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(54) Title (EN): PLATELIKE THERMAL INSULATION MATERIAL MADE FROM RECYCLED AND ENVIRONMENTALLY FRIENDLY RAW MATERIALS

### (57) Abstract:

(EN): The present invention relates to thermal insulation materials, particularly to environmentally friendly thermal insulation materials, manufacturing of which involves recycled raw materials and hemp fibres. The thermal insulation material described in the invention further comprises bi-component binder and conservation additive.

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European Patent Office (EPO) : AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR

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African Regional Intellectual Property Organization (ARIPO) : BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW

Eurasian Patent Organization (EAPO) : AM, AZ, BY, KG, KZ, RU, TJ, TM

## Receipt of Electronic Submission

The Receiving Office (RO/IB) acknowledges the receipt of a PCT International Application filed using ePCT-Filing. An Application Number and Date of Receipt have been automatically assigned ( Administrative Instructions, Part 7).

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Application Number:	PCT/IB2019/053646	
Date of Receipt:	03 May 2019	
Receiving Office:	International Bureau of the World Intellectual Property Organization	
Your Reference:	26288	
Applicant:	BALTICFLOC, SIA	
Number of Applicants:	1	
Title:	PLATELIKE THERMAL INSULATION MATERIAL MADE FROM RECYCLED AND ENVIRONMENTALLY FRIENDLY RAW MATERIALS	
Documents Submitted:		
	26288-appb-000001.pdf (Description.pdf)	135319
	26288-appb-000002.pdf (Claims.pdf)	186078
	26288-appb-000003.pdf (Abstract.pdf)	271836
	26288-appb-000004.pdf (Figure.pdf)	108996
	26288-appb.xml	859
	26288-decl.xml	2025
	26288-fees.xml	1967
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/Geneva, RO/IB/

**PCT REQUEST**

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<b>0</b>	<b>For receiving Office use only</b>	
0-1	International Application No.	<b>PCT/IB2019/053646</b>
0-2	International Filing Date	<b>03 May 2019 (03.05.2019)</b>
0-3	Name of receiving Office and "PCT International Application"	<b>RO/IB</b>
0-4	<b>Form PCT/RO/101 PCT Request</b>	
0-4-1	Prepared Using	<b>ePCT-Filing Version 4.5.004 MT/FOP 20190424/1.1</b>
0-5	<b>Petition</b>	
	The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	<b>Receiving Office (specified by the applicant)</b>	<b>International Bureau of the World Intellectual Property Organization (RO/IB)</b>
0-7	<b>Applicant's or agent's file reference</b>	<b>26288</b>
<b>I</b>	<b>Title of Invention</b>	<b>PLATELIKE THERMAL INSULATION MATERIAL MADE FROM RECYCLED AND ENVIRONMENTALLY FRIENDLY RAW MATERIALS</b>
<b>II</b>	<b>Applicant</b>	
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II-6	State of nationality	<b>LV</b>
II-7	State of residence	<b>LV</b>
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III-1-1	This person is	<b>Inventor only</b>
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III-1-5	Address	<b>Zinātnes 3 LV-4126 Priekuļi, Priekuļu novads Latvia</b>

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IV-1	<b>Agent or common representative; or address for correspondence</b> The person identified below is hereby/ has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	<b>Agent</b>
IV-1-1	Name (LAST, First)	<b>KROMANIS, Artis</b>
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IV-1-5	e-mail	<b>petpat@petpat.lv</b>
IV-1-5(a)	E-mail authorization The receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority are authorized to use this e-mail address, if the Office or Authority so wishes, to send notifications issued in respect of this international application:	<b>as advance copies followed by paper notifications</b>
<b>V</b>	<b>DESIGNATIONS</b>	
<b>V-1</b>	<b>The filing of this request constitutes under Rule 4.9(a), the designation of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.</b>	
<b>VI-1</b>	<b>Priority claim of earlier national application</b>	
VI-1-1	Filing date	<b>19 March 2019 (19.03.2019)</b>
VI-1-2	Number	<b>P-19-16</b>
VI-1-3	Country or Member of WTO	<b>LV</b>
<b>VI-2</b>	<b>Incorporation by reference :</b> where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.	
<b>VII-1</b>	<b>International Searching Authority Chosen</b>	<b>Federal Service for Intellectual Property (Rospatent) (Russian Federation) (ISA/RU)</b>

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<b>VIII</b>	<b>Declarations</b>	<b>Number of declarations</b>	
VIII-1	Declaration as to the identity of the inventor	1	
VIII-2	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent	-	
VIII-3	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application	-	
VIII-4	Declaration of inventorship (only for the purposes of the designation of the United States of America)	1	
VIII-5	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty	-	

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<b>VIII-1-1</b>	<b>Declaration: Identity of the Inventor</b> Declaration as to the identity of the inventor (Rules 4.17(i) and 51bis.1(a)(i))	<b>In relation to this international application</b>
	Name (LAST, First) Address	<b>CĀBULIS, Edžus of</b> <b>Zinātnes 3</b> <b>LV-4126 Priekuļi, Priekuļu novads</b> <b>Latvia</b> <b>is the inventor of the subject matter for which protection is sought by way of this international application</b>

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VIII-4-1	<b>Declaration: Inventorship (only for the purposes of the designation of the United States of America)</b> Declaration of Inventorship (Rules 4.17(iv) and 51bis.1(a)(iv)) for the purposes of the designation of the United States of America:	<p><b>I hereby declare that I believe I am the original inventor or an original joint inventor of a claimed invention in the application.</b></p> <p><b>This declaration is directed to the international application of which it forms a part.</b></p> <p><b>I hereby declare that the above-identified international application was made or authorized to be made by me.</b></p> <p><b>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.</b></p>
VIII-4-1-1-1	Name (LAST, First)	<b>CĀBULIS, Edžus</b>
VIII-4-1-1-2	Residence: (city and either US state, if applicable, or country)	<b>Priekuļi, Priekuļu Novads, Latvia</b>
VIII-4-1-1-3	Mailing Address:	<b>Zinātnes 3          LV-4126 Priekuļi, Priekuļu novads          Latvia</b>
VIII-4-1-1-4	Inventor's Signature: (The signature must be that of the inventor, not that of the agent)	<b>/EdzusCabulis/</b>
VIII-4-1-1-5	Date:	<b>03 May 2019 (03.05.2019)</b>

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<b>IX</b>	<b>Check list</b>	<b>Number of sheets</b>	<b>Electronic file(s) attached</b>
IX-1	Request (including declaration sheets)	<b>6</b>	✓
IX-2	Description	<b>4</b>	✓
IX-3	Claims	<b>2</b>	✓
IX-4	Abstract	<b>1</b>	✓
IX-5	Drawings	<b>1</b>	✓
IX-7	TOTAL	<b>14</b>	
	<b>Accompanying Items</b>	<b>Paper document(s) attached</b>	<b>Electronic file(s) attached</b>
IX-8	Fee calculation sheet	-	✓
IX-20	Figure of the drawings which should accompany the abstract	1	
IX-21	Language of filing of the international application	English	
IX-22	The receiving Office is requested to make this international application available to the Priority Document Access Service (DAS) (provided that an international application number and international filing date is accorded to this purported international application.)	Yes	
X-1	Signature of applicant, agent or common representative	/ArtisKromanis/	
X-1-1	Name (LAST, First)	KROMANIS, Artis	
X-1-3	Capacity (if such capacity is not obvious from reading the request)	Agent	

**FOR RECEIVING OFFICE USE ONLY**

10-1	Date of actual receipt of the purported international application	03 May 2019 (03.05.2019)
10-2	Drawings:	
10-2-1	Received	
10-2-2	Not received	
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application	
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)	
10-5	International Searching Authority	ISA/RU
10-6	Transmittal of search copy delayed until search fee is paid	

**FOR INTERNATIONAL BUREAU USE ONLY**

11-1	Date of receipt of the record copy by the International Bureau	
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**PCT (ANNEX - FEE CALCULATION SHEET)**

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(This sheet is not part of and does not count as a sheet of the international application)

<b>0</b>	<b>For receiving Office use only</b>		
0-1	International Application No.	PCT/IB2019/053646	
0-2	Date stamp of the receiving Office		
<b>0-4</b>	<b>Form PCT/RO/101 (Annex) PCT Fee Calculation Sheet</b>		
0-4-1	Prepared Using	ePCT-Filing Version 4.5.004 MT/FOP 20190424/1.1	
<b>0-9</b>	<b>Applicant's or agent's file reference</b>		
		26288	
<b>2</b>	<b>Applicant</b>		
		BALTICFLOC, SIA	
<b>12</b>	<b>Calculation of prescribed fees</b>		
		Fee amount/multiplier	Total amounts (EUR)
12-1	Transmittal fee T	⇔	88
12-2-1	Search fee S	⇔	529
12-2-2	International search to be carried out by	RU	
12-3	International filing fee (first 30 sheets) i1	1169	
12-4	Remaining sheets	0	
12-5	Additional amount (X)	0	
12-6	Total additional amount i2	0	
12-7	i1 + i2 = i	1169	
12-12	Electronic Filing reduction (Image) R	-176	
12-13	Total International filing fee (i-R) I	⇔	993
12-17	Fee for restoration of priority rights RP		
	Number of requests for restoration of priority rights	0	
	Total amount of fees for restoration of priority rights		
12-19	<b>TOTAL FEES PAYABLE (T+S+I+P+RP)</b>	⇔	<b>1610</b>
12-21	<b>Mode of payment</b>	Bank transfer	
12-22	<b>Payment contact</b>	artis@petpat.lv	

Pending processing

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VIII-4-1	<b>Declaration: Inventorship (only for the purposes of the designation of the United States of America)</b> Declaration of Inventorship (Rules 4.17(iv) and 51bis.1(a)(iv)) for the purposes of the designation of the United States of America:	<p><b>I hereby declare that I believe I am the original inventor or an original joint inventor of a claimed invention in the application.</b></p> <p><b>This declaration is directed to the international application of which it forms a part.</b></p> <p><b>I hereby declare that the above-identified international application was made or authorized to be made by me.</b></p> <p><b>I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.</b></p>
VIII-4-1-1-1	Name (LAST, First)	<b>CĀBULIS, Edžus</b>
VIII-4-1-1-2	Residence: (city and either US state, if applicable, or country)	<b>Priekuļi, Priekuļu Novads, Latvia</b>
VIII-4-1-1-3	Mailing Address:	<b>Zinātnes 3          LV-4126 Priekuļi, Priekuļu novads          Latvia</b>
VIII-4-1-1-4	Inventor's Signature: (The signature must be that of the inventor, not that of the agent)	<b>/EdzusCabulis/</b>
VIII-4-1-1-5	Date:	<b>03 May 2019 (03.05.2019)</b>

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VIII-1-1	<b>Declaration: Identity of the Inventor</b> Declaration as to the identity of the inventor (Rules 4.17(f) and 51bis.1(a)(i))	<b>In relation to this international application</b>
Name (LAST, First) Address	<b>CĀBULIS, Edžus of Zinātnes 3 LV-4126 Priekuļi, Priekuļu novads Latvia is the inventor of the subject matter for which protection is sought by way of this international application</b>	

Pending processing

# PLATELIKE THERMAL INSULATION MATERIAL MADE FROM RECYCLED AND ENVIRONMENTALLY FRIENDLY RAW MATERIALS

## Technical Field

[0001] The present invention relates to thermal insulation materials, particularly to environmentally friendly thermal insulation materials, manufacturing of which involves recycled raw materials and hemp fibres.

## Background Art

[0002] Many and various thermal insulation materials with different thermal and sound insulation properties are known, however nowadays increased attention is pointed towards how ecological is the material, namely, is the material friendly to the environment and human health during its production, use and after it has been utilised. Heat effectiveness and application of hemp in heating of building constructions are known for ages. Also in LT6210 hemp is named as applicable component in thermal insulation material, which protects composite with thermal insulation properties that contains 45 to 67 % filler of hemp shives and 10 to 20 % cellulose. Presence of cellulose and hemp derived raw material is named, without disclosing precise percentage of content and ratio, in EP1718896, which in manufacturing of product uses hemp fibres as ingredient of product, also mentioning bi-component polymer fibres.

[0003] An object of the invention is to create a thermal insulation material made from recycled and environmentally friendly raw materials, composition of which would increase protection of the product both against microbiological pollution and against rodents.

## Detailed Description of the Invention

[0004] The object of the invention is achieved by creation of product that is applicable as thermal insulation material and which comprises recycled raw materials, mainly, wastepaper, hemp fibres, bi-component binder, as well as additive.

[0005] Facilitating waste management and significantly reducing the consumption of natural resources, crushed wastepaper, which often is not recycled and arrives in landfills or is burned, more precisely glossy paper, magazines, laminated paper, books, cardboard, napkins, packaging, such as paper coffee cups, Tetra Pak, egg cartons, as well as plastic, particularly polyethylene, and iron, aluminium particles, are used as recycled raw material. Mentioned waste is treated, repeatedly crushed and separated from inapplicable admixtures. The length of fibres of the recycled raw material is 2 to 6 mm. The recycled raw material comprises 50 % of the total weight of the material.

[0006] Hemp fibres that are also crushed resulting in 3 to 10 mm fibres comprise 20 % of the total weight of the material. Characteristic thermal conductivity of hemp fibres is 0.036 W/mK.

[0007] To achieve the object of the invention a product in a form of a plate in thickness of 50 to 250 mm is created. To bind raw materials into one plate, bi-component binder is added to hemp fibres and recycled raw material, wherein bi-component binder comprises 24.5 to 26.5 % of the total weight of the material. Bi-component binder consists of polyester fibre core and a sheath of ethylene/vinyl acetate copolymer or other organic copolymer of ethylene with polar comonomer, especially acrylate(s) and melts in temperature of 100 °C. The length of the bi-component binder fibres is 6 to 40 mm.

[0008] An additive that comprises sulphamidic acid, aluminium hydroxide and silver in amount of 3.5 to 5.5 % of the total weight of the material is added to the plate composition. The presence of such a binder in a thermal insulation material improves its reaction to fire class, as well as improves protection of the product both against microbiological pollution and against rodents – it prevents the formation of mold and fungus, as well as does not attract rodents.

[0009] The described plates are ecological and their manufacture does not pollute the environment and does not involve usage of non-renewable natural resources.

[0010] The material gained as a result of the present invention is characterized by thermal conductivity in a range of 0.036 to 0.040 W/mK.

#### Brief Description of the Accompanying Drawings

[0011] Fig. 1 illustrates sectional view of the thermal insulation material.

#### Examples for Working of the Invention

##### Example 1

[0012] Fig. 1 illustrates a thermal insulation material plate in thickness of 150 mm, which comprises 50 % of recycled raw material obtained from crushed glossy paper, magazines, laminated paper, books, cardboard, napkins, paper coffee cups, Tetra Pak, egg cartons, polyethylene, iron and aluminium foil, the length of fibres of which varies from 2 to 6 mm; 20 % of hemp fibres, the length of fibres of which varies from 3 to 10 mm, 25 % of bi-component binder consisting of polyester fibre core and a sheath of ethylene/vinyl acetate copolymer, the length of fibres of which varies from 6 to 40 mm and 5 % of preservative additive comprising sulphamic acid, aluminium hydroxide and silver. The thermal conductivity of the insulation material is 0.038 W/mK.

##### Example 2

[0013] The working of the invention is possible also as a thermal insulation material plate in thickness of 50 to 250 mm, which comprises 50 % of recycled raw material obtained from crushed wastepaper, glossy paper, magazines, laminated paper, books, cardboard, napkins, packaging, paper coffee cups, Tetra Pak, egg cartons, plastic, polyethylene, iron and aluminium foil, the length of fibres of which varies from 3 to 5 mm; 20 % of hemp fibres, the length of fibres of which varies from 5 to 8 mm, 26 % of bi-component binder consisting of polyester fibre core and a sheath of ethylene/vinyl acetate copolymer, the length of fibres of which varies from 10 to 30 mm and 4 % of preservative additive comprising sulphamic acid, aluminium

hydroxide and silver. The thermal conductivity of the insulation material is 0.036 to 0,040 W/mK.

### Example 3

[0014] Another example of working of the invention is a thermal insulation material plate in thickness of 50 to 250 mm, which comprises 50 % of recycled raw material obtained from crushed wastepaper, glossy paper, magazines, laminated paper, books, cardboard, napkins, packaging, paper coffee cups, Tetra Pak, egg cartons, plastic, polyethylene, iron and aluminium folium, the length of fibres of which variates from 4 to 5 mm; 20 % of hemp fibres, the length of fibres of which variates from 6 to 7 mm, 24.5 % of bi-component binder consisting of polyester fibre core and a sheath of ethylene/vinyl acetate copolymer, the length of fibres of which variates from 20 to 25 mm and 5.5 % of preservative additive comprising sulphamidic acid, aluminium hydroxide and silver. The thermal conductivity of the insulation material is 0.036 to 0,040 W/mK.

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## CLAIMS

1. A thermal insulation material comprising crushed recycled raw material, hemp fibres and a bi-component binder, characterized by thermal insulation material additionally containing a preservation additive and by the crushed recycled raw material that optionally is crushed wastepaper, more precisely, glossy paper, magazines, laminated paper, books, cardboard, napkins, packaging, such as paper coffee cups, egg cartons, as well as plastic, particularly polyethylene, and iron, aluminium particles, wherein the crushed recycled raw material comprises 50 % of the total weight of the thermal insulation material, hemp fibres comprise 20 % of the total weight of the thermal insulation material, the bi-component binder comprises 24.5 to 26.5 % of the total weight of the thermal insulation material and the preservation additive comprises 3.5 to 5.5 % of the total weight of the thermal insulation material.
2. The thermal insulation material according to Claim 1, wherein the length of fibres of the crushed recycled raw material is 2 to 6 mm.
3. The thermal insulation material according to Claim 1 or 2, wherein the bi-component binder consists of a polyester fibre core and a sheath of ethylene/vinyl acetate copolymer or other organic copolymer of ethylene with polar comonomer, especially acrylate(s).
4. The thermal insulation material according to any of Claims 1 to 3, wherein the preservative additive comprises sulphamidic acid, aluminium hydroxide and silver.
5. The thermal insulation material according to any of Claims 1 to 4, wherein the length of the bi-component binder fibres is 6 to 40 mm.
6. The thermal insulation material according to any of Claims 1 to 5, wherein the length of hemp fibres is 3 to 10 mm.
7. The thermal insulation material according to any of Claims 1 to 6, wherein the thermal insulation material is in a form of plate in thickness of 50 to 250 mm.



8. The thermal insulation material according to any of Claims 1 to 7, characterized by thermal conductivity in a range of 0.036 to 0.040 W/mK.

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The present invention relates to thermal insulation materials, particularly to environmentally friendly thermal insulation materials, manufacturing of which involves recycled raw materials and hemp fibres. The thermal insulation material described in the invention further comprises bi-component binder and conservation additive.

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Fig. 1