



SUPPLEMENTARY EUROPEAN SEARCH REPORT

Application number:
EP 22 77 30 98

Classification of the application (IPC):

D01F 6/76, D02J 1/22, D01D 5/088, D01D 7/00, D01D 10/02, B65H 55/00, D01D 5/16

Technical fields searched (IPC):

D01D, D01F

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	WO 2014157543 A1 (KB SEIREN LTD [JP]) 02 October 2014 (2014-10-02) * claims; examples *	1-9
A	WO 2013129540 A1 (OJI HOLDINGS CORP [JP]) 06 September 2013 (2013-09-06) * claims; examples *	1-9

The supplementary search report has been based on the last set of claims valid and available at the start of the search.

Place of search Munich	Date of completion of the search 30 September 2024	Examiner Masson, Patrick
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CATEGORY OF CITED DOCUMENTS

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| X: particularly relevant if taken alone | P: intermediate document |
| Y: particularly relevant if combined with another document of the same category | T: theory or principle underlying the invention |
| A: technological background | E: earlier patent document, but published on, or after the filing date |
| O: non-written disclosure | D: document cited in the application |
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LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-9

claim 1: A polyphenylene sulfide monofilament having a phenylene sulfide unit as a main structural unit and satisfying (1) to (5): (1) a fineness of 6 to 35 dtex; (2) a breaking strength of 3.4 cN/dtex or more; (3) a breaking elongation of 24% to 45%; (4) a 5% modulus of 1.0 to 1.6 cN/dtex; and (5) a 10% modulus of 1.4 to 2.3 cN/dtex. Claim 2 relates to a pirn shape fiber package from the monofilament of claim 1. Claim 4 relates to a method for making the monofilament of claim 1. Claim 5 relates to a method for making the fiber package of claim 2.

1.1. claims: 1-5

A polyphenylene sulfide monofilament having a phenylene sulfide unit as a main structural unit and satisfying (1) to (5): (1) a fineness of 6 to 35 dtex; (2) a breaking strength of 3.4 cN/dtex or more; (3) a breaking elongation of 24% to 45%; (4) a 5% modulus of 1.0 to 1.6 cN/dtex; and (5) a 10% modulus of 1.4 to 2.3 cN/dtex. Claim 2 relates to a pirn shape fiber package from the monofilament of claim 1. Claim 4 relates to a method for making the monofilament of claim 1. Claim 5 relates to a method for making the fiber package of claim 2.

1.2. claims: 6, 7

A method of producing a fiber package made up of a polyphenylene sulfide monofilament having a phenylene sulfide unit as a main structural unit by using a direct spinning drawing method in which a polyphenylene sulfide resin is melt-extruded, cooled and solidified, and an obtained undrawn yarn is, without being wound once, continuously drawn and wound up on a bobbin in a pirn shape with a winding tension to a winder of 0.1 to 0.5 cN/dtex.

1.3. claim: 8

A method of producing a fiber package made up of a polyphenylene sulfide monofilament having a phenylene sulfide unit as a main structural unit by using a direct spinning drawing method in which a polyphenylene sulfide resin is melt-extruded, cooled and solidified, and an obtained undrawn yarn is, without being wound once, continuously drawn and wound up on a bobbin in a pirn shape by a winder, wherein a spin finish is applied to the undrawn yarn before being wound up on the bobbin to achieve an oil pick-up unit of 0.15 to 0.5 mass% for the polyphenylene sulfide monofilament, and the yarn is wound up on the bobbin in the pirn shape to have a winding width of 100 to 250 mm, a taper angle of 30° to 140°, and a lead angle of 0.6° to 2°.

1.4. claim: 9

A pirn-shaped polyphenylene sulfide monofilament fiber package having a winding width of 100 to 250 mm, a taper angle of 30° to 140°, a lead angle of 0.6° to 2°, and a heat shrinkage stress ratio between innermost and outermost layers of 0.85 to 1.15.

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

The supplementary search report has been based on the last set of claims valid and available at the start of the search.

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ANNEX TO SUPPLEMENTARY EUROPEAN SEARCH REPORT

Application number:
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on 30-09-2024.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO2014157543 A1	02-10-2014	JP 6283352 B2	21-02-2018
		JP WO2014157543 A1	16-02-2017
		TW 201504491 A	01-02-2015
		WO 2014155891 A1	02-10-2014
		WO 2014157543 A1	02-10-2014
WO2013129540 A1	06-09-2013	JP 5949895 B2	13-07-2016
		JP 5949896 B2	13-07-2016
		JP 6020612 B2	02-11-2016
		JP 6090342 B2	08-03-2017
		JP 6432615 B2	05-12-2018
		JP 2015071794 A	16-04-2015
		JP 2015110791 A	18-06-2015
		JP 2017125192 A	20-07-2017
		JP WO2013129540 A1	30-07-2015
		JP WO2013129541 A1	30-07-2015
		TW 201343407 A	01-11-2013
		TW 201343733 A	01-11-2013
		WO 2013129540 A1	06-09-2013
		WO 2013129541 A1	06-09-2013