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(54) Safety device for a front loader

(57) The present invention relates to a safety device for a front loader of the type having an adjustable locking device for locking work tools (21) to the front loader. Incorrectly attached work tools (21) are a source of danger for people in their vicinity as the tools (21) may separate from the front loader causing accidents resulting in serious injuries. The present safety device comprises a barrier (8) and a biasing member (10) mounted on the attachment device (1) of the front loader. The barrier (8) is normally biased into an in use position by the biasing member (10) preventing the adjustable locking member from adopting the locked position unless a tool (21) is properly connected to the attachment device.

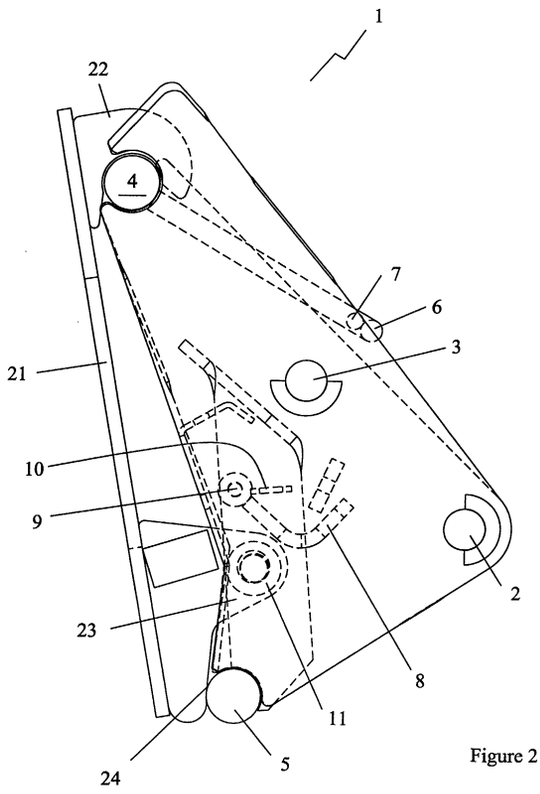

Figure 2

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Description

[0001] The present invention relates to a safety device for a front loader and in particular to a safety device for a front loader of the type having an adjustable locking device for locking work tools to the front loader.

[0002] A variety of front loaders are currently available equipped with specially adapted attachment devices to assist a machine operator with the attachment of a tool onto the front loader. A proportion of the tools for use with front loaders of this type are provided with two pairs of attachment members, one pair of attachment members located adjacent an upper end of the tool and the second pair of attachment members located adjacent the base of the tool. The attachment device of the front loader is provided with correspondingly located components for mating with the attachment members of the tool. In a large proportion of front loader and tool assemblies, the upper attachment members of the tool are provided by open hook members and the attachment device mounted on the arms of the front loader provide support bars which extend substantially perpendicular to the arms of the front loader. The support bars are formed for engagement with the hooks providing a simple and efficient method of attaching tools to the front loader.

[0003] In order to attach a tool to the front loader, a machine operator must first position the support bars to engage with the hook members. The machine operator may then raise the arms of the front loader or actuate the arms of the front loader to rotate the attachment device so that the tool pivots about the support bars. The lower attachment members of the tool move towards the corresponding attachment components located on the attachment device of the front loader. The base of the tool abuts against a portion of the front loader attachment device to align the attachment members of the tool and the attachment components of the front loader attachment device. The adjustable locking device is then actuated when the attachment members and components are aligned and a locking element extends between the mating members of the tool and the front loader locking the tool securely in position ready for use. There are many alternative types of attachment members provided on tools and front loaders and there are also many alternative types of actuation devices to operate the adjustable locking device, but the basic principles of the operation remain the same.

[0004] The adjustable locking device associated with these apparatuses has reduced the amount of manual work required in order to attach a tool to a machine and has therefore improved the overall efficiency of these machines. However, there are still a number of problems associated with these adjustable locking devices which can cause accidents resulting in serious injuries to people working in the vicinity of these machines. The main problem associated with these adjustable locking devices arises when the locking device has already adopted a locked position before the operator attempts to attach a tool and the machine operator is unaware of this. In this situation, the machine operator engages the hook members of the tool with the support bars in the normal manner and then raises the front loader. The tool pivots about the support bars under the force of its own weight. As the locking device is already in a locked position the lower attachment members of the tool are unable to align with the corresponding connecting members of the front loader. The tool is thus only connected to the front loader by the hooks and support bars. The machine operator remains unaware that the tool is not securely locked in position as the bonnet of the vehicle obscures the machine operator's view of the attachment points of the front loader. This is a potentially disastrous situation for other people in the vicinity of the machine as the tool is liable to separate from the front loader as the operator transports the vehicle or commences work with the tool.

[0005] It is an object of the present invention to provide a safety device for use with front loaders in order to overcome this problem.

[0006] Accordingly, the present invention provides a safety device for use with front loaders of the type having adjustable locking means for securing work tools in position, wherein the safety device is mountable on an attachment means of the front loader which has adjustable locking means, the safety device comprising a barrier and a biasing means wherein the barrier has a redundant position and an in use position and the barrier is normally biased into the in use position by the biasing means, the barrier preventing the adjustable locking means from adopting the locked position when it is in an in use position, the biasing force of the biasing means being overcome by a tool attachment means during attachment thereby moving the barrier from the in use position to the redundant position allowing the locking means to adopt the locked position.

[0007] The safety device of the present invention prevents accidental locking of the locking device unless a tool is properly connected to the front loader. If the locking device is actuated inadvertently by the machine operator or in some other way, the active component of the locking device will abut against the barrier of the safety device. If the machine operator subsequently attempts to attach a tool to the front loader the operation will be successful. The active component of the locking device will still close on the tool attachment members following alignment with the attachment components of the front loader as the barrier is moved from the in use position to the redundant position. This will greatly reduce the risk of injuries to other people as a result of tools separating from front loaders during transport of the vehicle or during work activities involving the incorrectly attached tool.

[0008] In one embodiment, the biasing means is provided by a torsion spring. The torsion spring provides a simple and inexpensive biasing member.

[0009] In another embodiment, the biasing means is

provided by a cylinder.

[0010] Ideally, the cylinder may be mechanical, electrical, pneumatic or hydraulic.

[0011] In a preferred embodiment, the cylinder is actuated by a compression spring.

[0012] Preferably, the barrier extends across the path of travel of an active component of the locking means when the barrier is in an in use position.

[0013] Preferably, the barrier is pivotally mounted on the attachment member of the front loader.

[0014] In one embodiment, the barrier is mounted on the free end of a piston rod housed in the cylinder.

[0015] The invention will now be described with reference to the accompanying drawings which show, by way of example only, one embodiment of safety device in accordance with the invention. In the drawings:

Figure 1 is a side view of an attachment device for mounting on the arms of a front loader; and

Figure 2 is a side view of the attachment device of Figure 1 with a tool attached.

[0016] Referring to the drawings and initially to Figure 1 there is shown an attachment device for a front loader indicated generally by the reference numeral 1. The device 1 is mounted on the arms of the front loader (not shown) at pivotal mounting points 2 and 3 which allow the operator of the machine to manipulate a mounted tool (see Figure 2) remotely. The attachment device 1 has a support bar 4 located adjacent the upper section of the attachment device 1 said bar 4 extending substantially perpendicular to the direction of travel of the machine. The attachment device 1 also provides a locating bar 5 extending substantially parallel to the support bar 4 and the locating bar 5 is located at the opposite end of the attachment device 1 to which the support bar 4 is located. A frame 6 is located on the support bar 4 having a retainer 7. A handle (not shown) extending from and operating the adjustable locking device is held in an open position by the retainer 7 of the frame 6. A barrier 8 provided by a block of steel material is mounted on the attachment device 1 by a pivot pin 9 and a torsion spring 10 is mounted for engagement with the barrier 8. The barrier 8 extends across the path of travel of the locking element of the adjustable locking device. The locking element is located to extend through lower attachment elements 11 of the attachment device 1 when it is activated.

[0017] Referring to the drawings and now to Figure 2, there is shown a side view of an attachment device for a front loader indicated generally by the reference numeral 1 which is identical to the attachment device 1 of Figure 1 described in detail above. Therefore the detailed description of Figure 1 relating to the attachment device 1 is applicable to the attachment device 1 of Figure 2 and identical parts have been designated identical reference numerals. A tool 21 having upper attachment members 22 and lower attachment members 23 is shown properly mounted on the attachment device 1. The upper attachment members 22 are mounted on the support bar 4 and the lower attachment members 23 are aligned with the lower attachment elements 11 of the attachment device 1. Alignment is facilitated by a contact surface 24 of the tool 21 abutting with the locating bar 5. The barrier 8 has been rotated from the in use position as shown in Figure 1 to the redundant position as shown in Figure 2 by contact with the lower attachment members 23 of the tool 21. It will of course be appreciated that the face of the barrier 8 which prevents a released active element of the locking device from extending through the attachment elements 11 must be closer to the active element of the locking device than or at least aligned with the expected path of travel of the face of the attachment member 23 of the tool 21 which would engage with the released active element of the locking device.

[0018] In use, a machine operator locates the support bar 4 of the attachment device 1 to engage with the upper attachment members 22 of the tool 21. The operator raises the attachment device 1 and the tool 21 pivots about the support bar 4. Optionally, the machine operator may pivot the attachment device 1 relative to the tool 21 by adjusting the position of the pivotal mounting points 2 and 3 relative to one another. The consequence of either action is that the lower attachment members 23 of the tool 21 and the lower attachment components 11 of the attachment device 1 align with one another. The locating bar 5 is provided on the attachment device 1 for contacting the surface 24 of the tool 21 in order to align the attachment members 23 and the attachment components 11. In this embodiment, the handle extending from and actuating the locking device is positioned to engage a section of the front loader at the same time as the attachment components 11 and attachment components 23 align. The handle is released from the retainer 7 and the locking member of the locking device is activated securely locking the tool 21 to the attachment device 1.

[0019] It will of course be understood that the invention is not limited to the specific details as herein described, which are given by way of example only, and that various alterations and modifications may be made without departing from the scope of the invention as defined in the appended claims.

Claims

1. A safety device for use with front loaders of the type having adjustable locking means for securing work tools (21) in position, wherein the safety device is mountable on an attachment means of the front loader which has adjustable locking means, the safety device comprising a barrier (8) and a biasing means wherein the barrier (8) has an in use position

and a redundant position and the barrier (8) is normally biased into the in use position by the biasing means, the barrier preventing the adjustable locking means from adopting the locked position when it is in an in use position, the biasing force of the biasing means being overcome by a tool attachment means during attachment thereby moving the barrier (8) from the in use position to the redundant position allowing the locking means to adopt the locked position.

2. A safety device as claimed in claim 1, wherein the biasing means is provided by a torsion spring (10).

3. A safety device as claimed in claim 1, wherein the biasing means is provided by a cylinder.

4. A safety device as claimed in any preceding claim, wherein the barrier (8) extends across the path of travel of an active component of the locking means when the barrier (8) is in an in use position.

5. A safety device as claimed in any preceding claims, wherein the barrier (8) is pivotally mounted on the attachment means of the front loader.

6. A safety device as claimed in claim 3, wherein the cylinder may be mechanical, electrical, pneumatic or hydraulic.

7. A safety device as claimed in claim 6, wherein the cylinder is actuated by a compression spring.

8. A safety device as claimed in any of claims 3, 6 or 7 wherein the barrier (8) is mounted on the free end of a piston rod housed in the cylinder.

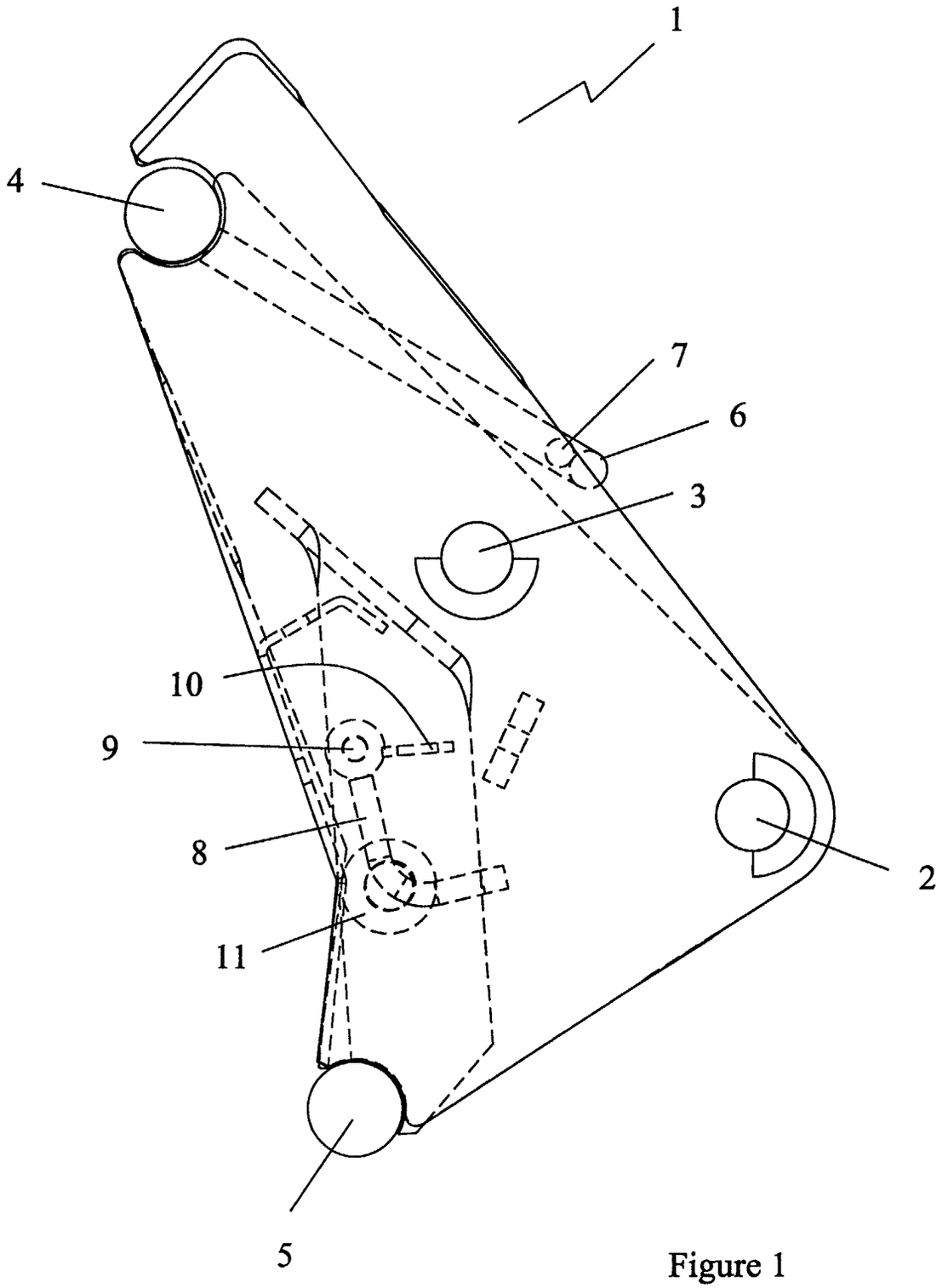

Figure 1

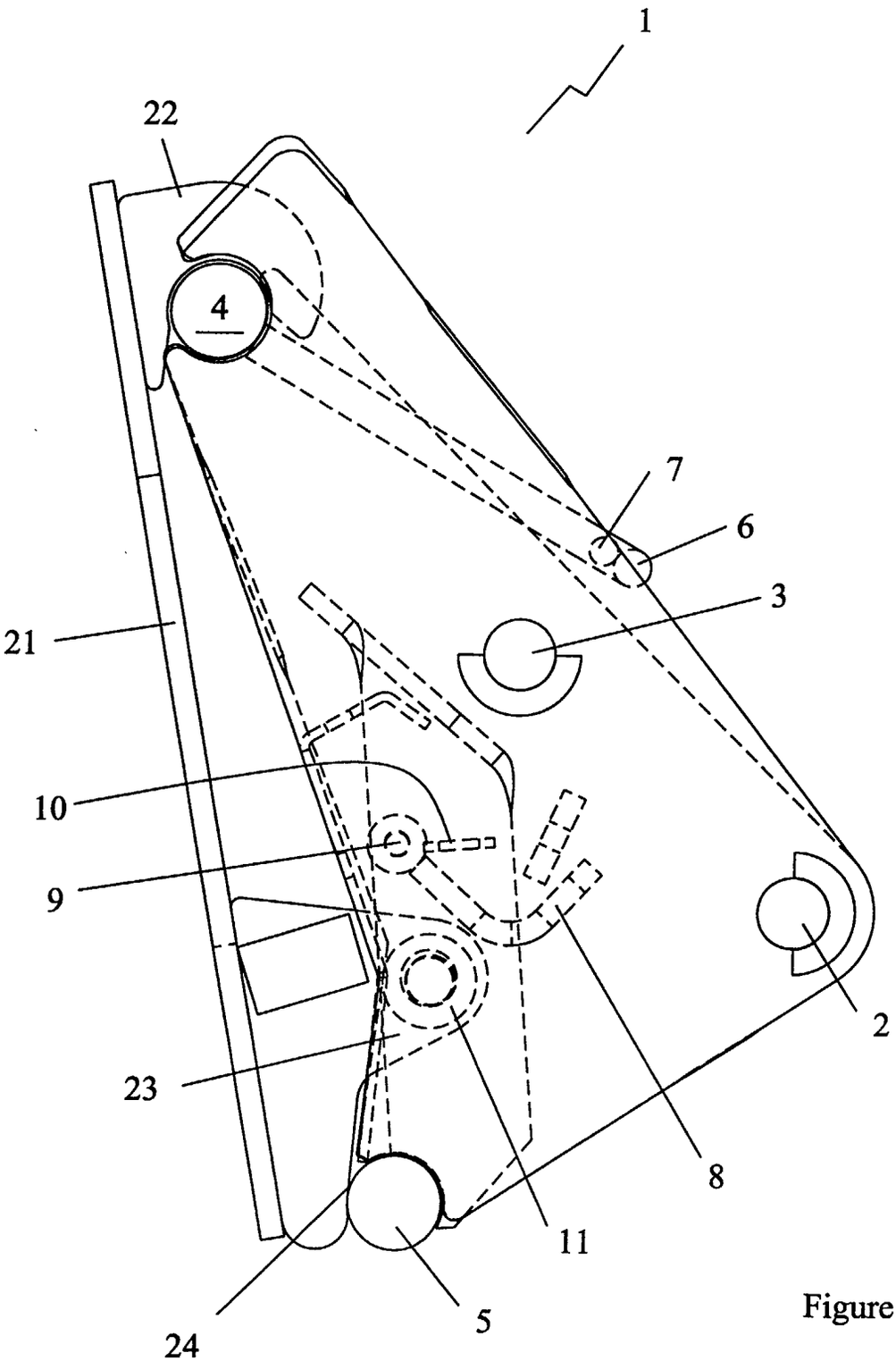

Figure 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 01 7840

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	FR 2 785 952 A (HUSSON ALAIN) 19 May 2000 (2000-05-19)	1,4,5	E02F3/36
A	* page 5, line 9 - page 6, line 25 * * page 8, line 4 - line 5 * * figures 2,3,6-8 * * page 9, line 22 - page 10, line 16 * * figures 16,17 *	2,3,6,7	
X	US 4 187 050 A (BARBEE GAIL G) 5 February 1980 (1980-02-05)	1,4,5	
A	* figures 1-3 * * column 2, line 16 - line 38 * * column 2, line 51 - column 3, line 11 *	2	
A	FR 2 307 752 A (INT HARVESTER CO) 12 November 1976 (1976-11-12) * figures 1-5,7 * * page 6, line 30 - page 7, line 30 * * page 8, line 9 - line 39 *	1	
X	FR 2 703 113 A (SOERMATP) 30 September 1994 (1994-09-30)	1,4	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	* page 9, line 14 - line 28 * * figures 4-6 *	2,5	E02F B66F A01D
X	EP 0 578 447 A (FERMEC MFG LTD) 12 January 1994 (1994-01-12)	1,4,5	
A	* page 3, line 38; claim 57 * * figures 1-3,6,7 *	2,3,6-8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 October 2002	Guthmuller, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 01 7840

This annex lists the patent family membersrelating 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
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07-10-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2785952 A	19-05-2000	FR 2785951 A1	19-05-2000
		FR 2785952 A1	19-05-2000
		AU 6209299 A	05-06-2000
		EP 1129259 A1	05-09-2001
		WO 0029680 A1	25-05-2000
		NO 20012330 A	11-05-2001
		PL 347629 A1	22-04-2002
US 4187050 A	05-02-1980	BE 873469 A1	16-07-1979
		CA 1081171 A1	08-07-1980
		FR 2417617 A1	14-09-1979
		JP 54110603 A	30-08-1979
FR 2307752 A	12-11-1976	US 3985249 A	12-10-1976
		CA 1039241 A1	26-09-1978
		CA 1046994 A2	23-01-1979
		DE 2616011 A1	21-10-1976
		FR 2307752 A1	12-11-1976
		GB 1492504 A	23-11-1977
		JP 51121902 A	25-10-1976
FR 2703113 A	30-09-1994	FR 2703113 A1	30-09-1994
EP 0578447 A	12-01-1994	EP 0578447 A1	12-01-1994
		GB 2268464 A ,B	12-01-1994

EPO FORM P0459

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