



(11)

EP 1 710 757 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
11.10.2006 Bulletin 2006/41

(51) Int Cl.:
G07D 11/00 (2006.01)

(21) Application number: **05077771.3**

(22) Date of filing: **05.12.2005**

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

(72) Inventors:
• **McAlpine, Charles
Dundee DD4 7JZ (GB)**
• **Leeper, Kevin Gerald
Carnoustie, Angus DD7 7DH (GB)**

(30) Priority: **07.04.2005 GB 0507040**

(74) Representative: **Williamson, Brian et al
NCR International, Inc.,
206 Marylebone Road
London NW1 6LY (GB)**

(71) Applicant: **NCR International, Inc.
Dayton,
Ohio 45479 (US)**

(54) Media cassette

(57) A media cassette (10) comprises urging means (26) for urging a stack of media items (34) to one end (24) of the cassette (10) such that the front most media item in the stack can be picked from the cassette (10). The cassette (10) further comprises a media item sepa-

rator (80), located adjacent said one end (24) of the cassette (10). The separator is adapted to utilise the motion of said stack (34) during the picking of the front most media item to separate each media item from adjacent media items in, at least, a portion of said stack.

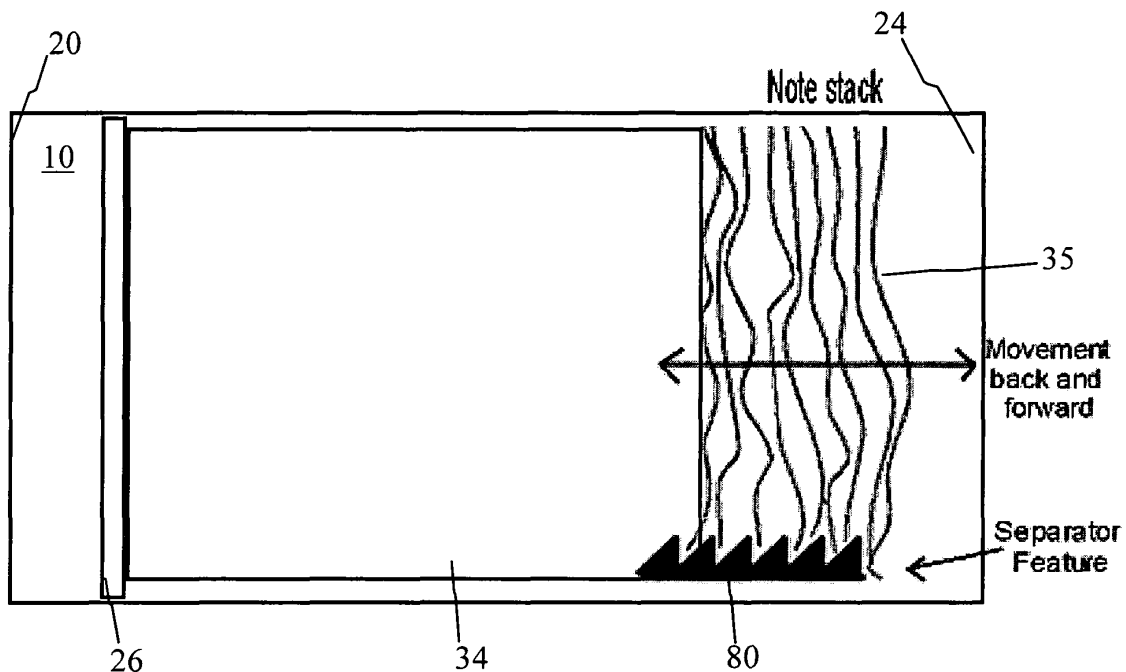


Fig 5

Description

[0001] The present invention relates to a media cassette for storing valuable media in sheet form. In particular, the invention relates to a media cassette for use in a self-service terminal (SST), such as a currency cassette for use in an Automated Teller Machine (ATM).

[0002] Currency cassettes provide ATMs with a source of banknotes, and are strong metal or plastics boxes comprising a lid releasably coupled to a body. One end of the body includes a covered aperture that is automatically opened when the cassette is inserted into a currency dispenser, and automatically closed when the cassette is removed from the currency dispenser. The opposite end of the body includes a handle for carrying the cassette, and to aid insertion and removal of the cassette. When a cassette is inserted into a currency dispenser, only the handle end of the cassette is visible.

[0003] Vacuum picking systems are used in automated teller machines for dispensing cash from such cassettes. Most of these include some form of pump mechanism for sucking air through a tube, which tube has a suction cup on its end. The suction cup is located on the end of a movable pick arm. In use, the arm and associated suction cup is moved into contact with a banknote, at the front of a stack of notes in the cassette, so that the suction created by the pump causes the banknote to stick to the cup.

[0004] Also associated with each arm is gearing or other mechanical means for moving the end of the arm into contact with the banknote, and then towards a dispensing location. This gearing is normally powered by the AC motor.

[0005] There is a known problem with vacuum pick mechanisms, known as double picking, when more than one note at a time is picked from the note stack, by the suction means. This problem is caused, in particular, by worn or poor quality notes. In addition, the use of polymer notes exacerbates this problem.

[0006] Also, the action of the arm toward a note, to bring the suction cup into contact with the front most note in the note stack, and then away from the note stack to pick the front most note, can exacerbate the problem of double picking. This is due to the packing action which pushes notes together, however slightly, as the pick arm is brought into and out of contact with the note stack.

[0007] Double picking of notes causes detrimental performance in ATM cash dispensers and results in overfilling of purge bins, to which double picked notes are diverted, requiring intervention by an ATM engineer.

[0008] It is among the objects of an embodiment of the present invention to obviate or mitigate the above disadvantage or other disadvantages associated with media cassettes.

[0009] According to a first aspect of the present invention there is provided a media cassette comprising: urging means for urging a stack of media items to one end of the cassette such that the front most media item in the

stack can be picked from the cassette; and a media item separator, located adjacent said one end of the cassette, the separator being adapted to utilise the motion of said stack during the picking of the front most media item to separate each media item from adjacent media items in, at least, a portion of said stack.

[0010] In one embodiment the item separator has a substantially saw tooth cross-section.

[0011] Preferably, each tooth in the item separator has a leading edge which is substantially vertical.

[0012] Preferably each tooth in the item separator has a 45 degree angle to the leading edge of the following tooth.

[0013] Most preferably the urging means comprises a pusher plate slidably mounted on a ratchet for urging media items towards said one end of the cassette.

[0014] According to a second aspect of the present invention there is provided a method of picking a media item from a media cassette comprising urging means for urging a stack of media items to one end of the cassette such that the front most media item in the stack can be picked from the cassette and a media item separator, located adjacent said one end of the cassette, the method including the step of utilising the motion of said stack during the picking of the front most media item to pass, at least, a portion of the media items in the stack across the separator so as to separate each media item from adjacent media items in, at least, a portion of said stack.

[0015] Preferably the motion of said stack during the picking of the front most media item is a forward and reverse motion along an axis running the length of the cassette towards said one end of the cassette.

[0016] According to a third aspect of the present invention there is provided an Automated Teller Machine (ATM) having a pick mechanism including a pick arm; and a media cassette comprising: urging means for urging a stack of media items to one end of the cassette such that the front most media item in the stack can be picked from the cassette by the pick arm being moved into contact with said note stack, the cassette further including a media item separator, located adjacent said one end of the cassette, the separator being adapted to utilise the motion of said stack during the picking of the front most media item, by said pick arm to separate each media item from adjacent media items in, at least, a portion of said stack.

[0017] The word "media" is used herein in a generic sense to denote one or more items, documents, or such like having a generally laminar sheet form, such as but not limited to bank notes.

[0018] Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig 1 is a schematic perspective view of a media cassette according to one embodiment of the present invention;

Fig 2 is a schematic perspective view of a body portion of the interior of the cassette of Fig 1;

Fig 3 is a schematic perspective underside view of a lid portion of the cassette of Fig 1;

Fig 4 is a schematic plan view of the body portion of the cassette of Fig 2;

Fig. 5 is a schematic view of one embodiment of a note separator means in accordance with the present invention;

Fig. 6 is a rear view of an Automated Teller Machine in accordance with another aspect of the present invention.

[0019] Referring to Figs 1 to 4, a media cassette 10, in the form of a polycarbonate currency cassette for storing banknotes, has a lid 12 secured to a body 14 by a latch 16. The body 14 has a handle 18 pivotably mounted at a handle end 20, and a pick area 22 at a pick end 24 opposite the handle end 20.

[0020] A pusher plate 26 is mounted on a linear ratchet 28 extending from the handle end 20 to the pick end 24, and is urged towards the pick end 24 by a resilient member (not shown). The pusher plate 26 is made of metal and is mounted above two lateral guides 30, 32 for guiding opposite short edges of banknotes 34 as the banknotes are urged towards the pick end 24.

[0021] The body 14 has a roller shutter 36 covering the pick area 22, so that when the cassette 10 is inserted into an ATM (not shown), tines in the ATM engage with recesses (not shown) in the body 14, and the roller shutter 36 is automatically lowered by the tines to allow banknotes 34 to be picked from the pick area 22 by a cash dispenser pick unit 95 in the ATM 100 (Figure 7)). When the cassette 10 is removed from the ATM 100, the tines in the ATM disengage from the recesses (not shown) in the body 14, and the roller shutter 36 is urged upwards to cover the pick area 22 and prevent access to the banknotes 34 in the cassette 10.

[0022] The underside of the lid 12 includes two banknote long-edge aligners 38 mounted on adjustable spacers 40. The aligners 38 prevent banknotes 34 stored within the cassette 10 from moving towards the lid 12 during transportation.

[0023] The pressure exerted by the pusher plate 26 towards the pick area 22, plus the downward pressure of the long edge aligners 38 combine to tightly pack the notes in the cassette 10.

[0024] As mentioned above, due to this tight packing, and the poor quality of some notes, it is possible for two notes to be picked simultaneously, especially when vacuum picking is utilised

[0025] This problem is addressed by the use of a cassette, in accordance with the present invention, as illustrated in particular in Figures 2 & 5. The media cassette

10 comprises urging means in the form of the pusher plate 26 for urging a stack of media items 34 to one end 24 of the cassette 10 such that the front most media item in the stack can be picked from the cassette. The cassette further includes a media item separator 80, located adjacent said one end 24 of the cassette 10, the separator 80 being adapted to utilise the motion of said stack 34 during the picking of the front most media item 35 to separate each media item from adjacent media items in, at least, a portion of said stack 34.

[0026] As can be seen most clearly in Figure 5, in one embodiment the separator 80 has a substantially saw tooth cross-section, the leading edge of which is substantially vertical, if the base of the cassette is taken as the horizontal plane. Also each tooth in the item separator has a 45 degree angle to the leading edge of the following tooth.

[0027] When in use, the cassette 10 minimises double picking of notes by utilising the action of the pick arm 90 (Fig. 7). As the pick arm, in any cassette, is brought into contact with the front most note 35 in the stack 34 the momentum of the pick arm pushes the note stack back away from the pick end 24 of the cassette 10. As the vacuum is activated the front most note 35 is drawn forward (towards the pick end 24) and ultimately from the cassette 10 and into the pick mechanism 95 (Fig. 7). The action of picking bank notes from the stack 34 therefore causes an oscillating movement of, at least, a portion of the note stack 34 towards and away from pick area 24. In prior art cassettes this motion only adds to the concentration and packing of the notes in the stack 34. However, in the cassette in accordance with the present invention, the oscillation of the note stack 34 combs the stack backwards and forwards over the note separator 80, which separated adjacent notes in the stack. Thus the pick arm 90 is more likely to pick a single note from the stack instead of double picking the first two (or more) notes.

[0028] Various modifications may be made to the above described embodiment within the scope of the invention

Claims

1. A media cassette (10) comprising: urging means (26) for urging a stack of media items (34) to one end (24) of the cassette (10) such that the front most media item (35) in the stack can be picked from the cassette (10); and a media item separator (80), located adjacent said one end (24) of the cassette (10), the separator (80) being adapted to utilise the motion of said stack (34) during the picking of the front most media item to separate each media item from adjacent media items in, at least, a portion of said stack (34).
2. A media cassette as claimed in claim 1, wherein the item separator has a substantially saw tooth cross-

section.

3. A media cassette as claimed in claim 2, wherein each tooth in the item separator has a leading edge which is substantially vertical. 5

4. A media cassette as claimed in claim 3, wherein each tooth in the item separator has a 45 degree angle to the leading edge of the following tooth. 10

5. A cassette according to any preceding claim, wherein the urging means (26) comprises a pusher plate slidably mounted on a ratchet (28) for urging media items (34) towards a media pick end opposite a handle end (20). 15

6. A method of picking a media item from a media cassette (10) comprising: urging means (26) for urging a stack of media items (34) to one end (24) of the cassette (10) such that the front most media item in the stack can be picked from the cassette (10); and a media item separator (80), located adjacent said one end (24) of the cassette (10), the method including the step of utilising the motion of said stack (34) during the picking of the front most media item to pass, at least, a portion of the media items in the stack across the separator so as to separate each media item from adjacent media items in, at least, a portion of said stack. 20
25
30

7. A method as claimed in claim 6, wherein the motion of said stack (34) during the picking of the front most media item (35) is a forward and reverse motion along an axis running the length of the cassette towards said one end (24) of the cassette (10). 35

8. An Automated Teller Machine (ATM) having a pick mechanism including a pick arm (90); and a media cassette (10) comprising: urging means (26) for urging a stack of media items (34) to one end (24) of the cassette (10) such that the front most media item in the stack can be picked from the cassette (10) by the pick arm being moved into contact with said note stack, the cassette (10) further including a media item separator (80), located adjacent said one end (24) of the cassette (10), the separator (80) being adapted to utilise the motion of said stack (34) during the picking of the front most media item, by said pick arm (90) to separate each media item from adjacent media items in, at least, a portion of said stack. 40
45
50

55

Fig 1

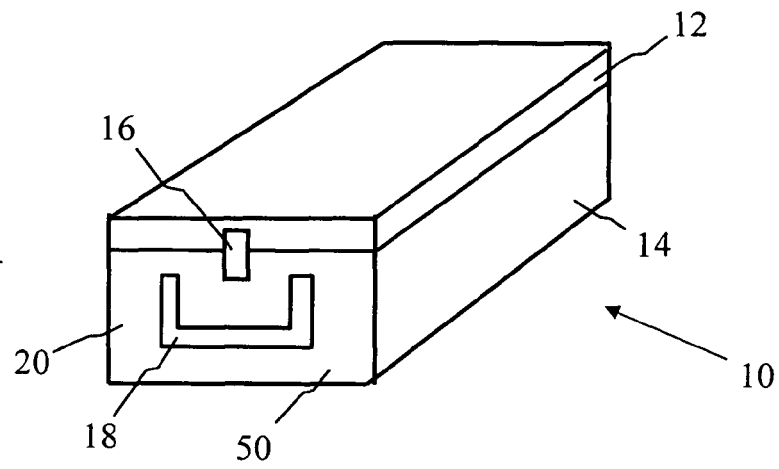


Fig 2

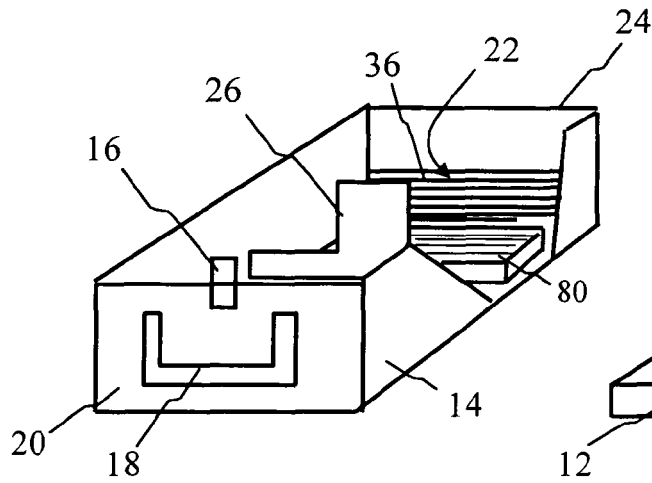


Fig 3

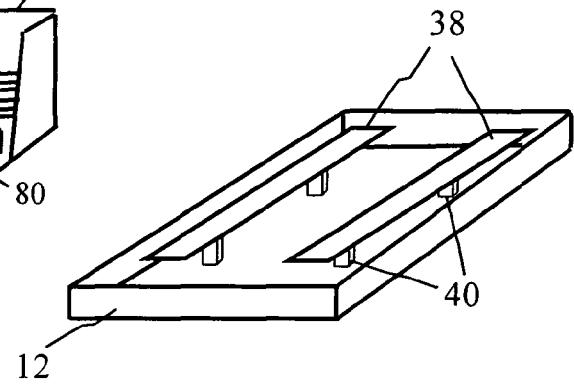
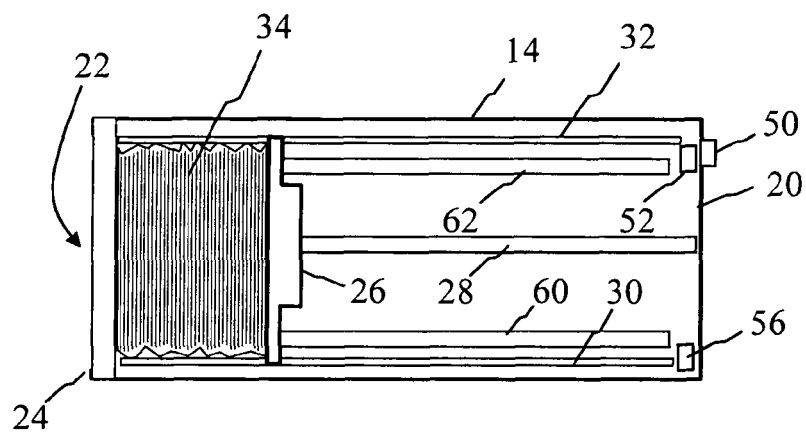


Fig 4



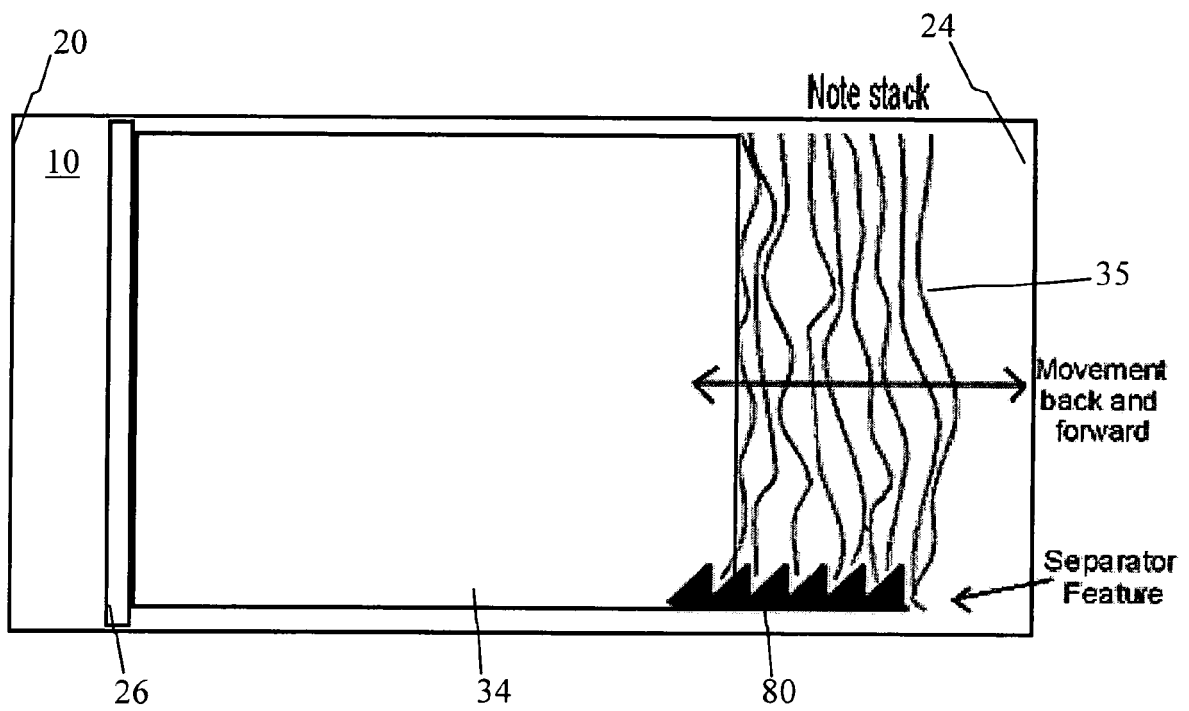


Fig 5

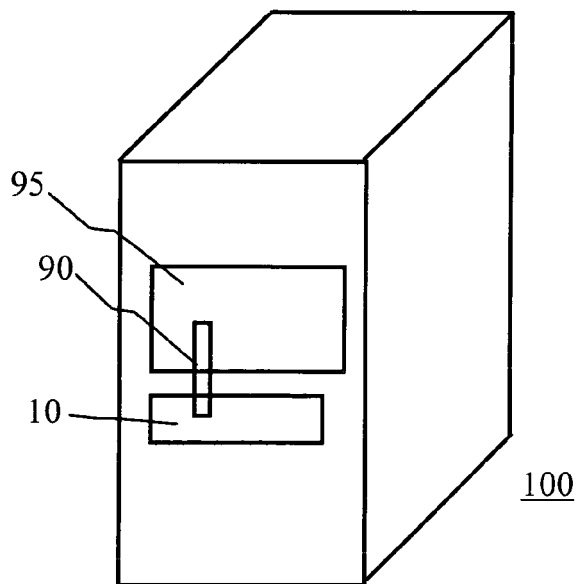


Fig 6



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 07 7771

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	EP 0 224 061 A (INTERNATIONAL BUSINESS MACHINES CORPORATION) 3 June 1987 (1987-06-03) * column 2, line 14 - column 3, line 37 * * column 4, lines 9-37 * * figures 1,2 *	1-8	INV. G07D11/00
X	EP 0 994 445 A (HITACHI, LTD) 19 April 2000 (2000-04-19) * paragraphs [0026] - [0028] * * paragraphs [0041] - [0055] * * figures 1,2,11 *	1,5-8	
X	US 4 704 061 A (PEEBLES ET AL) 3 November 1987 (1987-11-03) * column 1, lines 46-54 * * column 4, line 1 - column 5, line 27 * * figures 5,6 *	1,5-8	
A	EP 1 304 664 A (NCR INTERNATIONAL INC) 23 April 2003 (2003-04-23) * paragraphs [0008], [0012] * * paragraphs [0021] - [0024] * * figures 1-4 *	1,5-8	TECHNICAL FIELDS SEARCHED (IPC) G07D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 27 June 2006	Examiner Espuela, V
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

1
EPO FORM 1503 03.82 (P04C01)

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

EP 05 07 7771

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.

27-06-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0224061	A	03-06-1987	DE 3685093 D1	04-06-1992
			JP 5045493 B	09-07-1993
			JP 62121150 A	02-06-1987

EP 0994445	A	19-04-2000	CN 1258896 A	05-07-2000
			KR 2000028967 A	25-05-2000

US 4704061	A	03-11-1987	CA 1262706 A1	07-11-1989
			DE 3635976 A1	14-05-1987
			FR 2589840 A1	15-05-1987
			GB 2182717 A	20-05-1987

EP 1304664	A	23-04-2003	CN 1412094 A	23-04-2003
			US 2003071048 A1	17-04-2003
