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(54) **Application unit of a coating or sizing device for applying treatment substance on a fiber web**

(57) The invention relates to an application unit of a coating or sizing device for applying treatment substance on a fiber web, which application unit comprises a support beam (13) and an application module (10) comprising at one of its longitudinal ends an opening for the treatment substance inlet, a feed chamber (11) with feed openings located spaced apart in longitudinal direction of the ap-

plication module (10) and a flow-through at the other longitudinal end of the application module (10), which application module (10) is supported by an attachment element (12) on the support beam (13). The application module (10) is constructed at least partially of composite material.

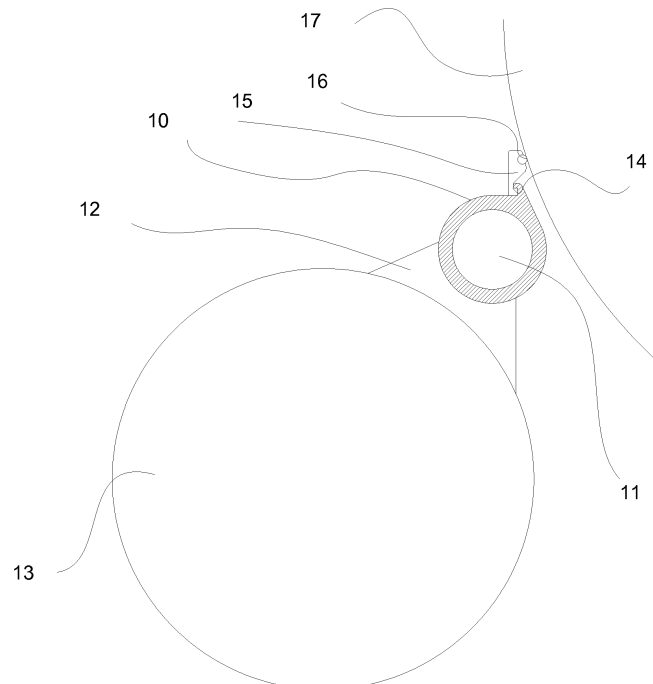


Fig. 1

Description

[0001] The invention relates to an application unit of a coating or sizing device for applying treatment substance on a fiber web, which application unit comprises a support beam and an application module. More especially the invention relates to an application unit according to the preamble of claim 1.

[0002] As known from the prior art in fiber web producing processes typically comprise an assembly formed by a number of apparatuses arranged consecutively in the process line. A typical production and treatment line comprises a head box, a wire section and a press section as well as a subsequent drying section and a reel-up. The production and treatment line can further comprise other devices and sections for finishing the fiber web, for example, a sizer, a calender, a coating section. The production and treatment line also comprises at least one winder for forming customer rolls as well as a roll packaging apparatus. In this description and the following claims by fiber webs are meant for example paper and board webs.

[0003] In production of fiber webs, for example of paper or board webs, treatment substances are added onto the fiber web. Sizing is used to alter the properties of a fiber web by adding sizing agents (sizing medium), for example glue chemicals onto the surface of the fiber web at the fiber web machine. In coating onto surface of a fiber web, is added a layer or layers of coating paste (coating medium) at a coating station followed by drying.

[0004] The coating or the sizing of a fiber web typically utilizes a coating device - a coater - or a sizing device - a sizer. In connection with the coaters and sizers different kinds of application technology for application of the coating medium or the sizing medium on the fiber web are employed, for example curtain technology or blade coating technology or film transfer technology or rod coating technology or air brush coating technology or spray coating technology. In some types of coaters and sizers, for example film transfer coaters, an application module of an application unit is utilized for applying the treatment substance on to a coating roll for then transferring it onto the fiber web or for applying the treatment substance directly onto the fiber web. Typically the application unit and the application module supported on a support beam of the application unit extend over the whole width of the fiber web and can thus be even over 10 meters long. The treatment substance is fed to the application module at one of its longitudinal ends and applied through feed openings located spaced apart in longitudinal direction of the application module and at the other longitudinal end is provided a flow-through. The application module comprises several hundred, for example 750 feed openings at 50 - 150 mm distance. The application module is typically constructed of acid proof steel and as one piece to avoid leakage points. The acid proof steel construction for the application module is heavy and thus difficult to be moved and complicated and expensive to produce.

In some cases even acid proof steel is not resistant enough for the chemicals used in the treatment substance.

[0005] In DE utility model publication 202004021048 is disclosed a device for applying a fluid substance on a passing material web comprising an application device for applying the substance and/or a doctor for smoothening and/or dosing the substance. The application and/or the doctor are supported by a support frame, which can be produced of steel, refined steel, synthetic material of fiber reinforced material.

[0006] In EP patent application publication 1211053 is disclosed a carrier beam, which has a longitudinal and hollow body with a round or polygonal cross section of a fiber compound material produced by winding. The fiber compound material can be plastics reinforced with glass or carbon fibers. The beam can be used in a web coating machine, using a liquid or paste coating medium to be applied to the surface of a moving web of paper or cardboard, for supporting at least one applicator and/or doctor.

[0007] In cases where support structures, for example the support beams, for treatment substance application devices, especially for application modules, are of fiber compound material or of other composite material and the application device is of metallic material thermal expansion in longitudinal direction i.e. in cross direction of the fiber web may cause problems due to dissimilar bending behavior of the structures caused by different thermal expansion coefficients of used materials.

[0008] When a composite structure is produced by winding, the production method sets limits to the design of the structure.

[0009] An object of the invention is to create a method and an application unit of a coating or sizing device for applying treatment substance on a fiber web, in which the above problems and disadvantages are eliminated or at least minimized.

[0010] Another object of the invention is to provide an application unit, which is producible cost-effectively.

[0011] In order to achieve the above objects the application unit of a coating or sizing device for applying treatment substance on a fiber web according to the invention is mainly characterized by the features of claim 1.

[0012] According to the invention the application unit of a coating or sizing device for applying treatment substance on a fiber web, which application unit comprises a support beam and an application module comprising at one of its longitudinal ends an opening for the treatment substance inlet, a feed chamber with feed openings located spaced apart in longitudinal direction of the application module and a flow-through at the other longitudinal end of the application module, which application module is supported on the support beam and which application module of the application unit is constructed at least partially of composite material.

[0013] According to an advantageous feature the support beam of the application unit is constructed at least

partially of composite material.

[0014] According to an advantageous feature the application module of the application unit is constructed substantially totally of composite material.

[0015] According to an advantageous feature the support beam of the application unit is constructed is constructed substantially totally of composite material.

[0016] According to an advantageous feature the application unit is constructed substantially totally of composite material.

[0017] According to an advantageous feature the application module of the application unit is produced by pultrusion.

[0018] According to an advantageous feature the application module of the application unit further comprises connecting element for in a releasable manner attaching a dosing arrangement to the application module.

[0019] According to an advantageous feature the application unit further comprises an attachment element for attaching the application module to the support beam and the application module and any of the attachment element and/or the support beam and/or the connecting element is formed as one piece by pultrusion of composite material.

[0020] The connecting element between the application module and the dosing arrangement at the application module's side can also be a separate connecting element attached to the application module. Depending on the application type the dosing arrangement can comprise a connecting element and the dosing element or the dosing element can be connected directly to the application module.

[0021] The application unit is utilized for applying the treatment substance on to a coating roll for then transferring it onto the fiber web of for applying the treatment substance directly onto the fiber web. The application unit extends over the whole width of the fiber web and can be over 10 meters long. The treatment substance is fed to the application module of the application unit at one of its longitudinal ends and applied from a feed chamber through feed openings located spaced apart in longitudinal direction of the application module and at the other longitudinal end is provided a flow-through. The application module comprises several hundred, for example 750 feed openings at 50 - 150 mm distance.

[0022] If the application unit is constructed to have the connecting element and/or the attachment element and/or support beam as separate parts of the application module, the application module is advantageously produced by pultrusion or winding. In these types of case the application module is constructed of composite material and the elements to be attached can be of same or different composite material or of other material, for example steel.

[0023] In the following the invention is described in more detail with reference to the accompanying drawing, in which

Figure 1 is a schematic example of one advantageous application unit according to the invention.

[0024] In the schematic example of figure 1 an application module 10 of an application unit is provided for applying treatment substance onto surface of a roll 17 of a coating or sizing device (not shown). The treatment substance is dosed by a rod 16 supported in a rod-bed 15, which is by a formfitting attachment 14 connected in a releasable manner to the application module 10. The application module 10 is supported by an attachment element 12 on the support beam 13 of the application unit.

[0025] In this example the connecting element (the formfitting attachment) 14 at the application module's side between the application module 10 and the dosing arrangement (the rod-bed 15 and the rod 16) are formed as part of the application module 10. The connecting element between the application module 10 and the dosing arrangement 15, 16 at the application module's side can also be a separate connecting element attached to the application module 10. Depending on the application type the dosing arrangement can comprise a connecting element and the dosing element as in this example or the dosing element can be connected directly to the application module 10 by the connecting element 14. The attachment element 12 can also be formed as part of the application module 10.

[0026] The application module of the application unit 10 is utilized for applying the treatment substance on to a coating roll 17 for then transferring it onto the fiber web of for applying the treatment substance directly onto the fiber web. The application unit extends over the whole width of the fiber web and can be over 10 meters long. The treatment substance is fed to the application module 10 at one of its longitudinal ends and applied from a feed chamber 11 through feed openings (not shown) located spaced apart in longitudinal direction of the application module 10 and at the other longitudinal end is provided a flow-through. The application module comprises several hundred, for example 750 feed openings at 50 - 150 mm distance.

[0027] The application module 10 is constructed at least partially of composite material, for example of glass fiber, carbon fiber or aramid. The support beam 13 is constructed at least partially of composite material, for example of glass fiber, carbon fiber or aramid.

[0028] In cases the application module 10 is constructed to have the connecting element 14 and/or the attachment element 12 as the same part, the application module 10 is advantageously produced by pultrusion. In this case the application module is constructed substantially totally of composite material. Furthermore also the support beam 13 can be constructed as the same part with the application module 10 and/or the attachment element 12 and/or the connecting element 14 i.e. the whole structure comprising the application element 10, the attachment element 12 and the connecting element 14 is formed as one piece by pultrusion.

[0029] In cases the application module 10 is constructed to have the connecting element 14 and/or the attachment element 12 as separate parts, the application module 10 is advantageously produced by pultrusion or winding. In this case the application module 10 is constructed of composite material and the elements to be attached 12, 14 can be of same or different composite material or of other material, for example steel. In cases the support beam 13 is a separate part from the application module 10, it can be constructed of same or different composite material or of other material, for example of steel.

[0030] In the example of the figure the cross section of the application module 10 and of the support beam 13 is substantially round but also other forms can be utilized.

Reference signs used in the drawing

10	application module	
11	treatment substance chamber	
12	attachment element	
13	support beam	20
14	formfitting attachment	
15	rod-bed	
16	rod	
17	roll	25

Claims

1. Application unit of a coating or sizing device for applying treatment substance on a fiber web, which application unit comprises a support beam (13) and an application module (10) comprising at one of its longitudinal ends an opening for the treatment substance inlet, a feed chamber (11) with feed openings located spaced apart in longitudinal direction of the application module (10) and a flow-through at the other longitudinal end of the application module (10), which application module (10) is supported by an attachment element (12) on the support beam (13), **characterized in that** the application module (10) is constructed at least partially of composite material. 30
2. Application unit according to claim 1, **characterized in that** the support beam (13) is constructed at least partially of composite material. 45
3. Application unit according to claim 1, **characterized in that** the application module (10) is produced by pultrusion. 50
4. Application unit according to claim 1 or 3, **characterized in that** the application module (10) further comprises connecting element (14) for in a releasable manner attach a dosing arrangement (15, 16) to the application module. 55
5. Application unit according to any of claims 1-4, **char-**

acterized in that the application module 10 and any of the attachment element (12) and/or the support beam (13) and/or the connecting element (14) is formed as one piece by pultrusion.

6. Application unit according to any of claims 1- 5, **characterized in that** the application module (10) is constructed substantially totally of composite material.
7. Application unit according to any of claim 1-6, **characterized in that** the support beam is constructed substantially totally of composite material.
8. Application unit according to any of claim 1-7, **characterized in that** the application unit is constructed substantially totally of composite material.

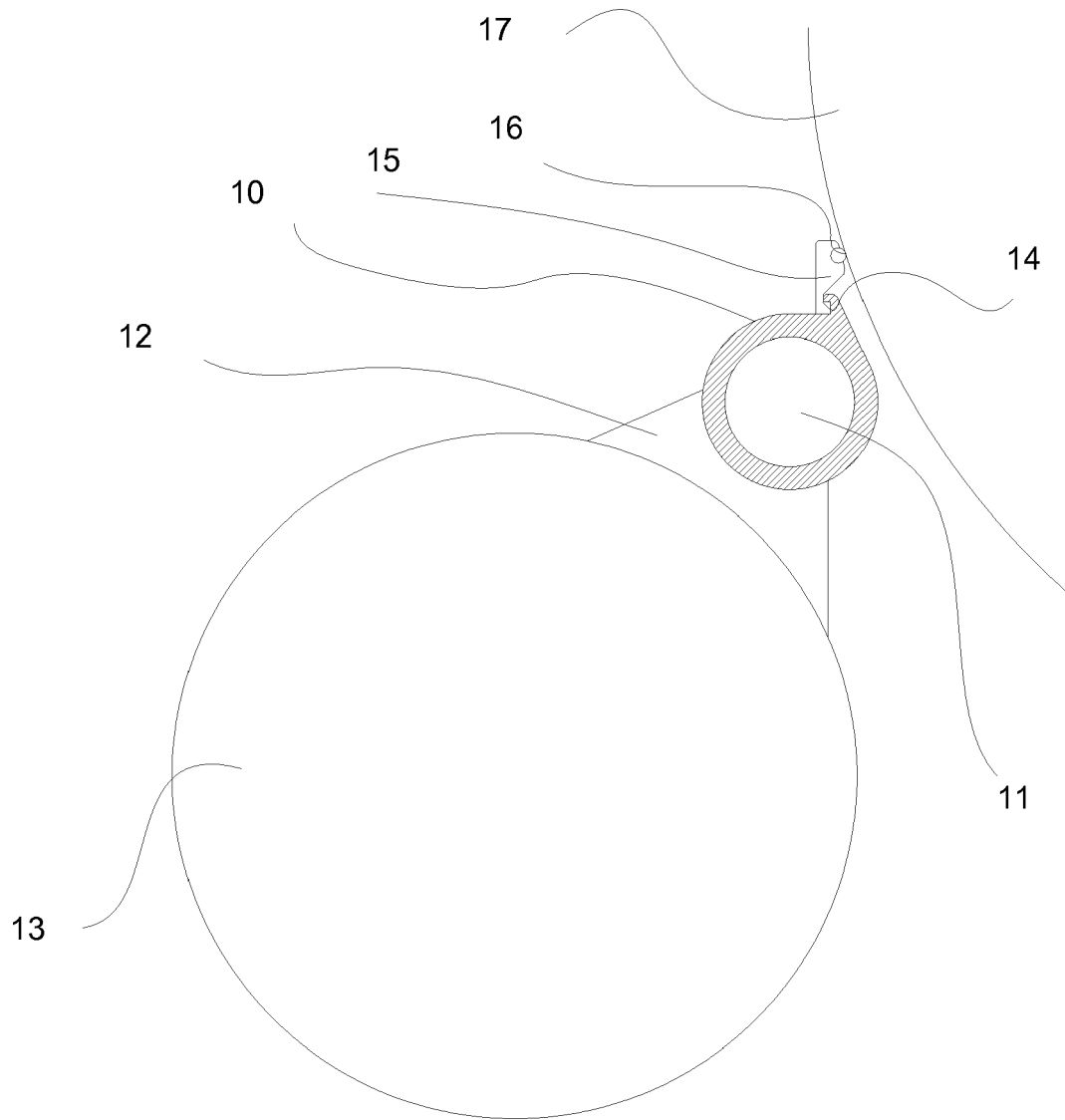


Fig. 1



EUROPEAN SEARCH REPORT

Application Number
EP 13 17 0733

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 202 557 B1 (KUSTERMAN MARTIN [DE]) 20 March 2001 (2001-03-20) * claims 1-8 * * column 2, line 49 - line 67 * -----	1-8	INV. D21H23/52 B05C1/08 D21H23/56
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A	US 2002/102372 A1 (HENNINGER CHRISTIOPH [DE]) 1 August 2002 (2002-08-01) * claims 1-4 * -----	1-8	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B05C D21H
Place of search		Date of completion of the search	Examiner
Munich		13 September 2013	Ponsaud, Philippe
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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