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Octrooi centrum  
Nederland

11 1036355

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72 Uitvinder(s):  
Willem Frans van der Mast te Eelde.

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04.01.2010

74 Gemachtigde:  
Geen

54 A method for supplying reinforcement fibres to an object.

57 Werkwijze voor het voorzien van een kunststof object met versterkingsvezels, waarbij een vezel snij-apparaat voor het snijden en afgeven van vezels is gepositioneerd boven genoemd object, zodat the vezels neervallen over een zekere afstand naar het oppervlak van genoemd object. De afstand tussen de plaats waar de vezels worden afgegeven door het snij-apparaat en het genoemde oppervlak van het object is beperkt op zodanige wijze dat de vezels in hoofdzaak hun oriëntatie behouden wanneer ze neervallen.

NL C 1036355

Dit octrooi is verleend ongeacht het bijgevoegde resultaat van het onderzoek naar de stand van de techniek en schriftelijke opinie. Het octrooischrift komt overeen met de oorspronkelijk ingediende stukken. Octrooi centrum Nederland is een agentschap van het ministerie van Economische Zaken.

A method for supplying reinforcement fibres to an object

The invention is related to a method for providing a plastic object with reinforcement fibres, whereby a cutter device for cutting and dispensing fibres is positioned above said object so that the fibres fall down over a certain distance to the surface of said object, and whereby the object is moving with respect to the cutter device. The expression 'distance' means the vertical distance (distance in vertical direction) between the location where the fibres are dispensed and the location where the fibres reaches the surface of the object.

In general, fibres can be used to reinforce a plastic object, whereby the fibres are embedded in the plastic material, in order to form a plastic composite construction. The fibres can be glass fibres or fibres of other material, such as basalt fibres, quartz fibres, silica fibres, or carbon fibres. The stiffness and strength of a composite (fibres and plastic) construction is mainly determined by the presence of the reinforcing fibres.

The fibres can be cut on a predetermined length by means of a cutter device and subsequently be dropped on the surface of the object. An example of such cutter device is described in WO-A-2005/087993. This publication describes a cutter device comprising two rolls (rollers) that are pressing against each other. The two rolls rotate with equal circumferential speed. Around the circumference of one or both rolls some sharp blades are installed. A long filament enters in the pinch of the rolls in tangential direction and is bended over the sharp blades so that it breaks in pieces. The length of the pieces (the fibres) that leave the cutter device is determined by the dimensions of the rolls and the number of blades in the rolls.

Each embedded fibre causes a reinforcement of the composite material substantially in the longitudinal direction of the fibre. In case reinforcement of the composite material in all directions is required, the fibres will be embedded in the plastic material randomly, i.e. in all directions. However, it may be sufficient or required to reinforce the composite material in only one direction, or in a only some directions.

For example, when manufacturing a pipe of composite material, it is usual to reinforce the composite material by winding a long

filament (fibre) around the pipe during manufacturing. Such reinforcement is mainly effective in tangential direction of the pipe, being the longitudinal direction of the wound fibre. In case the composite material needs also strength in axial direction of the pipe, it is usual to drop fibres, cut at a length of 25mm to 75mm on the surface of the pipe during manufacturing the pipe. Thereby, the fibres fall down randomly by gravity from the cutter device on to the surface of the pipe, while the pipe is rotating. Such method results in an omni directional reinforcement, i.e. a reinforcement in all directions. However, because strength in tangential direction of the pipe is already present, it would be preferred to have the supplied fibres oriented in only or mainly the axial direction of the pipe. (Orientation means that the longitudinal directions of the dosed fibres have a limited variation. i.e. 90% of the fibres orientation deviate less than 10° from the desired direction).

The object of the invention is a method for providing a plastic object with reinforcement fibres, whereby the fibres are applied on the surface of the object in a predetermined orientation.

In order to accomplish with that object, the distance between the location where the fibres are dispensed by the cutter device and the said surface of the object is limited in such manner that the fibres substantially maintain their orientation when they are falling down. Thereby, the fibres will arrive at the surface of the object in a substantial predetermined orientation resulting in a relative large reinforcement in de main direction of the fibres.

It has been found that the longer the fibres are, the longer said distance can be. Preferably, said distance is less than two times the length of the fibres dispensed by the cutter device, preferably less than the length of the fibres, more preferably less than half the length of the fibres.

In prior art methods for dropping reinforcement fibres on the surface of the object, the fibres are oriented randomly when they arrive on the surface. Thereby, the length of the fibres is has to be limited, and are in general between 25mm and 75mm. When applying the method according to the invention, the length of the fibres are preferably longer. In a preferred embodiment, the length of the fibres dispensed by the cutter device is between 25mm and 300mm,

more preferably between 80mm and 200mm. Such fibres provide for an appropriate reinforcement, and experiences have shown that such fibres keep their orientation during falling down over a distance equal or shorter than twice their length.

5 In a preferred embodiment, the fibres are dispensed while moving in its longitudinal direction, characterized in that the angle between said longitudinal direction and said surface of the object is between  $-10^{\circ}$  and  $+30^{\circ}$ . Preferably, the fibres arrive on the surface of the object in such manner that the rear end of the  
10 fibre touches the surface first, so that the fibre maintain its orientation while arriving on the surface. Therefore, in a preferred embodiment, the angle between said longitudinal direction and said surface of the object is larger than  $0^{\circ}$ , preferably larger than  $5^{\circ}$ , more preferably between  $5^{\circ}$  and  $15^{\circ}$ .

15 In a preferred embodiment, the object is a cylindrical pipe rotating around its axis and/or moving in its axial direction. Thereby, the pipe can be reinforced by means of continuous filaments by winding these filaments substantial tangential around the pipe surface. In order to reinforce the pipe in axial  
20 direction, fibres (pieces of a filament) are dosed on the pipe surface in axial orientation. The movement of the pipe is required in order to distribute the fibres over the surface of the pipe, assuming the cutter device is in fixed position. A combination of moving the pipe and moving the cutter device is also possible.

25 The invention is also related to a system for applying the method as described above, comprising a cutter device for cutting and dispensing fibres and means for locating the surface of the object underneath the cutter device, whereby the said means are designed in such way that the distance between the location where  
30 the fibres are dispensed by the cutter device and said surface of the object to be fixed by said means is limited in such manner that the fibres substantially maintain their orientation when they are falling down.

35 The invention will now be further elucidated by means of a description of an embodiment of a pipe producing machine, whereby a plastic pipe is provided with reinforcement fibres, whereby a cutter device for cutting and dispensing fibres is positioned above the pipe so that the fibres fall down to the outer surface of the

pipe, and whereby reference is made to a schematic drawing comprising three figures, whereby:

Fig. 1 is a side view of the machine;

Fig. 2 is a top view of the machine; and

5 Fig. 3 is an other side view of the machine.

The figures are diagrammatical representations, only showing parts that contribute to the elucidation of the method applied when operating the machine.

Figure 1 is a side view of the pipe producing machine, showing the pipe 1 during its production. Figure 2 show the machine of figure 1 in top view, and figure 3 shows the machine from the right side in figure 1.

Pipe 1 is rotating around its axis 2 in the direction indicated by arrow 3, and is moving in its axial direction indicated by arrow 10, in order to distribute cut fibres 7 on to the surface of the pipe. The pipe 1 is shaped around a mould, which mould is not shown in the drawing. Above the pipe is a cutter device comprising cutting rolls 4 driven by motor 5. A filament 6 is guided through a tube-like guiding member 8 to the pinch 12 of the rolls 4, which rolls 4 cut filament 6 into fibres 7.

The distance 11, indicated with "A", is the distance between the location where the fibres 7 are dispensed by the cutter device and the surface of the pipe 1 where the fibres 7 arrive on that surface. The fibres 7 are dispensed in their longitudinal direction, as indicated by arrow 9. After dispensing, the fibres 7 fall on the surface of the pipe 1, whereby they substantially maintain their substantially axial direction with respect to the pipe 1. The dispensing direction 9 makes an angle  $\alpha$  with the surface of the pipe 1, which angle  $\alpha$  can be adjusted in order to have the fibres 7 arriving on the surface of pipe 1 in an appropriate way. In order to prevent the fibres 7 from changing their orientation 9 too much on their flight from the cutter pinch 12 to the surface of pipe 1, the distance 11 is relative small.

In the figure the pieces of fibre 7 fall along the end edge of the pipe 1; this location is dependant the axial position of the pipe 1 related to the cutter and can be any, in this drawing this position is accidentally.

In figure 2 is indicated that the dispensing direction 9 of the fibres 7 makes an angle  $\beta$  with respect to the axial direction

10 in order to compensate for the rotating speed of pipe 1. This angle  $\beta$  can be adjusted depending of said rotating speed, which speed is indicated by arrow 3, in order to control the orientation of the arrived fibres 7 on the surface of pipe 1.

5 The schematic drawing shows only an example. An other type of cutter device can be used, provided that the desired length of the fibres 7 and the dispensing direction 9 and the distance 11 between can be achieved.

In particular, the invention is related to:

10 A method for providing a plastic object (1) with reinforcement fibres (7), whereby a cutter device (4,5) for cutting and dispensing fibres (7) is positioned above said object (1) so that the fibres (7) fall down over a certain distance (11) to the surface of said object (1), and whereby the object (1) is moving  
15 with respect to the cutter device (4,5), characterized in that said distance (11) between the location where the fibres are dispensed by the cutter device (4,5) and the said surface of the object (1) is limited in such manner that the fibres (7) substantially maintain their orientation when they are falling down.

20 A method as claimed in claim 1, characterized in that said distance (11) is less than two times the length of the fibres (7) dispensed by the cutter device (4,5), preferably less than the length of the fibres (7), more preferably less than half the length of the fibres (7).

25 A method as claimed in any one of the preceding claims, characterized in that the length of the fibres (7) dispensed by the cutter device (4,5) is between 25mm and 300mm, preferably between 80mm and 200mm.

30 A method as claimed in any one of the preceding claims, whereby the fibres (7) are dispensed while moving in its longitudinal direction (9), characterized in that the angle ( $\alpha$ ) between said longitudinal direction (9) and said surface of the object (1) is between  $-10^\circ$  and  $+30^\circ$ .

35 A method as claimed in claim 4, characterized in that the angle ( $\alpha$ ) between said longitudinal direction (9) and said surface of the object (1) is larger than  $0^\circ$ , preferably larger than  $5^\circ$ , more preferably between  $5^\circ$  and  $15^\circ$ .

A method as claimed in any one of the preceding claims, characterized in that said object is a cylindrical pipe (1) rotating around its axis (2) and/or moving in its axial direction.

5 A system for applying the method as claimed in any one of the preceding claims, comprising a cutter device (4,5) for cutting and dispensing fibres (7) and means for locating the surface of the object (1) underneath the cutter device (4,5), characterized in that said means are designed in such way that the distance (11) between the location where the fibres are dispensed by the cutter  
10 device (4,5) and said surface of the object (1) to be fixed by said means is limited in such manner that the fibres (7) substantially maintain their orientation when they are falling down.

## CONCLUSIES

1. Werkwijze voor het voorzien van een kunststof object (1) met versterkingsvezels (7), waarbij een vezel snij-apparaat (4,5) voor het snijden en afgeven van vezels (7) is gepositioneerd boven genoemd object (1), zodat the vezels (7) neervallen over een zekere afstand (11) naar het oppervlak van genoemd object (1), en waarbij het object (1) wordt bewogen ten opzichte van het snij-apparaat (4,5), met het kenmerk, dat genoemde afstand (11) tussen de plaats waar de vezels (7) worden afgegeven door het snij-apparaat (4,5) en het genoemde oppervlak van het object (1) is beperkt op zodanige wijze dat de vezels (7) in hoofdzaak hun oriëntatie behouden wanneer ze neervallen.
2. Werkwijze volgens conclusie 1, met het kenmerk, dat genoemde afstand (11) minder is dan twee keer de lengte van de vezels (7) die door het snij-apparaat (4,5) worden afgegeven, bij voorkeur minder dan de lengte van de vezels (7), meer bij voorkeur dan de halve lengte van de vezels (7).
3. Werkwijze volgens een der voorgaande conclusies, met het kenmerk, dat de lengte van de door het snij-apparaat (4,5) afgegeven vezels (7) tussen 25mm en 300mm is, en bij voorkeur tussen 80mm en 200mm is.
4. Werkwijze volgens een der voorgaande conclusies, waarbij de vezels (7) worden afgegeven terwijl zij in hun longitudinale richting bewegen, met het kenmerk, dat de hoek ( $\alpha$ ) tussen genoemde longitudinale richting (9) en genoemd oppervlak van het object (1) tussen  $-10^\circ$  en  $+30^\circ$  ligt.
5. Werkwijze volgens conclusie 4, met het kenmerk, dat hoek ( $\alpha$ ) tussen genoemde longitudinale richting (9) en genoemd oppervlak van het object (1) groter is dan  $0^\circ$ , bij voorkeur groter is dan  $5^\circ$ , meer bij voorkeur tussen  $5^\circ$  and  $15^\circ$  ligt.
6. Werkwijze volgens een der voorgaande conclusies, met het kenmerk, dat genoemd object een cilindrische pijp (1) is, die om zijn as (2) roteert en/of beweegt in zijn axiale richting.
7. Systeem voor het toepassen van de werkwijze volgens een der voorgaande conclusies, omvattende een snij-apparaat (4,5) voor het snijden en afgeven van vezels (7) en middelen voor het plaatsen van het oppervlak van het object (1) onder het snij-apparaat (4,5), met het kenmerk, dat genoemde middelen zodanig zijn ingericht dat de



afstand (11) tussen de plaats waar de vezels door het snij-apparaat (4,5) worden afgegeven en het oppervlak van het object (1) dat door genoemde middelen wordt vastgehouden zodanig beperkt is, dat de vezels (7) in hoofdzaak hun oriëntatie behouden wanneer ze  
5 neervallen.

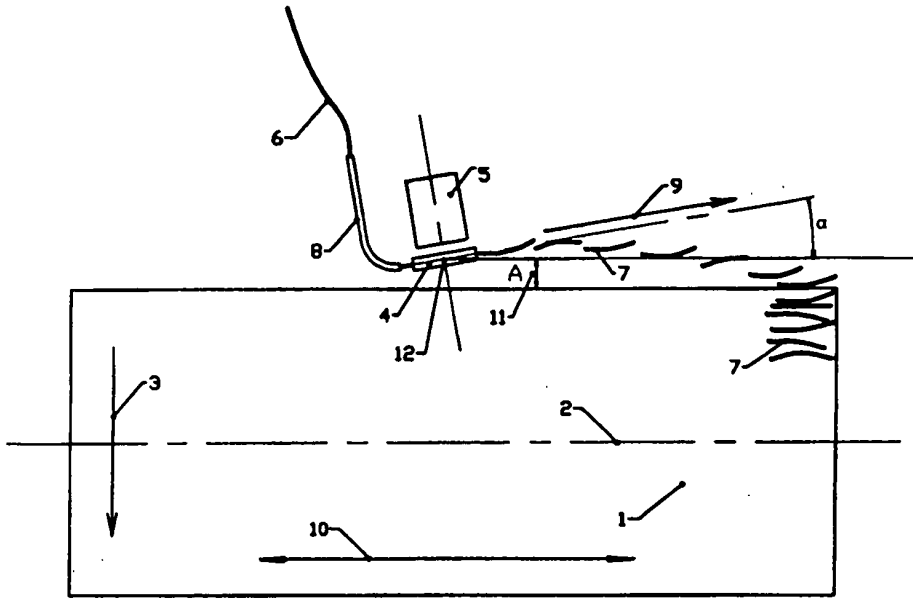


Fig. 1

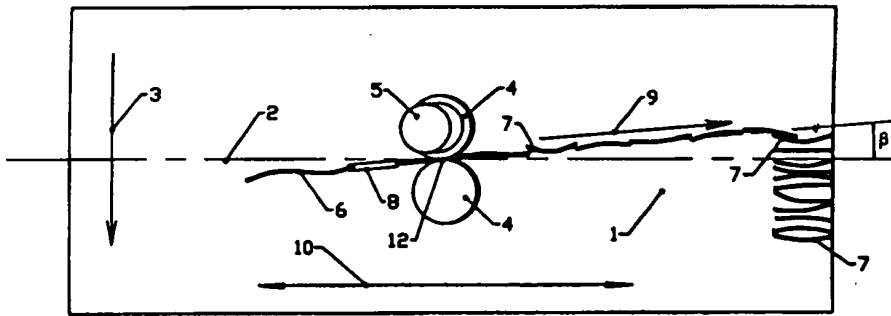


Fig. 2

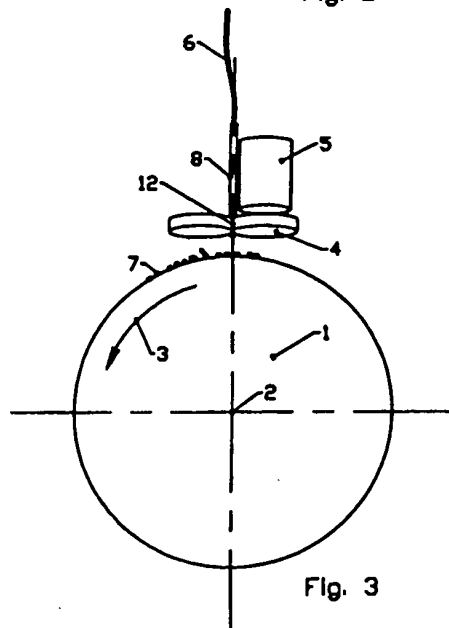


Fig. 3

# SAMENWERKINGSVERDRAG (PCT)

## RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

<b>IDENTIFICATIE VAN DE NATIONALE AANVRAGE</b>	<b>KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE</b>
Nederlands aanvraag nr.  <b>1036355</b>	Indieningsdatum  <b>22-12-2008</b>
	Ingeroepen voorrangsdatum
Aanvrager (Naam)  <b>van der Mast Willem Frans</b>	
Datum van het verzoek voor een onderzoek van internationaal type  <b>03-03-2009</b>	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.  <b>SN 51792</b>
<b>I. CLASSIFICATIE VAN HET ONDERWERP</b> (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)	
Volgens de internationale classificatie (IPC)	
<b>D01G1/04</b>	<b>B29C70/20</b>
<b>II. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK</b>	
Onderzochte minimumdocumentatie	
Classificatiesysteem	Classificatiesymbolen
<b>IPC8</b>	<b>B29C      D01G      C03B      B29B      F16L</b>
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen	
<b>III.</b>	<input type="checkbox"/> <b>GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES</b> (opmerkingen op aanvullingsblad)
<b>IV.</b>	<input type="checkbox"/> <b>GEBREK AAN EENHEID VAN UITVINDING</b> (opmerkingen op aanvullingsblad)

**ONDERZOEKSRAPPORT BETREFFENDE HET  
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND  
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar  
de stand van de techniek  
**NL 1036355**

A. CLASSIFICATIE VAN HET ONDERWERP  
INV. D01G1/04 B29C70/20

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)  
B29C D01G C03B B29B F16L

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)

EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	JP 04 122627 A (HONDA MOTOR CO LTD; NIPPON CATALYTIC CHEM IND) 23 april 1992 (1992-04-23) figuren 1,2; voorbeelden 1,6	1-3,7
X	GB 2 018 185 A (ATLANTIC BRIDGE CO) 17 oktober 1979 (1979-10-17) bladzijde 5, regel 81 - bladzijde 6, regel 129; figuren 12,13	1,3,6,7
X	US 2008/047657 A1 (JANDER MICHAEL H [BE]) 28 februari 2008 (2008-02-28) figuur 1a	1,6,7
X	WO 00/15526 A (OWENS CORNING S A NV [BE]; JANDER MICHAEL [BE] OWENS CORNING COMPOSITE) 23 maart 2000 (2000-03-23) bladzijde 4, regel 26; figuren 1,2	1,7



Verdere documenten worden vermeld in het vervolg van vak C.



Leden van dezelfde octroofamilie zijn vermeld in een bijlage

\* Speciale categorieën van aangehaalde documenten

\*A\* niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

\*D\* in de octrooiaanvraag vermeld

\*E\* eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

\*L\* om andere redenen vermelde literatuur

\*O\* niet-schriftelijke stand van de techniek

\*P\* tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

\*T\* na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

\*X\* de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

\*Y\* de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

\*Z\* lid van dezelfde octroofamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

11 Augustus 2009

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

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De bevoegde ambtenaar

Pollet, Didier

**ONDERZOEKSRAPPORT BETREFFENDE HET  
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND  
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar  
de stand van de techniek

NL 1036355

In het rapport genoemd octrooigeschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
JP 4122627	A	23-04-1992 JP 3007664 B2	07-02-2000
GB 2018185	A	17-10-1979 CA 1110817 A1 DE 2905997 A1 JP 54132669 A US 4417937 A	20-10-1981 06-09-1979 15-10-1979 29-11-1983
US 2008047657	A1	28-02-2008 EP 2073975 A2 WO 2008027206 A2	01-07-2009 06-03-2008
WO 0015526	A	23-03-2000 AU 5745899 A CA 2343291 A1 DE 69907743 D1 DE 69907743 T2 EP 1144288 A2 JP 2003520699 T MX PA01002659 A TW 438918 B US 6038949 A	03-04-2000 23-03-2000 12-06-2003 19-02-2004 17-10-2001 08-07-2003 08-04-2002 07-06-2001 21-03-2000



File No. SN51792	Filing date (day/month/year) 22.12.2008	Priority date (day/month/year)	Application No. NL1036355
International Patent Classification (IPC) INV. D01G1/04 B29C70/20			
Applicant Willem Frans van der Mast te Eelde			

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 with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the application
- Box No. VIII Certain observations on the application

	Examiner Pollet, Didier
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**WRITTEN OPINION****Box No. I Basis of this opinion**

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - a sequence listing
    - table(s) related to the sequence listing
  - b. format of material:
    - on paper
    - in electronic form
  - c. time of filing/furnishing:
    - contained in the application as filed.
    - filed together with the application in electronic form.
    - furnished subsequently for the purposes of search.
3.  In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## 1. Statement

Novelty	Yes: Claims	
	No: Claims	1-3,6-7
Inventive step	Yes: Claims	
	No: Claims	1-7
Industrial applicability	Yes: Claims	1-7
	No: Claims	

## 2. Citations and explanations

**see separate sheet**

**WRITTEN OPINION**

Application number  
NL1036355

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**Box No. VII Certain defects in the application**

see separate sheet

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**Box No. VIII Certain observations on the application**

see separate sheet



Reference is made to the following documents:

- D1: JP-A-04 122627
- D2: GB-A-2 018 185
- D3: US-A-2008/047657
- D4: WO-A-00/15526

### **Re Item V**

#### **Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

##### **V.1 Novelty**

The present application does not meet the criteria of patentability, because the subject-matter of claims 1-3, 6 and 7 is not new.

##### **re claims 1 and 7:**

Document D1 discloses (see Fig. 1-2) a *systeem omvattende een snij-apparaat (20) voor het snijden en afgeven van vezels (34) en middelen voor het plaatsen van het oppervlak (14) van het object (12, 14) onder het snij-apparaat waarbij de genoemde middelen zodanig zijn ingericht dat de afstand (L) tussen de plaats waar de vezels door het snij-apparaat (20) worden afgegeven en het oppervlak van het object dat door genoemde middelen wordt vastgehouden zodanig beperkt is (< 30 cm), dat de vezels in hoofdzaak hun oriëntatie behouden wanneer ze neervallen.*

The same reasoning applies, *mutatis mutandis*, to the subject-matter of the corresponding independent method claim 1, which therefore is also considered not new.

Further, note that also documents D2 (see Fig. 13), D3 (see Fig. 1A) and D4 (see Fig. 1) at least disclose the subject-matter of independent claims 1 and 7.

##### **re claim 2:**

*De genoemde afstand (L = 8 cm) in het systeem volgens D1 (zie voorbeeld 1) is minder dan twee keer de lengte van de vezels (5 cm) die door het snij-apparaat (20) worden afgegeven.*

re claim 3:

*De lengte van de door het snij-apparaat (20) afgegeven vezels (34) in het systeem volgens D1 is tussen 25 mm en 300 mm (voorbeeld 1 = 50 mm, voorbeeld 6 75 mm). See also D2, p. 6, l. 91-97.*

re claim 6:

*Genoemd object in het systeem volgens D2 (see Fig. 13, p. 2, l. 72) is een cilindrische pijp (M), die om zijn as roteert (R) en/of beweegt in zijn axiale richting.*

## **V.2 Inventive step**

Dependent claims 4 and 5 do not appear to contain any features which, in combination with the features of any claim to which they refer, meet the criteria of patentability. The features herein disclosed appear to be merely some of several constructional possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill. Hints thereto could easily be taken from the above mentioned documents.

## **V.3 Industrial applicability**

Since it appears that the claimed invention can be made or used in a technological sense in industry, the claimed invention appears to have industrial applicability.

### **Re Item VII**

#### **Certain defects in the application**

The relevant background art disclosed in the documents D1-D4 is not mentioned in the description, nor are these documents identified therein.

### **Re Item VIII**

#### **Certain observations on the application**

The claims 1, 4 and 7 are not clear.

The independent claims do not meet the requirement of clarity because the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved (*de*

*genoemde afstand is beperkt op zodanige wijze dat de vezels in hoofdzaak hun oriëntatie behouden wanneer ze neervallen*), which merely amounts to a statement of the underlying problem (see p. 2, l. 17-20 and also for example D4, p. 2), without providing the technical features necessary for achieving this result (e.g. the relation between the length of the fibres and the distance). Further, it is unclear which orientation and distance is meant (i.e. the orientation when leaving the cutting device?, the vertical or horizontal distance?). Finally, it is doubtful that only the distance between the cutting device and the object is responsible for maintaining the orientation of the fibres and that this distance is merely dependent on the fibre length. From document D1 it is clear that at least also the relative speed between the cutting device and the object is an influencing parameter!

The angle ( $\alpha$ ) is not clearly defined in claim 4 (i.e. an angle in a plane parallel or perpendicular to the object).

The wording *middelen voor het plaatsen van het oppervlak van het object* used in claim 7 is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers (e.g. clamping means, supporting means, moving means etc.) See p. 3, l. 20-25.

The description (see p. 5-6) should not additionally contain a set of claims.