

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 December 2001 (13.12.2001)

PCT

(10) International Publication Number
WO 01/94687 A3

- (51) International Patent Classification⁷: **D06M 11/83**, 11/36, 16/00
- (21) International Application Number: PCT/US01/14687
- (22) International Filing Date: 8 May 2001 (08.05.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
- | | | |
|------------|--------------------------|----|
| 09/585,762 | 2 June 2000 (02.06.2000) | US |
| 09/586,053 | 2 June 2000 (02.06.2000) | US |
| 09/586,081 | 2 June 2000 (02.06.2000) | US |
| 09/586,381 | 2 June 2000 (02.06.2000) | US |
| 09/589,179 | 2 June 2000 (02.06.2000) | US |
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:**
- with international search report
 - before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
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- (88) Date of publication of the international search report:
25 April 2002
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: YARNS AND FABRICS HAVING A WASH-DURABLE NON-ELECTRICALLY CONDUCTIVE TOPICALLY APPLIED METAL-BASED FINISH

(57) Abstract: Durable non-electrically conductive metal treatments (such as coatings or finishes) for yarns and textile fabrics. Such treatments preferably comprise silver and/or silver ions; however, other metals, such as zinc, iron, copper, nickel, cobalt, aluminum, gold, manganese, magnesium, and the like, may also be present or alternatively utilized. Such a treatment provides, as one example, an antimicrobial fiber and/or textile fabric which remains on the surface and does not permit electrical conductivity over the surface. The treatment is extremely durable on such substrates; after a substantial number of standard launderings and dryings, the treatment does not wear away in any appreciable amount and thus the substrate retains its antimicrobial activity (or other property). The method of adherence to the target yarn and/or fabric may be performed any number of ways, most preferably through the utilization of a binder system or through a transfer method from a donor fabric to a target textile fabric in the presence of moisture and upon exposure to heat. The particular methods of adherence, as well as the treated textile fabrics and individual fibers are also encompassed within this invention.

INTERNATIONAL SEARCH REPORT

Inter ☐ International Application No

PCT/US 01/14687

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 D06M11/83 D06M11/36 D06M16/00

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)

IPC 7 D06M

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 practical, search terms used)

EPO-Internal, PAJ, 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	EP 0 791 681 A (MITSUI MINING & SMELTING CO) 27 August 1997 (1997-08-27) page 4, line 10 - line 19 page 5, line 5 - line 40 page 6, line 3 - line 10; example 8 ---	1-6, 9-14, 26-38, 54-56
X	US 4 524 170 A (BERCZI CHARLES N ET AL) 18 June 1985 (1985-06-18) column 1, line 58 - column 2, line 36 column 2, line 53 - line 63; claim 1 --- -/--	1-3, 7-11, 15, 16, 26-28, 30-37, 54, 55, 63

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

21 February 2002

Date of mailing of the international search report

01/03/2002

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/14687

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 004 889 A (ICHIKAWA YOSHIO) 21 December 1999 (1999-12-21) the whole document ---	17-38, 54-57, 63
X	PATENT ABSTRACTS OF JAPAN vol. 016, no. 144 (C-0927), 10 April 1992 (1992-04-10) & JP 04 002877 A (NICHIBI:KK), 7 January 1992 (1992-01-07) abstract ---	1-38
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 05, 30 April 1998 (1998-04-30) & JP 10 001871 A (TOYOCO CO LTD), 6 January 1998 (1998-01-06) abstract ---	39-42, 45-50, 53
X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 499 (C-1109), 9 September 1993 (1993-09-09) & JP 05 132871 A (DAIWABO CO LTD), 28 May 1993 (1993-05-28) abstract ---	1-16, 26-33, 54, 55, 63
P, X	WO 00 46441 A (AKIEDA SHINGO ;MUKAI HISASHI (JP); GUNZE KK (JP); OZAWA NANAMI (JP) 10 August 2000 (2000-08-10) page 4, column 5, line 7 - line 23 -----	1, 26, 54, 63

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/14687

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0791681	A	27-08-1997	JP 9299457 A	25-11-1997
			JP 9299724 A	25-11-1997
			JP 9296363 A	18-11-1997
			JP 10130619 A	19-05-1998
			EP 0791681 A2	27-08-1997
			JP 9286615 A	04-11-1997
			US 5945211 A	31-08-1999
US 4524170	A	18-06-1985	US 4522872 A	11-06-1985
US 6004889	A	21-12-1999	NONE	
JP 04002877	A	07-01-1992	NONE	
JP 10001871	A	06-01-1998	NONE	
JP 05132871	A	28-05-1993	JP 2951457 B2	20-09-1999
WO 0046441	A	10-08-2000	EP 1162303 A1	12-12-2001
			WO 0046441 A1	10-08-2000
			JP 2000303360 A	31-10-2000