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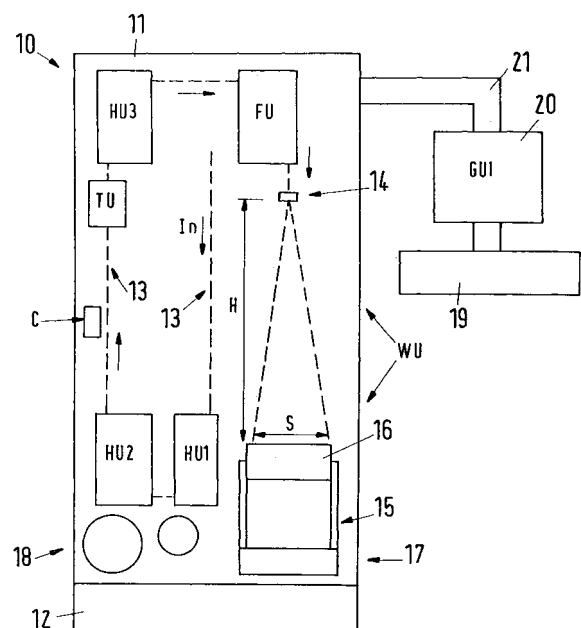
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(54) A thread heating device

(57) A false twist texturing machine is modified to enable it to operate at very high revolutions (e.g. above 20,000RPM), i.e. processing rates with high linear threadline speeds (above 2000 M/Min). The friction disc stack is provided with a drive motor for each spindle shaft. For safety at high RPMs, the stack is encased in a protective housing which can absorb energy of flying parts in the event of breakage. Heat is supplied to the thread by non-contact heating (convection and/ or radiation) in an insulated space, the thread preferably being guided through the heated space by positively driven godet units. The thread path is so arranged that positive forwarding elements are provided at each diverting location, so that no passive guides or feeding nips are required. A special start-up procedure enables establishment of a stable threadline at relatively slow processing speed followed by acceleration to the set operating speed.

Fig.1





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 5 760 374 A (FRANK BENNO ET AL) 2 June 1998 (1998-06-02) * column 8, line 64 - column 9, line 15 * -----	1-3	INV. D02J13/00 D02G1/02
A	EP 0 994 206 A (MURATA MACHINERY LTD) 19 April 2000 (2000-04-19) * column 4, lines 9-54 * -----	1-9	
A	FR 2 831 190 A (RIETER ICBT) 25 April 2003 (2003-04-25) * page 9, lines 1-9 * -----	1-9	
A	US 3 562 489 A (LENK ERICH) 9 February 1971 (1971-02-09) * column 1, line 71 - column 2, line 49 * -----	1-9	
A	EP 0 784 110 A (MURATA MACHINERY LTD) 16 July 1997 (1997-07-16) * column 5, line 15 - column 6, line 12 * -----	1-9	
A	US 5 755 086 A (HALBHEER ET AL) 26 May 1998 (1998-05-26) * column 2, line 24 - column 3, line 46 * -----	10	TECHNICAL FIELDS SEARCHED (IPC)
X	US 6 006 508 A (SHIGEKAWA ET AL) 28 December 1999 (1999-12-28) * column 1, lines 37-62 * -----	11	D02J D02G
A	US 4 551 970 A (PATEL ET AL) 12 November 1985 (1985-11-12) * column 4, lines 54-60; claim 1 * -----	11-13	
A	US 6 425 236 B1 (ROQUET XAVIER ET AL) 30 July 2002 (2002-07-30) * the whole document * -----	14	
----- -/--			
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 June 2006	Examiner Lanniel, G
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

5

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 115 987 A (TANIGUCHI ET AL) 26 September 1978 (1978-09-26) * column 2, line 58 - column 3, line 20 * * column 8, lines 30-42 * -----	15	
X	US 5 626 011 A (BALLHAUSEN ET AL) 6 May 1997 (1997-05-06) * column 5, lines 12-41 * -----	15	
A	US 6 209 301 B1 (BAADER UWE ET AL) 3 April 2001 (2001-04-03) * column 5, line 41 - column 6, line 5; claim 17 * -----	26	
X	EP 0 903 431 A (RIETER SCRAGG LIMITED) 24 March 1999 (1999-03-24) * the whole document * -----	31	
X	US 6 164 054 A (MATAS GABALDA ET AL) 26 December 2000 (2000-12-26) * the whole document * -----	31,32	
X	WO 03/029538 A (BARMAG AG; LIEBER, REINHARD; KLUG, MICHAEL; WORTMANN, THOMAS) 10 April 2003 (2003-04-10) * abstract * -----	38	
X	FR 2 621 605 A (ICBT ROANNE) 14 April 1989 (1989-04-14) * page 4, lines 10-27 * * page 7, lines 24-31 * -----	38	
A	US 4 215 530 A (BEAU, PATRICK ET AL) 5 August 1980 (1980-08-05) * the whole document * -----	1-44	
	-/--		
The present search report has been drawn up for all claims			
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5
EPO FORM 1503 03.82 (P04C01)



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	FR 2 835 261 A (RIETER ICBT) 1 August 2003 (2003-08-01) * page 2, lines 11-27 * * page 5, line 18 - page 8, line 15 * -----	1-44	
A	US 6 052 985 A (BALLHAUSEN ET AL) 25 April 2000 (2000-04-25) * column 2, lines 30-60 * -----	17-25	
A	US 2003/046871 A1 (WALTER STEFFEN ET AL) 13 March 2003 (2003-03-13) * paragraphs [0001], [0005] * -----	17-25	
X	US 5 201 170 A (STAHLECKER ET AL) 13 April 1993 (1993-04-13) * column 2, lines 35-60 * -----	15	
A	US 4 420 926 A (REMONTET ET AL) 20 December 1983 (1983-12-20) * column 2, line 52 - column 3, line 12 * -----	15,16	
X	US 5 111 647 A (GABALDA ET AL) 12 May 1992 (1992-05-12) * abstract * -----	15	TECHNICAL FIELDS SEARCHED (IPC)
A	DE 43 37 175 A1 (STAHLECKER, FRITZ, 73337 BAD UECKERINGEN, DE; STAHLECKER, HANS, 73079) 4 May 1995 (1995-05-04) * column 3, lines 30-68 * -----	15,16	
A	EP 1 149 941 A (TEIJIN SEIKI CO., LTD) 31 October 2001 (2001-10-31) * paragraphs [0033], [0035], [0074] - [0077] * -----	11-13	
A	US 4 771 598 A (SCHERPF ET AL) 20 September 1988 (1988-09-20) * claim 1; figure 2 * -----	1-44	
-/--			
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 June 2006	Examiner Lanniel, G
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

5

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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	WO 99/61692 A (BARMAG AG) 2 December 1999 (1999-12-02) * page 3, lines 4-30; figure 1 * -----	40	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 June 2006	Examiner Lanniel, G
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

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:

see sheet B

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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

a thread heating device for use in a thread processing machine

2. claim: 10

a galette or godet unit for use in a device as claimed in claims 1-9

3. claim: 11

a twisting device for use in a process employing false twist

4. claim: 14

a spindle module for use in a twisting device comprising a disc support shaft and an electric drive motor

5. claim: 15

a spindle module for use in a twisting device comprising a disc shaft, a motor connected to the shaft and a bearing

6. claims: 17-25

a high speed twisting device for use in a process employing false twist

7. claim: 26

a thread processing machine, for example a false twist texturing machine

8. claims: 27-30

a false twist texturing machine

9. claim: 31

a thread processing machine



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:

10. claims: 32-35

a thread processing machine

11. claim: 36

a high speed thread processing machine

12. claim: 37

a high speed thread processing machine

13. claims: 38-39

a machine

14. claims: 40-43

a godet module

15. claim: 44

a godet

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 03 02 4172

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The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-06-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5760374	A	02-06-1998	CN 1083548 A	09-03-1994
			WO 9325739 A1	23-12-1993
			EP 0644960 A1	29-03-1995
			JP 3634860 B2	30-03-2005
			JP 7506879 T	27-07-1995
			KR 9702558 B1	06-03-1997
EP 0994206	A	19-04-2000	JP 2000119923 A	25-04-2000
FR 2831190	A	25-04-2003	CN 1589343 A	02-03-2005
			EP 1442165 A2	04-08-2004
			WO 03033792 A2	24-04-2003
US 3562489	A	09-02-1971	BE 736709 A	31-12-1969
			CH 498214 A	31-10-1970
			DE 1804777 A1	27-05-1970
			ES 370342 A1	16-04-1971
			FR 2021482 A5	24-07-1970
			GB 1215270 A	09-12-1970
			NL 6914825 A	28-04-1970
			EP 0784110	A
			DE 69623432 D1	10-10-2002
			DE 69623432 T2	24-04-2003
			HK 1003180 A1	30-01-2004
			JP 2991100 B2	20-12-1999
			JP 9188926 A	22-07-1997
US 5755086	A	26-05-1998	CA 2163730 A1	26-05-1996
			CN 1132804 A	09-10-1996
			DE 59501776 D1	07-05-1998
			EP 0718424 A2	26-06-1996
			JP 8226038 A	03-09-1996
US 6006508	A	28-12-1999	DE 19832564 A1	28-01-1999
			JP 11043834 A	16-02-1999
US 4551970	A	12-11-1985	CH 664983 A5	15-04-1988
			DE 3323543 A1	10-01-1985
			FR 2548224 A1	04-01-1985
			GB 2142350 A	16-01-1985
			JP 1608532 C	28-06-1991
			JP 2035051 B	08-08-1990
			JP 60021933 A	04-02-1985
			US 6425236	B1

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 02 4172

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-06-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 6425236	B1	DE 19955399 A1	13-06-2001	
		EP 1101847 A1	23-05-2001	
		JP 2001172831 A	26-06-2001	
US 4115987	A	26-09-1978	CH 616459 A5	31-03-1980
			DE 2716283 A1	18-05-1978
			FR 2370806 A1	09-06-1978
			JP 53061748 A	02-06-1978
US 5626011	A	06-05-1997	CN 1131706 A	25-09-1996
			CZ 9502289 A3	13-03-1996
			DE 4431830 C1	26-10-1995
			EP 0701014 A2	13-03-1996
			JP 8170233 A	02-07-1996
US 6209301	B1	03-04-2001	CN 1108403 C	14-05-2003
			WO 9961690 A1	02-12-1999
			EP 0998600 A1	10-05-2000
			JP 2002516931 T	11-06-2002
			TW 583357 B	11-04-2004
EP 0903431	A	24-03-1999	JP 11131332 A	18-05-1999
US 6164054	A	26-12-2000	DE 69903983 D1	02-01-2003
			DE 69903983 T2	18-09-2003
			EP 0939153 A1	01-09-1999
			ES 2188117 T3	16-06-2003
			FR 2775299 A1	27-08-1999
			JP 11315434 A	16-11-1999
			PT 939153 T	30-04-2003
WO 03029538	A	10-04-2003	CN 1617959 A	18-05-2005
			EP 1430171 A2	23-06-2004
FR 2621605	A	14-04-1989	NONE	
US 4215530	A	05-08-1980	DE 2900799 A1	19-07-1979
			FR 2414568 A1	10-08-1979
			IT 1114360 B	27-01-1986
			JP 55022087 A	16-02-1980
FR 2835261	A	01-08-2003	CN 1625617 A	08-06-2005
			EP 1470276 A2	27-10-2004
			WO 03064741 A2	07-08-2003
			US 2005022492 A1	03-02-2005

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 02 4172

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-06-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6052985	A	25-04-2000	CN 1210912 A	17-03-1999
			CZ 9802869 A3	17-03-1999
			DE 19739282 A1	11-03-1999
			EP 0900863 A2	10-03-1999
			JP 11140726 A	25-05-1999
US 2003046871	A1	13-03-2003	AT 315201 T	15-02-2006
			DE 10144458 A1	27-03-2003
			EP 1291572 A2	12-03-2003
			JP 2003145386 A	20-05-2003
US 5201170	A	13-04-1993	NONE	
US 4420926	A	20-12-1983	DE 3262309 D1	28-03-1985
			EP 0069030 A1	05-01-1983
			ES 8305063 A1	16-06-1983
			FR 2508499 A1	31-12-1982
			JP 58004555 U	12-01-1983
			JP 62043970 Y2	17-11-1987
US 5111647	A	12-05-1992	DE 69003859 D1	18-11-1993
			DE 69003859 T2	24-02-1994
			EP 0395541 A1	31-10-1990
			ES 2045867 T3	16-01-1994
			FR 2646175 A1	26-10-1990
			JP 2848670 B2	20-01-1999
			JP 3014636 A	23-01-1991
DE 4337175	A1	04-05-1995	JP 3479347 B2	15-12-2003
			JP 7145521 A	06-06-1995
EP 1149941	A	31-10-2001	AU 1410700 A	26-06-2000
			CN 1329684 A	02-01-2002
			WO 0034558 A1	15-06-2000
			TW 463001 B	11-11-2001
US 4771598	A	20-09-1988	CH 676609 A5	15-02-1991
			DE 3610614 A1	01-10-1987
			FR 2596424 A1	02-10-1987
			GB 2188339 A	30-09-1987
			IT 1204928 B	10-03-1989
			JP 62231040 A	09-10-1987
WO 9961692	A	02-12-1999	CN 1272153 A	01-11-2000

EPO FORM P0459

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12-06-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		DE 19980953 D2	13-07-2000

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82