は木材パルプ 100%の場合に比べ、柔軟性が著しく向上し、しかも驚くことに強度、更に配合する非木材パルプによっては嵩も増加することが見出された。言い換えれば本発明によるクレープ紙は表面が滑らかでシルクライクな感触を持つ独特な風合いを有し、しかも従来のクレープ紙よりも嵩高で強度に優れている。特にケナフ、アバカを配合すると顕著である。
【●●１３】柔軟剤などの薬品を内添、もしくは塗布・塗工する場合、柔軟性は向上するが、強度が低下する。また叩解や紙力増強剤の使用によって強度を増加させることができるが、柔軟性が悪化することは既に知られている。即ち、柔軟性と強度は裏腹の関係にあることを考えれば柔軟性と強度、更には嵩をも向上させることはティシューペーパーなどには極めて好ましく、特異なことである。
【●●１４】本発明における非木材パルプは木材パルプとは異なるそれぞれ固有の繊維形態、繊維特性を有している。それらを詳細に検討した結果、繊維が同じ繊維長レベルにある木材パルプに比べて細いことが判明した。
【●●１５】繊維の太さ／細さを示す指標に繊維粗度がある。これは繊維 100m当たりの重量をmgで表わすものである。繊維粗度が小さいほど繊維が細いことを意味する。この繊維粗度は繊維長分布測定装置ＫＡＪＡＡＮＩ　ＦＳ－１０●によって計測に要した繊維数と繊維重量、計測された数平均繊維長から容易に測定できる。
【●●１６】本発明における非木材パルプの繊維粗度は産地の違いで多少異なるが一例を挙げると概ね次の通りである。単位はmg/100m
ケナフ：10～11、サイザル麻：12～13、アバカ：10～12、エスパルト：８～9.5 、サンヘンプ：14～15、竹：10～11、ワラ：６～７
【●●１７】また、繊維長は同様に次の通りである。単位はmm
ケナフ： 2.7～3.0 、サイザル麻： 2.5～2.7 、アバカ： 4.0～4.3 、エスパルト：1.25～1.4 、サンヘンプ： 2.8～3.0 、竹： 1.5～1.7 、ワラ： 0.9～1.0
【●●１８】木材パルプは材種にもよるが市販品で、繊維粗度（mg/100m）は針葉樹クラフトパルプ：16～28、広葉樹クラフトパルプ：８～18である。繊維長（mm）は針葉樹クラフトパルプ： 2.8～4.0 、広葉樹クラフトパルプ： 0.7～1.5 である。なお、繊維粗度はパルプ製造方法に関係なく、その材種に依存し、木材パルプでは繊維長が長いほど繊維粗度は大きくなる傾向にある。
【●●１９】したがって、本発明における非木材パルプは同一繊維長レベルの木材パルプに比べて繊維粗度が小さく、特にアバカは木材パルプに比べ繊維が長い割に繊維粗度は小さい。また、電子顕微鏡や光学顕微鏡観察からも上記の非木材パルプは木材パルプよりも細いことが観察できる。
【●●２●】本発明における非木材パルプは繊維粗度が16mg/100m未満であることが重要な特徴である。更に詳しくは、繊維長が 2.5mm以上である場合、繊維粗度が16mg/100m未満であることが必要である。これに該当する非木材パルプはサンヘンプ、ケナフ、サイザル麻、アバカなどが挙げられる。この場合、繊維粗度が16mg/100m以上であると針葉樹クラフトパルプと同レベルとなり十分な柔軟性の向上は得られない。針葉樹クラフトパルプの一部、または全量をこれらの非木材パルプに置き換えて配合することにより上記の効果が得られる。
【００２１】また、繊維長が 1.1mm以上～2.5mm 未満である場合、繊維粗度が12mg/100m未満であることが必要である。これに該当する非木材パルプとしてエスパルト、竹などが挙げられる。
【●●２２】さらに、繊維長が 1.1mm未満である場合、繊維粗度が８mg/100m未満であることが必要である。これに該当する非木材パルプとしてワラなどが挙げられる。これらの場合、それぞれ繊維粗度が12mg/100m以上、８mg/100m以上であると広葉樹クラフトパルプと同一繊維長で同レベルとなり十分な柔軟性の向上は得られない。広葉樹クラフトパルプの一部、または全量をこれらの非木材パルプに置き換えて配合することにより上記の効果が得られる。
【００２３】いずれにしても同一繊維長レベルの木材パルプに比べて繊維粗度が低い非木材パルプを配合することが上記の効果を得るのに必要である。以上を容易に理解するために、本発明に該当する非木材パルプの形態上の概略位置づけ（繊維長 VS.繊維粗度）を図１に示す。また本発明に係わる代表的な非木材パルプの概要を以下記す。
【００２４】サンヘンプはアジア南部に産する一年生草本で、製紙特性は強度に優れ、剛度の低い紙を与える。
【●●２５】ケナフはアオイ科の一年生草本で、黄麻代用の繊維植物として製紙原料の他ロープ、魚網に使用さ

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れている．製紙特性は強度、平滑性に優れ、嵩高な紙を与える．

【●●２６】サイザル麻はヒガンバナ科に属し、中南米、アフリカ等で栽培されている．葉から繊維を採取し、６～７年でパルプ原料となるといわれる．製紙特性は吸水性に優れ、剛度の低い紙を与える．

【００２７】アバカは別名マニラ麻と呼ばれ、バショウ科に属する多年性草本である．フィリピンや中米で栽培され、葉から繊維を採取する．製紙特性は繊維が細く、強度が著しく高い紙を与える．

【●●２８】エスパルトはイネ科の多年性草本で、北アフリカ、スペイン等で栽培されている．大部分は製紙用に利用され、製紙特性は繊維が細く、嵩高な紙を与える．

【●●２９】竹は多年性植物で、中国等で製紙原料として利用されている．製紙特性は吸水性に優れ、剛度の低い紙を与える．

【●●３●】ワラは木材の代替として、森林資源に乏しい地域で製紙原料として利用されている．製紙特性は繊維が非常に細く、地合、平滑性に優れている．

【●●３１】これらの非木材パルプは少なくとも１種を配合すればよいが、柔軟性のほかに要求される品質によって２種以上配合することも可能である．むしろ複数配合の方が個々の特長を生かし、柔軟性においても相乗効果が発揮できるため、より好ましい．そして、前記条件に当てはまる非木材パルプと木材パルプとからなる全抄紙原料パルプの平均繊維粗度が６mg/100m以上、16mg/100m未満であれば、本発明の効果が発揮される．

【●●３２】本発明において、上記の非木材パルプを木材パルプに配合する割合は少なくとも５重量％（対抄紙原料）が望ましいが、更に５～80重量％がより好ましく、特に10～50重量％配合することが最も好ましい．上記の非木材パルプの配合割合が５重量％未満では満足いく柔軟性が得られず、80重量％を越えるとそれ以上の柔軟性の向上は見られない．

【００３３】加えて、上記の非木材パルプは未叩解時で木材パルプに比べ強度が高いものもあり、乾燥紙力増強剤や叩解は不要で紙力の向上も達成できる．また、品目によって柔軟性を損なわない程度に全抄紙原料を叩解したり、木材パルプのみ叩解する分別叩解も可能である．

【●●３４】以上のような効果が得られる原因は必ずしも明らかではないが、本発明者らの研究結果から非木材パルプの繊維粗度という特性がティシューペーパーなどのクレープ紙の柔軟性に大きく寄与していることを見出した．

【●●３５】即ち、前述のように本発明における非木材パルプ繊維は木材パルプと同等もしくはそれ以上の繊維長を有しているにもかかわらず、繊維粗度等から見られるように同一繊維長レベルの木材パルプに比べ繊維が細く、繊維自身がしなやかであり、かつ繊維間結合能力にも優れているため、両者の相乗効果によりヤンキードライヤーでクレープ化された後、細かいクレープが形成されて剛度が減少し、クレープ表面のざらつき感がなくなり表面の滑らかさが向上したため、強度があって、しかも手の触感や肌触りで柔らかく感じられるものと推定される。

【●●３６】本発明によるクレープ紙には、フェイシャルティシュー、トイレットティシュー、ペーパータオル、ワイパー等が当てはまり、必要に応じて抄紙時にポリアミド・ポリアミン・エピクロルヒドリン樹脂などの湿潤紙力増強剤やポリエチレンオキサイドなどの分散剤の併用も可能である．特にアバカなどの長繊維を配合する場合、分散剤は必要である．

【００３７】

【実施例】以下に、本発明を実施例により具体的に説明するが、本発明はこれらの実施例によって何ら制限されるものではない．

【●●３８】針葉樹クラフトパルプ／広葉樹クラフトパルプ＝50／50より成る木材パルプに対し、非木材パルプを表１に示すように配合し（すべて未叩解）、更に分散剤としてポリエチレンオキサイドを0.15％（対抄紙原料）、湿潤紙力増強剤としてポリアミド・ポリアミン・エピクロルヒドリン樹脂を0.12％（対抄紙原料）それぞれ添加し、長網ヤンキーマシンにより坪量15ｇ／m^2 のクレープ紙（クレープ率20％）を抄造した．その後クレープ紙は２プライに加工し、品質試験に供した．

【●●３９】なお、比較品４は木材パルプ 100％を原料とし、上記薬品のほかにカチオン系柔軟剤を 0.1％（対抄紙原料）を添加し、上記と同条件で抄造した場合である．以下に、各種品質試験の測定方法を説明する．

【００４０】嵩：試料を10プライ重ねたときの紙厚（ｍｍ）を嵩とした．

【００４１】引張り強度：ＭＤ方向、ＣＤ方向において試料を15㎜幅にカットし、各方向の引張り強度を１プライにて測定し、次式により算出したものを引張り強度とした．

引張り強度（ｇ）＝（ＭＤ引張り強さ×ＣＤ引張り強さ）$^{1/2}$

【００４２】吸水度：試料表面に0.01mlの水を滴下し、吸収するまでの時間（秒）

【００４３】柔軟度：ＪＩＳ　Ｌ１０９６に記載されている織物の風合い計測法の一つであるハンドリングテスタ法により測定した．引張り試験機を使用し、測定リングから試料が引き抜かれる時の最大抵抗（ｇ）を柔軟度とした．よって値が小さいほど引き抜きに要する抵抗が小さいことから柔軟性が高いことを示す．

【●●４４】平均摩擦係数、摩擦係数の平均偏差：カトーテック社製ＫＥＳ－ＳＥ試験機により測定した．ピアノ線よりなる摩擦子が試料表面を走査し、計測する．平均摩擦係数が小さい程滑りやすく、その平均偏差が小さ

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い程ざらつき感が小さいことを示す．

【００４５】柔軟性の官能総合評価：パネラー10名により手の触感、及び肌触りの評価を行った．評価基準はA：非常に柔らかい　B：柔らかい　C：普通

【００４６】

【表１】

		本発明品1	本発明品2	本発明品3	本発明品4	比較品1	比較品2	比較品3	比較品4
パルプ配合(%)	木材パルプ	40	60	70	80	100	97	10	100
	ケナフ		20	10					カチオン系柔軟剤添加
	サイザル麻	20	20					45	
	アバカ	20			20		3		
	エスパルト	20		20				45	
嵩 (mm/10プライ)		1.18	1.18	1.19	1.05	1.02	1.02	1.25	1.01
引張り強度(g)		208	155	132	209	125	129	125	104
吸水度(秒)		1.6	1.5	1.6	1.9	2.2	2.2	1.6	2.6
柔軟度(g)		5.6	6.7	6.8	6.0	9.3	9.2	5.7	8.4
平均摩擦係数		0.147	0.168	0.171	0.156	0.174	0.174	0.148	0.172
摩擦係数の平均偏差		0.0086	0.0086	0.0087	0.0090	0.0098	0.0099	0.0086	0.0099
柔軟性の総合官能評価		A	A	A	A	C	C	A	B
非木材パルプの繊維粗度 (mg/100m)		11.0	12.0	9.5	10.9	-	10.9	10.5	-
全パルプの繊維粗度 (mg/100m)		12.0	12.9	12.3	13.0	13.5	13.4	10.8	13.5

【００４７】表の結果から明らかなように、実施例によって得られた各本発明品は木材パルプ100%の比較品１に比べ、表面の滑らかさとシルクライクな感触を示すことにより、柔軟性が著しく向上し、しかも引張り強度、嵩においても優れていた．これらは本発明における非木材パルプが独特の繊維形態と繊維特性を有しているからである．

【００４８】なお、比較品２では、柔軟性の向上がほとんどみられず、比較品３では、本発明品以上の柔軟性の向上は認められなかった．さらに、比較品４では、ある程度の柔軟性の向上は得られたが、その分強度低下が生じた．

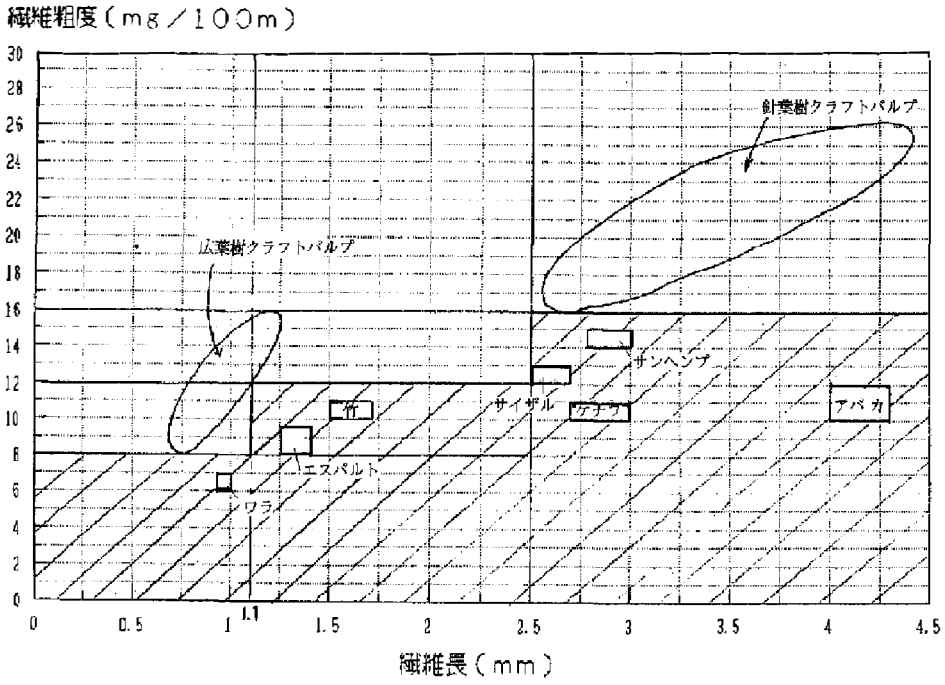
【００４９】

【発明の効果】以上、詳細に説明した通り、本発明は繊維粗度が16mg/100m未満である非木材パルプを少なくとも１種以上を木材パルプに少なくとも５重量%（対抄紙原料）配合し、クレープ処理することであり、それによりクレープ表面が滑らかでシルクライクな感触を与えることにより、柔軟性が著しく向上し、しかも強度、嵩を低下するどころかむしろ増加し、柔軟剤等では得られなかった効果をもたらす．

【図面の簡単な説明】

【図１】木材パルプと非木材パルプの繊維長 VS.繊維粗度の概略値を示す線図である．

【図１】



フロントページの続き

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Ｄ２１Ｈ　15/02

Flexible crepe paper and its production

Abstract

PURPOSE:To obtain crepe paper capable of rather increasing the strength and water absorption far from causing deterioration thereof, further increasing the bulkiness in some cases and remarkably improved in flexibility. CONSTITUTION:This crepe paper is obtained by blending at least one nonwoody pulp having <16 mg/100 m fiber coarseness with at least 5wt.%, preferably 5-80wt.%, especially 10-50wt.% (based on the papermaking raw material) with wood pulp and creping the resultant pulp. The fiber coarseness of the whole papermaking raw material pulp is preferably >=6mg/100m and <16mg/100m. Nonwoody pulp having g 2.5mm average fiber length and <16mg/100m fiber coarseness [e.g. pulp obtained from sunn hemp (Crotalaria junicea), kenaf (Hibiscus canabinus L.), sisal hemp (Agave sisalana) or abaca (Musa textilis)], having >=1.1 and <2.5mm average fiber length and <12mg/100m fiber coarseness [e.g. pulp obtained from esparto (Stipa tenacissima or Lygeum spartum) or a bamboo (Bambusa arundinacea, etc.)] and having <1.1mm average fiber length and <8mg/100m fiber coarseness (e.g. pulp obtained from straw) is cited as the nonwoody pulp.

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Japan

Find Prior Art Similar

Other languages: Japanese

Inventor: Mamoru Takahashi, 守 高橋, Masayuki Ozeki, 雅幸 尾関, Hitoshi Yamagawa, 均 山川

Current Assignee : KURESHIA KK

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Application JP5351617A events

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Info: Cited by (16), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Claims (16)

Hide Dependent
translated from Japanese

[Claims] 1. A crepe paper characterized by comprising at least 5% by weight of wood pulp (at least 5% by weight of paper making material) of non-wood pulp and creping the mixture. 2. The fiber roughness of the non-wood pulp is 16 mg / 100.
The crepe paper according to claim 1, which is less than m. 3. The crepe paper according to claim 1, wherein the non-wood pulp has an average fiber length of 2.5 mm or more and a fiber roughness of less than 16 mg / 100 m. 4. The crepe paper according to claim 1, wherein the non-wood pulp has an average fiber length of 1.1 mm or more and less than 2.5 mm and a fiber roughness of less than 12 mg / 100 m. 5. The crepe paper according to claim 1, wherein the non-wood pulp has an average fiber length of less than 1.1 mm and a fiber roughness of less than 8 mg / 100 m. 6. The fiber roughness of all pulp for papermaking is 6 mg / 100.
The crepe paper according to any one of claims 1 to 5, which has a size of m or more and less than 16 mg / 100 m. 7. The crepe paper according to any one of claims 1 to 6, wherein the blending% of the non-wood pulp (based on the papermaking material) is 5 to 80% by weight. 8. The composition% of non-wood pulp (based on papermaking material) is
The crepe paper according to any one of claims 1 to 6, which is 10 to 50% by weight. 9. The non-wood pulp is any one of sun hemp, kenaf, sisal hemp, abaca, esparto, bamboo and straw
The crepe paper according to any one of claims 1 to 8, which is a pulp obtained from one or more kinds. 10. The basis weight after crepe treatment is 5 to 60 g / m.
The crepe paper according to any one of claims 1 to 9, which is a facial tissue of ^{2}. 11. The basis weight after crepe treatment is 5 to 60 g / m.
The crepe paper according to any one of claims 1 to 9, which is a toilet tissue of item ^{2}. 12. The basis weight after crepe treatment is 5 to 60 g / m.
The crepe paper according to any one of claims 1 to 9, which is a paper towel of ^{2}. 13. A method for producing crepe paper, which comprises blending at least 5% by weight of wood pulp with at least 5% of non-wood pulp (based on a raw material for papermaking) and creping. 14. The fiber roughness of non-wood pulp is 16 mg / 100 m.
14. The method for producing crepe paper according to claim 13, which is less than. 15. The non-wood pulp is sun hemp, kenaf,
15. The method for producing crepe paper according to claim 13 or 14, which is a pulp obtained from sisal hemp, abaca, esparto, bamboo, and straw. 16. The method according to claim 13, wherein a dispersant is added at the time of paper making.
16. The manufacturing method according to any one of 1 to 15.

Description

translated from Japanese

Detailed Description of the Invention

[0001]

BACKGROUND OF THE INVENTION 1. Field of the Invention The present invention relates to a crepe-treated crepe paper such as facial tissue, toilet tissue, paper towel and the like having excellent flexibility, and a method for producing the same

[0002]

2. Description of the Related Art Conventionally, as a means for increasing the flexibility of tissue paper, a softening agent is added to a pulp slurry, a wet paper before crepe treatment or a dry coating after crepe treatment is applied by spraying or printing method. The coating method is already known.

In the former method, a cationic surfactant is mainly used as a softening agent. Representative examples of cationic surfactants include quaternary ammonium salts and amine salts.

In the latter method, an anionic surfactant and a nonionic surfactant are used in addition to the cationic surfactant.

However, in any of the methods, the fact that the softening agent is used to improve the flexibility is due to a common mechanism because the softening agent is a surfactant, and also involves various problems. These are described below.
Taking a cationic surfactant as an example, a cationic group which is a hydrophilic group is adsorbed on the surface of the pulp fiber, and a lipophilic group is arranged outward. Microscopically, when this lipophilic group is present between the fibers, the frictional resistance between the fibers decreases, and the sheet feels soft by giving a slimy feel to the sheet. However, the lipophilic group between the fibers inhibits the hydrogen bonding between the fibers and causes a decrease in strength. In addition, since the lipophilic group is present on the fiber surface, the water absorption becomes poor.

As described above, the softening effect is exerted, but the strength and the water absorption are reduced accordingly, which is a serious defect for tissue paper and the like. Further, the decrease in strength causes an increase in paper powder, which is not preferable in practice.

On the other hand, a method of increasing the tactile sensation without using a chemical such as a softening agent is disclosed in Japanese Patent Laid-Open No. 2-29222. This is a method of mixing polyester fibers having a specific denier and fiber length with wood pulp. However, since polyester fibers do not have a hydrogen bonding ability, a vanider is required for mixing. The use of this binder results in some loss of flexibility. Further, since the fiber is hydrophobic, it is not suitable for tissue paper or the like that requires water absorption.

Further, there are methods of changing the blending ratio of softwood pulp and hardwood pulp at 100% of wood pulp, and a method of carefully selecting parfu suitable for tissue paper, but it is the current situation that sufficient flexibility cannot be achieved, is there. Although there are methods for improving flexibility as described above, all have various drawbacks as described above.

[0009]

DISCLOSURE OF THE INVENTION In view of these problems, the present inventors have earnestly studied, and as a result, not only the decrease in strength and water absorption was increased but rather increased, and in some cases, the increase in bulk was brought about. Crepe paper with significantly improved flexibility,
And, they have invented a manufacturing method thereof.

[0010]

That is, the present invention provides a crepe paper characterized by containing at least 5% by weight of a non-wood pulp (based on a papermaking msterial) in wood pulp, and a method for producing the same. Tc provide

[0011]

In general, the term "non-wood pulp" refers to a pulp obtained from a fiber material other than wood fiber, and is often limited tc a pulp composed of a plant fiber other than wood. Non-wood pulp in the present invention is also included in this definition.

The crepe paper produced by the method of the present invention has significantly improved flexibility as compared with the case of 100% wood pulp, snd surprisingly, the strength, and the bulk may be increased depending on the non-wood pulp to be blended. Was found. In other words, the crepe paper according to the present invention has a unique texture with a smooth surface and a silky feel, and is bulkier and stronger than conventional crepe paper. Especially when kenaf and abaca are mixed

Internal addition or application of chemicals such as softeners
When applied, flexibility is improved, but strength is reduced.
Although strength can be increased by beating or the use of a paper strengthening agent, it is already known that the flexibility is deteriorated. That is, considering that the flexibility and the strength are contradictory to each other, it is extremely preferable and peculiar to improve the flexibility and the strength, and further the bulk.

The non-wood pulp according to the present invention has unique fiber morphology and fiber characteristics different from those of wood pulp. Detailed examination of them revealed that the fibers were thinner than wood pulp at the same fiber length level.

Fiber roughness is an index indicating the thickness / thinness of the fiber. This is expressed in mg per 100 m of fiber. The smaller the fiber roughness, the finer the fibers. This fiber roughness is measured by a fiber length distribution measuring device KAJAANI.
It can be easily measured from the number of fibers required for measurement, the fiber weight, and the measured number average fiber length by FS-100.

The fiber roughness of the non-wood pulp in the present invention is slightly different depending on the place of production, but one example is as follows. The unit is mg / 100m Kenaf: 10-11, Sisal: 12-13, Abaca: 10-1
2, Esparto: 8-9.5, Sunhemp: 14-15, Bamboo: 1
0-11, straw: 6-7

The fiber lengths are also as follows. The unit is mm Kenaf: 2.7-3.0, Sisal: 2.5-2.7, Abaca: 4.0-4.3, Esparto: 1.25-1.4, Sunhemp: 2.8-3.0, Bamboo: 1.5-1.7, Straw: 0.9-1.0

Wood pulp is a commercially available product although it depends on the material type, and thefiber roughness (mg / 100 m) is softwood kraft pulp: 16 to 25, Hardwood kraft pulp: 8-18. The fiber length (mm) is 2.8 to 4.0 for softwood kraft pulp and 0.7 to 1.5 for hardwood kraft pulp. The fiber roughness depends on the type of material regardless of the pulp manufacturing method, and the longer the fiber length of wood pulp, the higher the fiber roughness tends to be.

Therefore, the non-wood pulp of the present invention has a smaller fiber roughness than the wood pulp of the same fiber length level, and in particular, abaca has a smaller fiber roughness than the wood pulp in spite of its longer fibers. Further, it can be observed that the above-mentioned non-wood pulp is thinner than wood pulp by observation with an electron microscope or an optical microscope.

The non-wood pulp of the present invention has a fiber roughness of
An important feature is less than 16 mg / 100 m. More specifically, when the fiber length is 2.5 mm or more, the fiber roughness is 16
It should be less than mg / 100m. Non-wood pulps that fall under this category include sun hemp, kenaf, sisal, and abaca. In this case, the fiber roughness is 16mg / 100m
If it is above, it will be the same level as the softwood kraft pulp and sufficient improvement in flexibility cannot be obtained. The above effect can be obtained by substituting a part or all of the softwood kraft pulp for these non-wood pulps and blending them.

When the fiber length is 1.1 mm or more and less than 2.5 mm, the fiber roughness must be less than 12 mg / 100 m. Examples of non-wood pulp corresponding to this include esparto and bamboo

Further, when the fiber length is less than 1.1 mm,
It is necessary that the fiber roughness is less than 8 mg / 100 m. Examples of the non-wood pulp corresponding to this include straw and the like. In these cases, when the fiber roughness is 12 mg / 100 m or more and 8 mg / 100 m or more, the same fiber length as that of the hardwood kraft pulp is obtained at the same level and sufficient flexibility cannot be obtained. The above effects can be obtained by replacing a part or the whole amount of the hardwood kraft pulp with these non-wood pulps and blending them.

In any case, it is necessary to blend non-wood pulp having a fiber roughness lower than that of wood pulp having the same fiber length level in order to obtain the above effect. In order to easily understand the above, the schematic positioning (fiber length VS. fiber roughness) of the non-wood pulp according to the present invention is shown in FIG.
The outline of a typical non-wood pulp according to the present invention will be described below.

Sunhemp is an annual herb that is produced in southern Asia and has excellent paper-making properties and gives a paper with low rigidity.

Kenaf is an annual herb of the Malvaceae family, and is used as a fiber plant for jute substitution, as a raw material for papermaking, as well as ropes and fishnets. The papermaking properties are excellent in strength and smoothness, and give bulky paper.

Sisal hemp belongs to the family Amaryllidaceae and is cultivated in Central and South America, Africa and the like. It is said that fiber is collected from the leaves and used as a pulp raw material in 6 to 7 years. The papermaking properties are excellent in water absorption and give a paper with low rigidity.

Abaca, also known as Manila hemp, is a perennial herb belonging to the family Musaceae. Cultivated in the Philippines and Central America, fiber is extracted from the leaves. The papermaking characteristics are fine fibers,
Gives papers of very high strength.

Esparto is a perennial herb belonging to the family Gramineae and is cultivated in North Africa, Spain and the like. Mostly used for papermaking, the papermaking properties give thin and bulky papers.

Bamboo is a perennial plant and is used as a raw material for papermaking in China and the like. The papermaking properties are excellent in water absorption and give a paper with low rigidity.

Straws are used as a raw material for papermaking in regions where forest resources are scarce as an alternative to wood. The papermaking properties are very fine fibers, excellent texture and smoothness.

At least one kind of these non-wood pulps may be blended, but it is also possible to blend two or more kinds depending on the required quality in addition to the flexibility. Rather, a combination of a plurality of compounds is more preferable because the individual characteristics can be utilized and the synergistic effect can be exerted in the flexibility. And, the average fiber roughness of the whole papermaking raw material pulp which consists of non-wood pulp and wood pulp that meets the above conditions is 8 mg / 100 m or more, 16 mg / 1
When it is less than 00 m, the effect of the present invention is exhibited.

In the present invention, the ratio of the non-wood pulp to be mixed with the wood pulp is preferably at least 5% by weight (based on the paper making material), more preferably 5 to 80% by weight, particularly preferably 10 to 50% by weight. Most preferably. If the above-mentioned non-wood pulp content is less than 5% by weight, satisfactory flexibility cannot be obtained, and if it exceeds 80% by weight, no further improvement in flexibility is observed.

In addition, since some of the above non-wood pulps have higher strength than wood pulp when not beaten, a dry paper strengthening agent and beating are not necessary and the paper strength can be improved. Further, depending on the item, it is possible to beat all the papermaking raw materials to the extent that flexibility is not impaired, or separate beaten to beat only wood pulp.

Although the reason why the above effects are obtained is not always clear, the characteristic of the fiber roughness of the non-wood pulp greatly contributes to the flexibility of crepe paper such as tissue paper from the results of the study by the present inventors. I found that.

That is, as described above, although the non-wood pulp fiber in the present invention has a fiber length equal to or longer than that of wood pulp, it has the same fiber length level as seen from the fiber roughness. Since the fibers are finer than those of wood pulp, and the fibers themselves are supple and have excellent interfiber bonding ability, the synergistic effect of the two causes the crepe to be formed with a Yankee dryer, and then a fine crepe is formed and the rigidity is increased. It is presumed that the crepe surface has a reduced roughness and the smoothness of the crepe surface has disappeared and the smoothness of the surface has improved, and that the crepe has strength and is soft to the touch and touch.

Facial tissue, toilet tissue, paper towel, wiper, etc. are applied to the crepe paper according to the present invention, and if necessary, a wet paper strengthening agent such as polyamide / polyamine / epichlorohydrin resin or a dispersant such as polyethylene oxide during papermaking. Can be used together. A dispersant is necessary especially when blending long fibers such as abaca.

[0037]

EXAMPLES The present invention will now be described in detail with reference to examples, but the present invention is not limited to these examples.

A non-wood pulp was compounded as shown in Table 1 (all unbeaten) to a wood pulp consisting of 50/50 softwood kraft pulp / hardwood kraft pulp, and 0.15% polyethylene oxide was added as a dispersant (paired). Raw materials for papermaking), polyamide / polyamine /
0.12% of epichlorohydrin resin (for papermaking material) was added to each, and crepe paper (crepe ratio 20%) having a basis weight of 15 g / m ^{2} was produced by s long net Yankee machine. After that, the crepe paper was processed into two plies and subjected to a quality test.

Comparative product 4 is s case where 100% of wood pulp is used as a raw material, 0.1% of a cationic softening agent (for papermaking rsw material) is added in addition to the above chemicals, and pspermsking is performed under the same conditions as above. The measuring methods of various quality tests will be described below.

Bulk: Paper thickness (m when 10 plies of samples are stacked)
m) was made bulky.

Tensile strength: A sample was cut into a width of 15 mm in the MD and CD directions, the tensile strength in each direction was measured with one ply, and the value calculated by the following equation was taken as the tensile strength. Tensile strength (g) = (MD tensile strength x CD tensile strength) $^{1/2}$

Water absorption: 0.01 ml of water was dropped on the surface of the sample,
Time to absorb (seconds)

Softness: Measured by a handling tester method, which is one of the methods for measuring the texture of a woven fabric described in JIS L1096. Using a tensile tester, the maximum resistance (g) when the sample was pulled out from the measuring ring was defined as the flexibility. Therefore, the smaller the value, the smaller the resistance required for pulling out, indicating that the flexibility is high.

Average coefficient of friction and average deviation of coefficient of friction: Measured with a KES-SE tester manufactured by Kato Tech. A friction element consisting of a piano wire scans the surface of the sample and measures it. The smaller the average friction coefficient is, the easier it is to slip, and the smaller the average deviation is, the smaller the graininess is.

Sensory comprehensive evaluation of softness: Ten panelists evaluated the feel and touch of the hand. The evaluation standard is A: very soft B: soft C: normal

[0048]

[Table 1]

As is clear from the results in the table, each of the products of the present invention obtained in the examples is a comparative product 1 containing 100% of wood pulp. Compared with, the surface smoothness and silky-like feel significantly improve flexibility, and the tensile strength,
It was also excellent in bulk. These are because the non-wood pulp of the present invention has unique fiber morphology and fiber characteristics.

In Comparative Product 2, almost no improvement in flexibility was observed, and in Comparative Product 3, no improvement in flexibility over the product of the present invention was observed. Further, in Comparative product 4, although the flexibility was improved to some extent, the strength was reduced accordingly.

[0049]

As described above in detail, according to the present invention, at least one non-wood pulp having a fiber roughness of less than 16 mg / 100 m is blended with wood pulp in an amount of at least 5% by weight (based on a papermaking material). It is a crepe treatment, which gives a smooth and silky feel to the crepe surface, thereby significantly improving the flexibility and further increasing the strength rather than decreasing the strength and bulk, which cannot be obtained with a softening agent or the like. Bring effect.

[Brief description of drawings]

FIG. 1 is a diagram showing the approximate values of fiber length VS. fiber roughness of wood pulp and non-wood pulp.

---------- Continuation of the front page (51) Int.Cl. [6] Identification code Internal reference number FI technical display part D21H 15/02

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Publication number	Priority date	Publication date	Assignee	Title
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JP2002249994A *	2001-02-26	2002-09-06	Daio Paper Corp	Sanitary tissue paper and method for producing the same
JP2002348676A *	2001-05-28	2002-12-03	Daio Paper Corp	Thin sanitary paper roll and manufacturing method therefor
JP2003159193A *	2000-02-01	2003-06-03	Oji Paper Co Ltd	Tissue paper
JP2004124314A *	2002-10-03	2004-04-22	Daio Paper Corp	Sanitary paper
JP2005124884A *	2003-10-24	2005-05-19	Daio Paper Corp	Domestic sanitary tissue
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JP2006265742A *	2005-03-22	2006-10-05	Oji Paper Co Ltd	Raw paper for paper yarn
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Family To Family Citations

* Cited by examiner, † Cited by third party, ‡ Family to family citation

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JP2555177B2	1996-11-20	Bulky paper and manufacturing method thereof
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JP7259624B2	2023-04-18	Water-disintegratable nonwoven fabric, wet water-disintegratable nonwoven fabric, and method for producing water-disintegratable nonwoven fabric

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
JP35161793A	1993-12-28	1993-12-28	Flexible crepe paper and method for producing the same

Applications Claiming Priority (1)

Application	Filing date	Title
JP35161793A	1993-12-28	Flexible crepe paper and method for producing the same

Legal Events

Date	Code	Title	Description
2006-08-01	R250	Receipt of annual fees	Free format text: JAPANESE INTERMEDIATE CODE: R250
2006-09-26	R313	Written request for registration of change of name	Free format text: JAPANESE INTERMEDIATE CODE: R313533
2006-10-04	R350	Written notification of registration of transfer	Free format text: JAPANESE INTERMEDIATE CODE: R350
2007-07-24	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20080725

			Year of fee payment: 5
2008-07-17	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20080725 Year of fee payment: 5
2008-07-22	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20090725 Year of fee payment: 6
2009-07-16	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20090725 Year of fee payment: 6
2009-07-21	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20100725 Year of fee payment: 7
2010-05-11	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20110725 Year of fee payment: 8
2011-06-14	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20120725 Year of fee payment: 9
2012-04-10	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20130725 Year of fee payment: 10
2013-03-14	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20130725 Year of fee payment: 10
2013-03-19	FPAY	Renewal fee payment (event date is renewal date of database)	Free format text: PAYMENT UNTIL: 20140725 Year of fee payment: 11
2013-12-28	EXPY	Cancellation because of completion of term	

Concepts

machine-extracted

Download Filter table

Name	Image	Sections	Count	Query match
manufacturing process		title,claims,description	10	0.000
fiber		claims,abstract,description	86	0.000
Pulp (paper)		claims,abstract,description	65	0.000
Musa textilis		claims,abstract,description	13	0.000
raw material		claims,abstract,description	12	0.000
mixing		claims,abstract,description	9	0.000
Agave sisalana		claims,abstract,description	8	0.000
Bambusa arundinacea		claims,abstract,description	8	0.000
Bambusa tulda		claims,abstract,description	7	0.000
Hibiscus cannabinus		claims,abstract,description	7	0.000
Phyllostachys viridis		claims,abstract,description	7	0.000
bamboo		claims,abstract,description	7	0.000
straw		claims,abstract,description	7	0.000
Agave sisalana		claims,abstract,description	5	0.000
tissues		claims,description	11	0.000
material		claims,description	9	0.000
Bambusa tulda		claims,description	6	0.000
Crotalaria ochroleuca		claims,description	6	0.000

⊗ Crotalaria ●chroleuca	claims,description	6	0.000
⊗ dispersing agent	claims,description	4	0.000
⊗ facial	claims,description	3	0.000
⊗ mixture	claims,description	3	0.000
⊗ water	abstract,description	9	0.000
⊗ absorption reaction	abstract,description	8	0.000
⊗ Bambusa arundinacea	abstract	2	0.000
⊗ Crotalaria	abstract	1	0.000
⊗ Crotalaria juncea	abstract	1	0.000
⊗ Hibiscus	abstract	1	0.000
⊗ Hibiscus lunariifolius	abstract	1	0.000
⊗ Hibiscus rosa sinensis	abstract	1	0.000
⊗ Hibiscus rosa-sinensis	abstract	1	0.000
⊗ Lygeum spartum	abstract	1	0.000
⊗ Macrochloa tenacissima	abstract	1	0.000

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最終頁に続く

(54)【発明の名称】間仕切部分における柱撤去梁補強方法及び梁補強構造

(57)【特許請求の範囲】
【請求項１】
木造建築物内の隣接する部屋の間の間仕切部分において、該間仕切部分の中間部位に設けられて梁部材を支持する中間柱を撤去すると共に、前記梁部材を補強する柱撤去梁補強方法であって、
前記梁部材の下方に添設して、前記中間柱とこれの両側の柱との間に添梁を填め込むようにして取り付ける工程と、
前記両側の柱の柱間スパンよりも短い長さを有する補強用帯板状鉄骨梁を、これの帯板部分によって前記梁部材と前記添梁との接合部分を覆った状態で前記中間柱の両側に跨るようにして、両側の柱と両端部との間に間隔を保持した状態で当該間隔を残して前記柱間スパンの略全長に亘って取り付ける工程と、
前記中間柱の前記添梁よりも下方の部分を切断撤去する工程とからなることを特徴とする間仕切部分における柱撤去梁補強方法。
【請求項２】
木造建築物内の隣接する部屋の間の間仕切部分において、該間仕切部分の中間部位に設けられて梁部材を支持する中間柱を撤去した際に、前記梁部材を補強するための梁補強構造であって、
前記梁部材の下方に添設されて、前記中間柱の上端残存部と両側の柱との間に填め込まれるようにして各々設置される添梁と、
帯板部分によって前記梁部材と前記添梁との接合部分を覆った状態で前記中間柱の上端

残存部の両側に跨るようにして、両側の柱と両端部との間に間隔を保持した状態で当該間隔を残して前記柱間スパンの略全長に亘って取り付けられる、前記両側の柱の柱間スパンよりも短い長さを有する補強用帯板状鉄骨梁とからなることを特徴とする梁補強構造。

【請求項３】

前記補強用帯板状鉄骨梁の端部と前記両側の柱との間の間隔部分に配置されて、前記添梁を下方から支持する梁受金物が取り付けられている請求項２記載の梁補強構造。

【請求項４】

前記補強用帯板状鉄骨梁は、帯板部分に形成された打込み孔を介して前記梁部材及び前記添梁に向けてスクリューボルトを打ち込むことにより、前記梁部材と前記添梁との接合部分を覆った状態で取り付けられる請求項２又は３に記載の梁補強構造。

【請求項５】

前記補強用帯板状鉄骨梁には、該補強用帯板状鉄骨梁から延設される小梁を支持する小梁受金物が、前記打込み孔を介した前記スクリューボルトの打ち込みに伴って取り付けられる請求項４に記載の梁補強構造。

【発明の詳細な説明】

【技術分野】

【０００１】

本発明は、木造建築物内の隣接する部屋の間の間仕切部分において、該間仕切部分の中間部位に設けられて梁部材を支持する中間柱を撤去すると共に、梁部材を補強する柱撤去梁補強方法、及びこの中間柱を撤去した際に梁部材を補強するための梁補強構造に関する。

【背景技術】

【０００２】

近年、木造建築物をリフォームする際に、隣接する部屋として例えば居間と和室との間の間仕切部分等を撤去することにより、一つの部屋として広く使いたいという要望が増えている。間仕切部分を撤去するための工法は種々提案されているが、中間部位に建築物の骨組み部材である柱が設けられている場合には、このような中間柱は、一般に間仕切部分において梁部材を下方から支持するものであることから、その撤去作業が困難になる。

【０００３】

すなわち、中間柱を撤去するには、これを単に抜き取るだけでは上方の梁部材が不安定な状態となり、特に梁部材がその中間部位において継手を介して複数の部材を軸方向に連接一体化したものである場合は、梁部材は落下しやすくなる。したがって、中間柱を撤去するのに先立って、例えば仮設の支持構造等を設けて梁部材を支持しておく必要を生じて多くの手間がかかることになる。

【０００４】

また、中間柱を撤去することにより梁部材が不安定になることから、これを補強する方法として、例えば補強用の鉄骨梁を、補強すべき梁部材の下面に沿って両側の柱の間に架設する方法が考えられる（例えば、特許文献１参照）。

【特許文献１】特開昭５６－１２５５４９号公報

【発明の開示】

【発明が解決しようとする課題】

【０００５】

しかしながら、特許文献１の鉄骨梁によって木製の梁部材を補強する方法によれば、鉄骨梁は、補強すべき梁部材を組み付けるのに先立って、予め両側の柱の間に架設されるものであるため、既に構築された木造建築物の間仕切部分において、既存の梁部材の下面に沿って取り付けようとすると、種々の問題が生じることになる。

【０００６】

すなわち、間仕切部分において両側の柱の間に鉄骨を架設するには、柱間スパンに相当する長さの鉄骨を、既存の木造建築物の内部で振り回す必要を生じるため、周囲の物を破損したり傷付けたりすることなく鉄骨の運搬や取り付け作業を行うことが困難になる。ま

た、中間柱を撤去するまでの間は当該中間柱が邪魔になることにより、中間柱を撤去した後は仮設の支持構造等が障害となることにより、梁部材の下面に沿って鉄骨をスムーズに取り付けることが困難になる。

【０００７】

本発明は、このような従来の課題に着目してなされたもので、梁部材を効果的に補強しつつ、間仕切部分の中間部位に設けられた中間柱を容易且つスムーズに撤去することのできる間仕切部分における柱撤去梁補強方法、及び困難な作業を要することなく中間柱の撤去後の梁部材を効果的に補強することのできる梁補強構造を提供することを目的とする。

【課題を解決するための手段】

【０００８】

本発明は、木造建築物内の隣接する部屋の間の間仕切部分において、該間仕切部分の中間部位に設けられて梁部材を支持する中間柱を撤去すると共に、前記梁部材を補強する柱撤去梁補強方法であって、前記梁部材の下方に添設して、前記中間柱とこれの両側の柱との間に添梁を填め込むようにして取り付ける工程と、前記両側の柱の柱間スパンよりも短い長さを有する補強用帯板状鉄骨梁を、これの帯板部分によって前記梁部材と前記添梁との接合部分を覆った状態で前記中間柱の両側に跨るようにして、両側の柱と両端部との間に間隔を保持した状態で当該間隔を残して前記柱間スパンの略全長に亘って取り付ける工程と、前記中間柱の前記添梁よりも下方の部分を切断撤去する工程とからなることを特徴とする間仕切部分における柱撤去梁補強方法を提供することにより、上記目的を達成したものである。

【０００９】

また、本発明は、木造建築物内の隣接する部屋の間の間仕切部分において、該間仕切部分の中間部位に設けられて梁部材を支持する中間柱を撤去した際に、前記梁部材を補強するための梁補強構造であって、前記梁部材の下方に添設されて、前記中間柱の上端残存部と両側の柱との間に填め込まれるようにして各々設置される添梁と、帯板部分によって前記梁部材と前記添梁との接合部分を覆った状態で前記中間柱の上端残存部の両側に跨るようにして、両側の柱と両端部との間に間隔を保持した状態で当該間隔を残して前記柱間スパンの略全長に亘って取り付けられる、前記両側の柱の柱間スパンよりも短い長さを有する補強用帯板状鉄骨梁とからなることを特徴とする梁補強構造を提供することにより、上記目的を達成したものである。

【００１０】

そして、本発明の梁補強構造によれば、前記補強用帯板状鉄骨梁の端部と前記両側の柱との間の間隔部分に配置されて、前記添梁を下方から支持する梁受金物が取り付けられていることが好ましい。

【００１１】

また、本発明の梁補強構造によれば、前記補強用帯板状鉄骨梁は、帯板部分に形成された打込み孔を介して前記梁部材及び前記添梁に向けてスクリューボルトを打ち込むことにより、前記梁部材と前記添梁との接合部分を覆った状態で取り付けられていることが好ましい。

【００１２】

さらに、本発明の梁補強構造によれば、前記補強用帯板状鉄骨梁には、該補強用帯板状鉄骨梁から延設される小梁を支持する小梁受金物が、前記打込み孔を介した前記スクリューボルトの打ち込みに伴って取り付けられていることが好ましい。

【発明の効果】

【００１３】

本発明の間仕切部分における柱撤去梁補強方法によれば、梁部材を効果的に補強しつつ、間仕切部分の中間部位に設けられた中間柱を容易且つスムーズに撤去することができる。また、本発明の梁補強構造によれば、困難な作業を要することなく中間柱の撤去後の梁部材を効果的に補強することができる。

【発明を実施するための最良の形態】

【００１４】
本発明の好ましい一実施形態に係る間仕切部分における柱撤去梁補強方法は、例えば木造建築物をリフォームする際に、木造建築物内の隣接する部屋としての例えば居間と和室との間の間仕切部分を撤去することにより、一つの部屋として広く使えるようにすることを目的として採用されたものであって、図１（ａ）～（ｄ）に示すように、間仕切部分１１の中間部位に設けられて梁部材１２を支持する中間柱１３を撤去すると共、中間柱１３が撤去された後の間仕切部分１１の梁部材１２を効果的に補強するために用いられるものである。
【００１５】
そして、本実施形態の柱撤去梁補強方法は、梁部材１２の下方に添設して、中間柱１３とこれの両側の柱１４との間に添梁１５を取り付ける工程（図１（ｂ）参照）と、両側の柱１４の柱間スパンよりも短い長さを有する補強用帯板状鉄骨梁１６を、これの帯板部分１７によって梁部材１２と添梁１５との接合部分１８を覆った状態で中間柱１３の両側に跨るように取り付ける工程（図１（ｃ）参照）と、中間柱１３の添梁１５よりも下方の部分を切断撤去する工程（図１（ｄ）参照）とによって構成されている。
【００１６】
本実施形態によれば、間仕切部分１１は、例えば居間と和室との間を仕切るように設けられた部分であって、図１（ａ）に示すように、骨組部材である両側の柱１４及びこれらの上端部間に架設される梁部材１２によって囲まれる門形部分に、仕切壁や引戸、開戸等が設けられることにより、隣接する部屋の間を出入り可能に仕切る部分である。また、本実施形態によれば、梁部材１２は、分割梁１２ａ，１２ｂを継手１９を介して軸方向に連接一体化して構成されるものであり、間仕切部分１１の中間部位には、継手１９に近接する部位においてスパン中央部分で梁部材１２を下方から安定して支持するために中間柱１３が設けられている。本実施形態の柱撤去梁補強方法は、梁部材１２を効果的に補強しつつ、この中間柱１３を容易且つスムーズに撤去できるようにするための方法である。
【００１７】
なお、本実施形態によれば、両側の柱１４は、例えば縦１００～１２０ｍｍ程度、横１００～１２０ｍｍ程度の大きさの矩形断面形状を有しており、中間柱１３は、例えば縦１００～１２０ｍｍ程度、横１００～１２０ｍｍ程度の大きさの矩形断面形状を有している。また梁部材１２は、例えば幅１０５～１２０ｍｍ程度、高さ１０５～３００ｍｍ程度の大きさの矩形断面形状を有している。さらに、例えば幅１０５～１２０ｍｍ程度、高さ１０５～３６０ｍｍ程度の大きさの矩形断面形状を有する側方梁２０が、柱１４によって支持されて、梁部材１２と垂直な方向に延設して設けられている。本実施形態によれば、柱１４の直上に位置する部分の側方梁２０は、梁部材１２や添梁１５の端部が取り付けられる部分であり、柱１４に相当する部分として取り扱うことが可能な部分である。
【００１８】
また、本実施形態によれば、図１（ａ）～（ｄ）において間仕切部分１１は、仕切壁や引戸、開戸等を適宜撤去した後の骨組み構造のみの状態で示されており、両側の柱１４及び梁部材１２は、開口形状が例えば幅２６００～３６００ｍｍ程度、高さ２７００～３０００ｍｍ程度の大きさの門形形状を形成している。また梁部材１２や側方梁２０は、リフォーム工事の終了後においては、天井板によって覆い隠されて天井裏部分に配置される部分となるものである。
【００１９】
そして、本実施形態によれば、図１（ｂ）に示す工程において、中間柱１３とこれの両側の柱１４との間に各々取り付けられる添梁１５は、例えば幅１０５～１２０ｍｍ程度、高さ１５０～２１０ｍｍ程度の大きさの矩形断面形状を有していると共に、中間柱１３の各側面と、両側の柱１４の側面との間の間隔部分の長さに相当する、例えば７９０～２６２５ｍｍ程度の長さを有している。各添梁１５は、中間柱１３の各側面と、両側の柱１４の側面との間に填め込まれるようにして、梁部材１２の下面に沿って各々配置されると共に、図２に示すように、例えば添梁１５の下面側から上方の梁部材１２に向けて、例えば

ラグスクリュー等のスクリューボルト２１を打ち込むことにより、梁部材１２の下方に各々添設固定されることになる。

【００２０】

また、図１（ｃ）に示す工程において、梁部材１２と添梁１５との接合部分１８を覆った状態で取り付けられる補強用帯板状鉄骨梁１６は、例えば２００×５０×４．０の断面形状を有する溝形鋼（チャンネル部材）であって、図２にも示すように、中間プレート部が２００ｍｍの幅の平坦な帯状の帯板部分１７を形成している。補強用帯板状鉄骨梁１６は、両側の柱１４間の柱間スパンＬよりも短い例えば２１３０～４８６０ｍｍ程度の長さを有しており、中間プレート部１７の上下両側縁部に配置された５０ｍｍの幅のリブ部２２を外側に突出させた状態で、その帯板部分１７の平坦な背面を添設一体化された梁部材１２及び添梁１５の両側面に各々密着させつつ、これらの両側に一対取り付けられる。また補強用帯板状鉄骨梁１６は、梁部材１２と添梁１５との接合部分１８を覆い隠すようにしつつ、中間柱１３の両側に跨って延設配置されると共に、当該補強用帯板状鉄骨梁１６の両端部と両側の柱１４との間に例えば１５０～３００ｍｍの間隔Ｓを残した状態で各々固定されることになる。

【００２１】

ここで、補強用帯板状鉄骨梁１６の中間プレート部による帯板部分１７には、例えば２００～　　３００ｍｍ程度のピッチで複数の打込み孔２３が、上下２段（好ましくは上下千鳥状）に開口形成されており、これらの打込み孔２３を介して梁部材１２及び添梁１５に向けて例えばラグスクリュー等のスクリューボルト２４を打ち込むことにより、補強用帯板状鉄骨梁１６は、接合部分１８を覆った状態で梁部材１２及び添梁１５の側面に強固に取り付けられることになる。

【００２２】

さらに、本実施形態によれば、補強用帯板状鉄骨梁１６を取り付けた後、図１（ｄ）に示す工程において、中間柱１３の添梁１５よりも下方の部分を、例えばノコギリ等を用いて切断撤去することにより、中間柱１３の撤去後の梁部材１２が効果的に補強された、本実施形態の梁補強構造１０が容易に形成されることになる。

【００２３】

すなわち、本実施形態の梁補強構造１０は、上述のように隣接する部屋の間の間仕切部分１１において、この間仕切部分１１の中間部位に設けられて梁部材１２を支持する中間柱１３を撤去した際に、梁部材１２を補強するための補強構造であって、梁部材１２の下方に添設されて、中間柱１３の上端残存部１３ａと両側の柱１４との間に各々設置される添梁１５と、帯板部分１７によって梁部材１２と添梁１５との接合部分１８を覆った状態で中間柱１３の上端残存部１３ａの両側に跨るように取り付けられる、両側の柱１４の柱間スパンＬよりも短い長さを有する補強用帯板状鉄骨梁１６によって構成されることになる。

【００２４】

また、本実施形態の梁補強構造１０によれば、梁部材１２及び添梁１５の側面に取り付けられた補強用帯板状鉄骨梁１６の端部と両側の柱１４との間には、例えば１００～３００ｍｍ程度の間隔Ｓが残っているので、この間隔部分２５に配置されて、図３（ａ）及び（ｂ）に示すように、添梁１５を下方から支持する梁受金物２６が、柱１４の直上部分の側方梁２０にスクリューボルト等を介して固定されて取り付けられている。すなわち、補強用帯板状鉄骨梁１６の長さが両側の柱１４間の柱間スパンＬよりも短い長さとなっているので、補強用帯板状鉄骨梁１６と柱１４との間隔部分２５を利用して、梁受金物２６を後入れ方式により設置することが可能になり、これによって梁部材１２及び添梁１５をさらに強固に支持することが可能になる。また、補強用帯板状鉄骨梁１６の端部と柱１４との間に間隔部分２５が残置されることにより、柱１４と側方梁２０等との接合部に羽子板ボルト等の接合金物が取り付けられている場合であっても、これらの金物の影響を受けることなく、補強用帯板状鉄骨梁１６を梁部材１２及び添梁１５の側面に取り付けてゆくことが可能になる。

【００２５】
さらに、本実施形態によれば、補強用帯板状鉄骨梁１６は、帯板部分１７に形成された打込み孔２３を介して、梁部材１２及び添梁１５に向けてスクリューボルト２４を打ち込むことにより取り付けられるので、例えば梁部材１２や添梁１５に予め貫通形成したボルト孔に締付けボルトを挿通して固定する場合と比較して、ボルト孔の位置合せ等を要することなくスムーズに補強用帯板状鉄骨梁１６を取り付けてゆくことが可能になると共に、ルーズな状態となるのを効果的に回避して、より強固に補強用帯板状鉄骨梁１６を梁部材１２及び添梁１５の側面に固定することが可能になる。
【００２６】
さらにまた、本実施形態の梁補強構造１０によれば、補強用帯板状鉄骨梁１６には、図４（ａ）及び（ｂ）に示すように、当該補強用帯板状鉄骨梁１６から延設される小梁２７を支持する小梁受金物２８が、打込み孔２３を介したスクリューボルト２４の打ち込みに伴って、後入れ方式により取り付けられている。すなわち、小梁受金物２８の取り付けプレート部２９には、補強用帯板状鉄骨梁１６の打込み孔２３と合致する位置に、取付け孔３０が形成されており、この取付け孔３０を打込み孔２３に合致させてスクリューボルト２４を打ち込むことにより、小梁受金物２８を梁部材１２の側面に容易に取り付けることが可能になる。また取り付けられた小梁受金物２８の填め込み凹部３１に小梁２７の端部を填め込むように載置すると共に、固定孔３２にビズ等を打ち込むことにより、小梁２７を小梁受金物２８に支持させた状態で容易に取り付けることが可能になる。
【００２７】
そして、本実施形態の柱撤去梁補強方法によれば、梁部材１２を効果的に補強しつつ、間仕切部分１１の中間部位に設けられた中間柱１３を容易且つスムーズに撤去することができる。すなわち、本実施形態によれば、梁部材１２の下方に添設して添梁１５を取り付ける工程と、柱間スパンＬよりも短い長さの補強用帯板状鉄骨梁１６を取り付ける工程と、添梁１５よりも下方の中間柱１３を切断撤去する工程とによる簡易な施工方法によって、困難な作業を要することなく容易に中間柱１３を撤去することができると共に、柱間スパンＬよりも短い長さの補強用帯板状鉄骨梁１６を用いることにより、既存の木造建築物の内部における当該鉄骨梁１６の運搬や取付け時の振り回し等の取り扱いが容易になり、且つ中間柱１３を撤去して得られた梁補強構造１０は、添梁１５と補強用帯板状鉄骨梁１６とが一体となって梁部材１２を補強することにより、中間柱１３が撤去された後も、両側の柱１４間に梁部材１２を強固且つ安定した状態で架設させておくことが可能になる。
【００２８】
なお、本発明は上記実施形態に限定されることなく種々の変更が可能である。例えば、本発明の柱撤去梁補強方法は、間仕切部分の両側の柱の間に１本の中間柱がある場合のみならず、２本以上の中間柱が配置されている場合においても、これらの中間柱を撤去するべく採用することができる。また、帯板部分を有する補強用帯板状鉄骨梁として、溝形鋼（チャンネル部材）を用いる必要は必ずしもなく、例えば横長の帯板形状を有する平鋼等を用いることもできる。さらに、本発明の梁補強構造は、補強用帯板状鉄骨梁の端部と柱との間の間隔部分に梁受金物を設ける必要は必ずしもなく、また補強用帯板状鉄骨梁に小梁受金物を取り付ける必要は必ずしもない。さらにまた、補強用帯板状鉄骨梁は、スクリューボルトを打ち込むことによって梁部材や添梁に取り付けられる必要は必ずしもない。
【図面の簡単な説明】
【００２９】
【図１】（ａ）～（ｄ）は、本発明の一実施形態に係る柱撤去梁補強方法の工程を説明する略示正面図である。
【図２】添梁及び補強用帯板状鉄骨梁の取り付け状況を説明する図１（ｄ）のＡ－Ａに沿った断面図である。
【図３】（ａ）は梁受金物の取付け状況を説明する部分斜視図、（ｂ）は梁受金物の斜視図である。
【図４】（ａ）は小梁受金物の取付け状況を説明する部分斜視図、（ｂ）は同断面図であ

る。

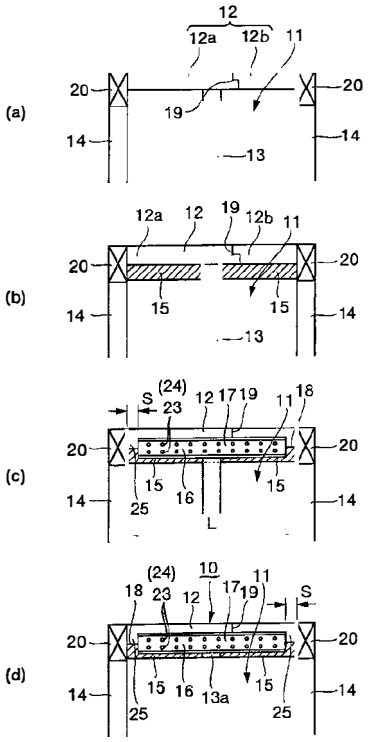
【符号の説明】

【００３０】

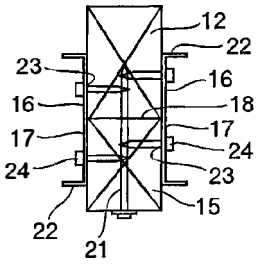
１０，５０　床下収納部構造
１１　間仕切部分
１２　梁部材
１２ａ，１２ｂ　分割梁
１３　中間柱
１３ａ　中間柱の上端残存部
１４　両側の柱
１５　添梁
１６　補強用帯板状鉄骨梁
１７　帯板部分
１８　梁部材と添梁との接合部分
１９　梁部材の継手
２０　側方梁
２１，２４　スクリュー－ボルト
２２　溝形鋼のリブ部
２３　打込み孔
２５　間隔部分
２６　梁受金物
２７　小梁
２８　小梁受金物
２９　パイプ部材
３０　取付け孔
３１　填め込み凹部
３２　固定孔
Ｌ　柱間スパン
Ｓ　補強用帯板状鉄骨梁の端部と柱との間の間隔

Kimberly Clark EX1002, p. 1271
PGR2026-00078

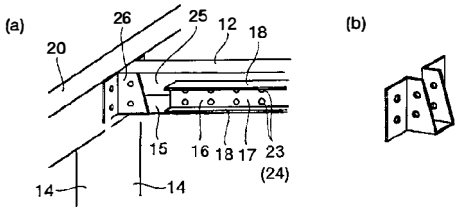
【図１】


(a)
(b)
(c)
(d)
12
12a
12b
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13
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18
23
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13a

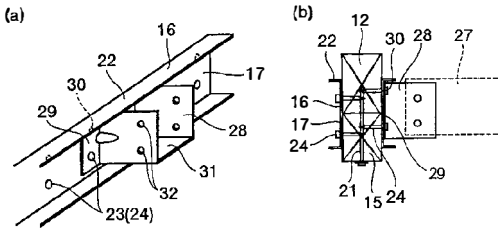
【図２】


12
22
23
16
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17
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21

【図３】


(a)
(b)
26
25
12
18
20
15
16
18
17
23
(24)
14

【図４】


(a)
(b)
16
22
30
17
29
28
31
32
23(24)
12
27
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フロントページの続き

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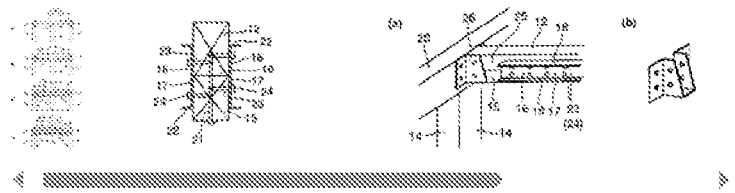
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(56)参考文献　特開２００５－００９１０９（ＪＰ，Ａ）

(58)調査した分野(Int.Cl.，ＤＢ名)
Ｅ０４Ｇ　２３／０２

Column removal beam reinforcement method and beam reinforcement structure in partition

Images (4)



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Japan

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Other languages: Japanese

Inventor: [redacted]

Current Assignee : Sumitomo Forestry Co Ltd

Worldwide applications

2003 JP

Application JP2003376467A events

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Info: Cited by (13), Legal events, Similar documents, Priority and Related Applications

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Claims (5)

Hide Dependent
translated from Japanese

In a partition part between adjacent rooms in a wooden building, an intermediate column provided at an intermediate part of the partition part for supporting a beam member is removed, and a column removal beam reinforcement method for reinforcing the beam member. And
Attaching under the beam member and attaching the beam so as to fit between the intermediate column and the columns on both sides thereof; and
A reinforcing strip-like steel beam having a length shorter than the span between the columns on both sides of the intermediate column in a state where the joint portion between the beam member and the auxiliary beam is covered by the strip portion. A step of attaching over the substantially entire length of the span between the columns while leaving the interval in a state where the interval is maintained between the columns on both sides and both ends so as to straddle both sides.
The method further comprises a step of cutting and removing a portion of the intermediate column below the accessory beam. In a partition part between adjacent rooms in a wooden building, a beam reinforcing structure is provided to reinforce the beam member when an intermediate column provided at an intermediate part of the partition part and supporting the beam member is removed. There,
Attached below the beam member, each attached beam installed so as to be inserted between the upper end remaining portion of the intermediate column and the columns on both sides,
The gap between the pillars on both sides and both ends was maintained so as to straddle both sides of the upper end remaining part of the intermediate pillar in a state where the joining portion of the beam member and the auxiliary beam was covered by the strip plate part . A reinforcing strip plate-like steel beam having a length shorter than the inter-column spans of the columns on both sides, which is attached over substantially the entire length of the inter-column spans leaving the interval in the state. Beam reinforcement structure. The beam reinforcement according to claim 2, wherein a beam receiver is attached to a portion between the end portion of the reinforcing steel plate-like steel beam and the columns on both sides and supports the auxiliary beam from below Construction. The reinforcing band plate-shaped steel beam is formed by driving a screw bolt toward the beam member and the auxiliary beam through a driving hole formed in the band plate portion, thereby joining the beam member and the auxiliary beam. The beam reinforcing structure according to claim 2 or 3, wherein the beam reinforcing structure is attached in a state of covering. A steel beam support for supporting a small beam extending from the reinforcing steel strip-like steel beam is attached to the reinforcing steel strip-like steel beam as the screw bolt is driven through the driving hole. The beam reinforcing structure according to claim 4.

Description

translated from Japanese

The present invention removes an intermediate column that is provided at an intermediate portion of a partition portion between adjacent rooms in a wooden building and supports a beam member, and removes a column that reinforces the beam member. The present invention relates to a method and a beam reinforcing structure for reinforcing a beam member when the intermediate pillar is removed.

In recent years, when renovating a wooden building, there is an increasing demand for wide use as one room by removing, for example, a partition between a living room and a Japanese room as an adjacent room. Various methods for removing the partition part have been proposed. However, when a pillar, which is a framework member of a building, is provided at the intermediate part, such an intermediate pillar generally has a beam member at the partition part. Since it is supported from below, its removal work becomes difficult.

That is, in order to remove the intermediate column, the upper beam member becomes unstable by simply pulling out the intermediate column, and in particular, the beam member is connected and integrated in the axial direction via a joint at the intermediate portion. When it is a thing, a beam member becomes easy to fall. Therefore, prior to removing the intermediate pillar, it is necessary to provide a temporary support structure or the like to support the beam member, which takes a lot of work.

Moreover, since the beam member becomes unstable by removing the intermediate column, as a method of reinforcing this, for example, a reinforcing steel beam is placed between the columns on both sides along the lower surface of the beam member to be reinforced. A method of erection is conceivable (see, for example, Patent Document 1).
JP 56-125549 A

However, according to the method of reinforcing a wooden beam member with a steel beam of Patent Document 1, the steel beam is laid in advance between columns on both sides prior to assembling the beam member to be reinforced. Therefore, in the partition part of the wooden building that has already been constructed, various problems will arise when attempting to attach along the lower surface of the existing beam member.

In other words, in order to construct a steel frame between pillars on both sides in the partition part, it is necessary to swing a steel frame having a length corresponding to the span between the pillars inside the existing wooden building. It becomes difficult to carry and install the steel frame without damage or damage. Also, until the intermediate column is removed, the intermediate column becomes an obstacle, and after the intermediate column is removed, the temporary support structure becomes an obstacle, so that the steel frame can be smoothly moved along the lower surface of the beam member. It becomes difficult to attach to.

The present invention has been made by paying attention to such a conventional problem, and can easily and smoothly remove the intermediate pillar provided at the intermediate portion of the partition portion while effectively reinforcing the beam member. An object of the present invention is to provide a beam removal method for reinforcing a column in a partition portion and a beam reinforcement structure capable of effectively reinforcing a beam member after removal of an intermediate column without requiring a difficult operation.

The present invention removes an intermediate column that supports a beam member provided at an intermediate portion of the partition portion in a partition portion between adjacent rooms in a wooden building, and removes the column beam that reinforces the beam member. It is a reinforcing method, and is attached below the beam member, and is attached so that the beam is inserted between the intermediate column and the columns on both sides of the intermediate column, and the span between the columns of the columns on both sides. the reinforcing strip plate steel beam having a short length, so as to straddle both sides of the intermediate pillar while covering a junction between the said beam members thereby of the strip portion on both sides of the A step of attaching over the substantially entire length of the span between the columns while leaving the interval between the columns and both ends, and a step of cutting and removing a portion of the intermediate column below the spur beam Pillar removal in the partition part characterized by comprising By providing a beam reinforcement method, in which to achieve the above objects.

Further, the present invention reinforces the beam member in a partition portion between adjacent rooms in a wooden building when the intermediate pillar provided at an intermediate portion of the partition portion and supporting the beam member is removed. a beam reinforcing structure for, are additionally provided below the beam member, and , each of which is disposed so as to be fitted between the upper remaining portion and both sides of the pillars of the intermediate pillar, the band A state in which a space is maintained between the pillars on both sides and both ends so as to straddle both sides of the upper end remaining part of the intermediate pillar in a state where the joint portion of the beam member and the auxiliary beam is covered by a plate portion And a reinforcing strip-like steel beam having a length shorter than the inter-column span of the columns on both sides, which is attached over substantially the entire length of the inter-column span leaving the interval. The above object is achieved by providing a reinforcing structure.

And according to the beam reinforcing structure of the present invention, the beam receiver is arranged at the interval between the end of the reinforcing strip-like steel beam and the columns on both sides, and supports the auxiliary beam from below. Is preferably attached.

According to the beam reinforcing structure of the present invention, the reinforcing band plate-like steel beam is driven by screw bolts toward the beam member and the auxiliary beam through driving holes formed in the band plate portion. It is preferable that the beam member and the accessory beam are attached so as to cover a joint portion.

Further, according to the beam reinforcing structure of the present invention, the reinforcing band plate-like steel beam has a beam receiving object supporting a small beam extending from the reinforcing band plate-like steel beam, the driving hole. It is preferable that the screw bolt is attached along with the driving of the screw bolt.

According to the column removal beam reinforcing method in the partition portion of the present invention, the intermediate column provided in the intermediate portion of the partition portion can be easily and smoothly removed while effectively reinforcing the beam member. Moreover, according to the beam reinforcement structure of this invention, the beam member after removal of an intermediate | middle pillar can be effectively reinforced without requiring a difficult operation | work.

The column removal beam reinforcement method in the partition part which concerns on preferable one Embodiment of this invention, for example, when reforming a wooden building, the partition part between a living room and a Japanese-style room as an adjacent room in a wooden building is used. It was adopted for the purpose of making it widely usable as one room by removing it, and as shown in FIGS. 1 (a) to 1 (d), it is provided at an intermediate portion of the partition portion 11. When the intermediate column 13 supporting the beam member 12 is removed, it is used to effectively reinforce the beam member 12 of the partition portion 11 after the intermediate column 13 is removed.

And the pillar removal beam reinforcement method of this embodiment is attached below the beam member 12, and the process of attaching the beam 15 between the intermediate column 13 and the column 14 of the both sides (FIG.1 (b)) The reinforcing strip plate-like steel beam 15 having a length shorter than the span between the columns 14 on both sides is covered with the strip plate portion 17 to cover the joint portion 18 between the beam member 12 and the beam 15. A step (see FIG. 1 (c)) for attaching the intermediate column 13 so as to straddle both sides of the intermediate column 13, and a step (see FIG. 1 (d)) for cutting and removing a portion below the beam 15 of the intermediate column 13; It is constituted by.

According to this embodiment, the partition part 11 is a part provided, for example so that a living room and a Japanese-style room may be partitioned, Comprising: As shown to Fig.1 (a), the pillar 14 of the both sides which are frame members, and A partition wall, a sliding door, an open door, and the like are provided in a gate-shaped portion surrounded by the beam member 12 laid between these upper end portions, thereby partitioning adjacent rooms so that they can enter and exit. Further, according to the present embodiment, the beam member 12 is configured by connecting and dividing the split beams 12 a and 12 b in the axial direction via the joint 19, and the joint 19 is provided at an intermediate portion of the partition portion 11. An intermediate column 13 is provided in order to stably support the beam member 12 from below at the center portion of the span at a portion close to the center. The column removal beam reinforcement method of the present embodiment is a method for easily and smoothly removing the intermediate column 13 while effectively reinforcing the beam member 12.

According to the present embodiment, the pillars 14 on both sides have a rectangular cross-sectional shape having a size of about 100 to 120 mm and a width of about 100 to 120 mm, for example, and the intermediate column 13 is a length of 100 to 120 mm, for example. It has a rectangular cross-sectional shape with a size of about 100 to 120 mm in width. The beam member 12 has a rectangular cross-sectional shape having a width of about 105 to 120 mm and a height of about 105 to 300 mm, for example. Further, for example, a side beam 20 having a rectangular cross-sectional shape having a width of about 105 to 120 mm and a height of about 105 to 360 mm is supported by the column 14 and extends in a direction perpendicular to the beam member 12. It has been. According to the present embodiment, the side beam 20 in the portion located immediately above the column 14 is a portion to which the end of the beam member 12 or the beam 15 is attached, and can be handled as a portion corresponding to the column 14. It is an important part.

Moreover, according to this embodiment, in FIG.1 (a)-(d), the partition part 11 is shown in the state of only the framework structure after removing a partition wall, a sliding door, an open door, etc. suitably, both sides are shown. The column 14 and the beam member 12 have a gate shape with an opening shape of, for example, a width of about 2600 to 3600 mm and a height of about 2700 to 3000 mm. Further, the beam member 12 and the side beams 20 are portions that are covered with the ceiling plate and disposed in the ceiling back portion after the renovation work is completed.

And according to this embodiment, in the process shown in FIG.1 (b), the beam 15 attached between the intermediate ; middle pillar 13 and the pillar 14 of the both sides of this is about 105-120 mm in width, for example, and height It has a rectangular cross-sectional shape with a size of about 150 to 210 mm, and corresponds to the length of the space between each side surface of the intermediate column 13 and the side surfaces of the columns 14 on both sides, for example, about 790 to 2525 mm. Has a length of Each accessory beam 15 is disposed along the lower surface of the beam member 12 so as to be fitted between each side surface of the intermediate column 13 and the side surfaces of the columns 14 on both sides, as shown in FIG. Further, for example, by driving a screw bolt 21 such as a lag screw from the lower surface side of the beam 15 toward the upper beam member 12, the beam is fixed below the beam member 12.

Further, in the step shown in FIG. 1C, the reinforcing strip-shaped steel beam 16 attached in a state of covering the joint portion 18 between the beam member 12 and the beam 15 is, for example, 200 × 50 × 4.0. A grooved steel (channel member) having a cross-sectional shape, and as shown in FIG. 2, the intermediate plate portion forms a flat belt-shaped strip portion 17 having a width of 200 mm. The reinforcing strip-shaped steel beam 16 has a length shorter than the inter-column span L between the columns 14 on both sides, for example, about 2130 to 4860 mm, and is disposed on the upper and lower side edges of the intermediate plate portion 17. While the rib portion 22 having a width of 50 mm is projected outward, the flat back surface of the band plate portion 17 is brought into close contact with both side surfaces of the beam member 12 and the beam 15 which are integrated and attached, respectively. A pair is attached to both sides. Further, the reinforcing band plate-like steel beam 16 is extended and disposed across both sides of the intermediate column 13 while covering the joint portion 18 between the beam member 12 and the beam 15 and the reinforcing band plate. The steel beam 16 is fixed in a state where, for example, a space S of 150 to 300 mm is left between both ends of the steel beam 16 and the pillars 14 on both sides.

Here, in the strip portion 17 formed by the intermediate plate portion of the reinforcing strip-like steel beam 16, a plurality of driving holes 23 are opened in two upper and lower stages (preferably upper and lower staggered) at a pitch of about 200 to 300 mm, for example. The reinforcing band plate-like steel beam 16 is formed with a joint portion 18 by driving a screw bolt 24 such as a lag screw toward the beam member 12 and the beam 15 through the driving holes 23. In the covered state, it is firmly attached to the side surfaces of the beam member 12 and the beam 15.

Furthermore, according to the present embodiment, after attaching the reinforcing strip-shaped steel beam 16, in the step shown in FIG. 1 (d), the portion below the spur beam 15 of the intermediate column 13 is, for example, sawed or the like. By using and cutting and removing, the beam reinforcing structure 10 of the present embodiment in which the beam member 12 after the removal of the intermediate pillar 13 is effectively reinforced is easily formed.

That is, the beam reinforcing structure 10 of the present embodiment has removed the intermediate column 13 that is provided in the intermediate portion of the partition portion 11 and supports the beam member 12 in the partition portion 11 between adjacent rooms as described above. In this case, the reinforcing structure for reinforcing the beam member 12 is provided below the beam member 12 and installed between the upper end remaining portion 13a of the intermediate column 13 and the columns 14 on both sides. Between the columns of the columns 14 on both sides, which are attached to straddle both sides of the upper end remaining portion 13a of the intermediate column 13 with the beam 15 and the strip plate portion 17 covering the joint portion 18 of the beam member 12 and the beam 15 The reinforcing strip plate-like steel beam 16 having a length shorter than the span L is formed.

Further, according to the beam reinforcing structure 10 of the present embodiment, between the ends of the reinforcing strip-shaped steel beam 16 attached to the side surfaces of the beam member 12 and the beam 15 and the columns 14 on both sides, for example, Since the space S of about 100 to 300 mm remains, the beam receiver 26 that is arranged in the space portion 25 and supports the spur beam 15 from below as shown in FIGS. 3 (a) and 3 (b), it is fixedly attached to the side beam 20 directly above the column 14 via a screw bolt or the like. That is, since the length of the reinforcing strip-shaped steel beam 16 is shorter than the inter-column span L between the columns 14 on both sides, the interval portion 25 between the reinforcing strip-shaped steel beam 16 and the column 14 is provided. Using this, it becomes possible to install the beam receiver 26 by a post-insertion method, and thereby, the beam member 12 and the beam 15 can be supported more firmly. Further, by leaving a gap portion 25 between the end of the reinforcing strip-like steel beam 16 and the column 14, a metal fitting such as a wing plate bolt is attached to the joint between the column 14 and the side beam 20 or the like. Even if it is attached, it is possible to attach the reinforcing strip-like steel beam 16 to the side surfaces of the beam member 12 and the beam 15 without being affected by these hardware.

Further, according to the present embodiment, the reinforcing band plate-like steel beam 16 is driven by the screw bolt 24 toward the beam member 12 and the beam 15 through the driving hole 23 formed in the band plate portion 17. For example, as compared with the case where the fastening bolt is inserted and fixed in the bolt hole previously formed in the beam member 12 or the beam 15, the reinforcing band is smoothly installed without requiring the bolt hole alignment or the like. It becomes possible to attach the plate-shaped steel beam 16, and effectively avoid the loose state, and the reinforcing strip-shaped steel beam 16 is more firmly attached to the beam member 12 and the beam 15. It becomes possible to fix to the side.

Furthermore, according to the beam reinforcing structure 10 of the present embodiment, the reinforcing strip plate-like steel beam 16 is separated from the reinforcing strip plate-like steel beam 16 as shown in FIGS. 4 (a) and 4 (b). A beam receiver 28 for supporting the extended beam 27 is attached by a post-insertion method as the screw bolt 24 is driven through the driving hole 23. That is, a mounting hole 30 is formed in the mounting plate portion 29 of the small beam receiver 28 at a position that matches the driving hole 23 of the reinforcing strip-shaped steel beam 15, and the mounting hole 30 is inserted into the driving hole 23. By driving the screw bolt 24 in conformity with the above, it is possible to easily attach the small beam receiver 28 to the side surface of the beam member 12. In addition, the end of the small beam 27 is placed in the insertion recess 31 of the attached small beam receiver 28 and a biz or the like is driven into the fixing hole 32 so that the small beam 27 is received by the small beam receiver. It can be easily attached in a state where it is supported by 28.

And according to the pillar removal beam reinforcement method of this embodiment, the intermediate pillar 13 provided in the intermediate part of the partition part 11 can be removed easily and smoothly, reinforcing the beam member 12 effectively. That is, according to the present embodiment, the step of attaching the beam 15 attached below the beam member 12, the step of attaching the reinforcing strip-like steel beam 16 having a length shorter than the span L between the columns. The intermediate column 13 can be easily removed without requiring a difficult operation by a simple construction method based on the step of cutting and removing the intermediate column 13 below the accessory beam 15, and is shorter than the span L between the columns. By using the reinforcing steel strip 16 for reinforcing the length, the handling of the steel beam 16 inside the existing wooden building can be easily handled, and the intermediate pillar 13 can be removed. In the beam reinforcing structure 10 obtained in this manner, the beam 15 and the reinforcing steel strip-like steel beam 16 are integrated to reinforce the beam member 12, so that the columns on both sides are removed even after the intermediate column 13 is removed. 14 between the beam member 12 and it is possible to keep is bridged at a constant state.

The present invention is not limited to the above-described embodiment, and various modifications can be made. For example, the column removal beam reinforcement method of the present invention is not limited to the case where there is one intermediate column between the columns on both sides of the partition portion, but also when two or more intermediate columns are arranged. Can be employed to remove the intermediate post. Moreover, it is not always necessary to use a grooved steel (channel member) as the reinforcing strip-shaped steel beam having the strip portion, and for example, a flat steel having a horizontally long strip shape can be used. Furthermore, in the beam reinforcing structure of the present invention, it is not always necessary to provide a beam receiver in the space between the end of the reinforcing strip-shaped steel beam and the column, and the reinforcing strip-shaped steel beam has a small beam. It is not always necessary to attach a receipt. Furthermore, the reinforcing strip-shapad steel beam does not necessarily have to be attached to the beam member or the accessory beam by driving a screw bolt.

(A)-(d) is a schematic front view explaining the process of the column removal beam reinforcement method which concerns on one Embodiment of this invention. It is sectional drawing in alignment with AA of FIG.1 (d) explaining the attachment condition of an accessory beam and a strip-shaped steel beam for reinforcement. (A) is a

fragmentary perspective view explaining the attachment condition of a beam receiver, (b) is a perspective view of a beam receiver. (A) is a fragmentary perspective view explaining the attachment condition of a small beam receiving object, (b) is the same sectional drawing.

Explanation of symbols

DESCRIPTION OF SYMBOLS 10,50 Underfloor storage part structure 11 Partition part 12 Beam member 12a, 12b Split beam 13 Intermediate pillar 13a Upper end remaining part 14 of intermediate pillar Both pillars 15 Auxiliary beam 16 Steel strip for reinforcement 17 Strip part 18 Beam member Joint part 19 of beam member and joint 20 of beam member Side beam 21, 24 Screw bolt 22 Rib part 23 of grooved steel 25 Driving hole 26 Spacing part 25 Beam receiving object 27 Small beam 28 Small beam receiving object 29 Pipe member 30 Mounting hole 31 Insertion recessed part 32 Fixing hole L Column span S Space between end of column steel beam for reinforcement and column

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