



(11) EP 1 466 756 A3

(12)

## EUROPEAN PATENT APPLICATION

(88) Date of publication A3:  
07.02.2007 Bulletin 2007/06

(51) Int Cl.:  
B31F 1/07 (2006.01) B42D 15/00 (2006.01)

(43) Date of publication A2:  
13.10.2004 Bulletin 2004/42

(21) Application number: 04251941.3

(22) Date of filing: 31.03.2004

(84) Designated Contracting States:  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PL PT RO SE SI SK TR  
Designated Extension States:  
AL LT LV MK

(30) Priority: 03.04.2003 GB 0307755

(71) Applicant: De La Rue International Limited  
Basingstoke, Hampshire RG22 4BS (GB)

(72) Inventors:  

- Howland, Paul  
Andover  
Hants, SP10 2QR (GB)
- Pearson, Nicholas George  
Kingsclere  
Hampshire RG20 5PJ (GB)

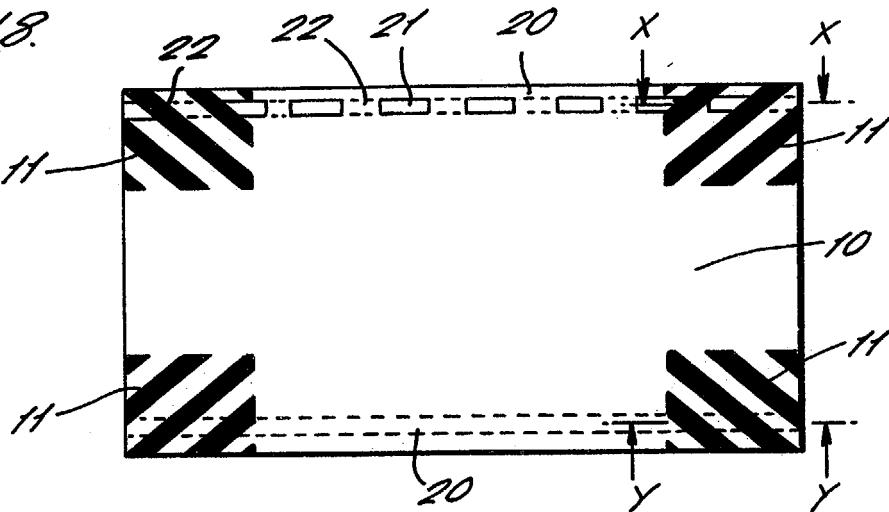
(74) Representative: Bucks, Teresa Anne et al  
BOULT WADE TENNANT,  
Verulam Gardens  
70 Gray's Inn Road  
London WC1X 8BT (GB)

### (54) Improvement of the strength of paper sheets

(57) The invention relates to improvements in paper, and in particular to the use of watermarks and security elements for strengthening paper sheets and documents made therefrom. The invention therefore provides a sheet having at least four corners and at least four sides

joined at said corners, wherein corner reinforcing watermarks are provided at each of said corners. An elongate security element is at least partially embedded within the sheet along and close to an edge of each of at least a pair of opposing sides.

FIG. 18.





DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
P, X	WO 03/046282 A (RUE DE INT LTD [GB]; PEARSON NICHOLAS GEORGE [GB]) 5 June 2003 (2003-06-05) * page 2, line 1 - line 12 * * page 3, line 14 - page 9, line 5; figures 1-8 * -----	1-32	INV. B31F1/07 B42D15/00
Y	GB 2 309 039 A (PORTALS LTD [GB]) 16 July 1997 (1997-07-16) * page 1, line 3 - line 5 * * page 3, line 16 - page 4, line 18 * * page 5, line 24 - page 6, line 4 * -----	1-32	
Y	EP 0 101 203 A2 (WIGGINS TEAPE GROUP LTD [GB]) 22 February 1984 (1984-02-22) * page 1, paragraph 1 * * page 4, paragraphs 2,3 * * page 5, paragraph 2 * * page 8, paragraphs 4,5; claims 1,9; figures 3,4 *	1-32	
A	EP 0 238 043 A2 (GAO GES AUTOMATION ORG [DE]) 23 September 1987 (1987-09-23) * the whole document *	1-32	TECHNICAL FIELDS SEARCHED (IPC)
A	US 4 462 867 A (FULLER JAMES S [GB]) 31 July 1984 (1984-07-31) * the whole document *	1-32	B31F B42D B41M B44C D21F
The present search report has been drawn up for all claims			
4	Place of search Munich	Date of completion of the search 19 December 2006	Examiner Pulver, Michael
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			

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

EP 04 25 1941

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.

19-12-2006

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 03046282	A	05-06-2003	AU 2002356269 A1		10-06-2003
			BR 0214420 A		14-09-2004
			CA 2468421 A1		05-06-2003
			CN 1592808 A		09-03-2005
			EP 1468142 A1		20-10-2004
			GB 2382325 A		28-05-2003
			RU 2286414 C2		27-10-2006
			UA 77026 C2		16-08-2004
			US 2005163970 A1		28-07-2005
<hr/>					
GB 2309039	A	16-07-1997	AT 186344 T		15-11-1999
			AU 715428 B2		03-02-2000
			AU 1185597 A		01-08-1997
			BG 62979 B1		29-12-2000
			BG 102604 A		29-01-1999
			BR 9612585 A		29-06-1999
			CA 2242551 A1		17-07-1997
			CN 1207784 A		10-02-1999
			CZ 9802170 A3		11-11-1998
			DE 69605059 D1		09-12-1999
			DE 69605059 T2		16-03-2000
			EG 21483 A		28-11-2001
			EP 0873448 A1		28-10-1998
			ES 2140916 T3		01-03-2000
			WO 9725476 A1		17-07-1997
			HU 9903866 A2		28-03-2000
			ID 15823 A		14-08-1997
			IN 189655 A1		05-04-2003
			JP 2000503077 T		14-03-2000
			PL 327661 A1		21-12-1998
			RU 2159826 C2		27-11-2000
			TR 9801264 T2		21-10-1998
			US 6063239 A		16-05-2000
			ZA 9700212 A		31-07-1997
<hr/>					
EP 0101203	A2	22-02-1984	AU 1697283 A		26-01-1984
			BR 8303858 A		28-02-1984
			DK 331783 A		23-01-1984
			ES 8405865 A1		01-10-1984
			FI 832631 A		23-01-1984
			GR 78884 A1		02-10-1984
			JP 59030999 A		18-02-1984
			NO 832645 A		23-01-1984
			PT 77050 A		01-08-1983
			ZA 8305233 A		25-04-1984
<hr/>					

EP0459  
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 04 25 1941

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.

19-12-2006

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 0238043	A2	23-09-1987	AT DE ES US	124377 T 3609090 A1 2037675 T3 4892336 A	15-07-1995 24-09-1987 01-07-1993 09-01-1990	
US 4462867	A	31-07-1984	AU AU BR CA DE DK EP ES FI IN	548793 B2 8591982 A 8204037 A 1176893 A1 3265421 D1 312482 A 0070172 A1 8307958 A1 822474 A 158262 A1	02-01-1986 20-01-1983 05-07-1983 30-10-1984 19-09-1985 14-01-1983 19-01-1983 01-11-1983 14-01-1983 04-10-1986	