(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 562 333 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.02.2013 Bulletin 2013/09

(21) Application number: **11178547.3**

(22) Date of filing: **23.08.2011**

(51) Int Cl.:
E05B 15/10 *(2006.01)* ***E05B 47/00*** *(2006.01)*
E05B 65/14 *(2006.01)* ***B65D 90/54*** *(2006.01)*
G07C 9/00 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **KALE Kilit Dis ticaret A.S.**
34610 Istanbul (TR)

(72) Inventor: **Dogan, Cavit**
34610 Istanbul (TR)

(74) Representative: **Sevinç, Erkan**
Istanbul Patent & Trademark Consultancy Ltd.
Plaza-33, Büyükdere cad. No: 33/16
Sisli
34381 Istanbul (TR)

(54) Automotive and Transportation Control Systems

(57) The invention relates to a system of a type in which providing information to predetermined and subsequently designated monitoring stations relating to the position and security of a cargo contained in a vehicle is achieved by centrally monitored locks with a central connection realized via GSM network or by means of Internet such that all of the data can be centrally monitored online. The system comprises a Global Positioning System (GPS) receiver, a microcontroller unit, a communication platform and a software platform. The high security lock configuration according to the present invention configuration comprises an electronic control circuitry associated with said microcontroller unit for driving an electric motor blocking the electronic lock, said lock being located at a physically inaccessible position from outside, and a means of identification in communication with the control circuitry and positioned on the door wing. The means of identification may be a keypad, a fingerprint reader, an ID card reader (eg MIFARE card), an ID/IB/TOM key reader or may be with a remote control. The high security lock arrangement according to the present invention features a multi-point bolt electronic lock system actuated by an electrical motor in response to a signal by said microcontroller unit. Said motor serves to advance a plurality of bolts in a door wing into respective slots in a simultaneous manner. Said bolts are attached to a carrier bar extending perpendicular to the locking axis along the longitudinal axis of said wing (19). Said carrier bar is further associated with upper and lower bolts which in turn advances into respective upper and lower slots.

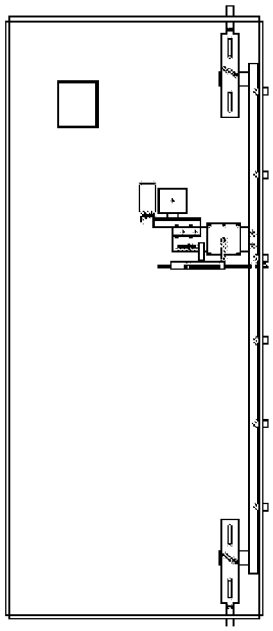

Fig. 4a

EP 2 562 333 A1

Description

Technical Field of the Invention

[0001] The present invention relates to a high security lock configuration allowing monitoring stations relating to the position and security of cargo contained in a vehicle associated with said high security lock. The configuration puts an end to the use of a lock in a configuration accessible from outside preventing malicious picking interferences from outside.

Background of the Invention

[0002] Vehicles with moveable assets such as cargo containers are currently locked on the outside, which locks may be broken into easily during transit. This necessitates serious measures in order for ensuring tracking and monitoring position and security status of a cargo in a vehicle in a more automatized manner.

[0003] A high security lock configuration associated with a vehicle or container can be very useful in terms of control over the lock's security and accessibility status. Therefore, an automated system allowing selective and location-based authorization of employees or authorized third parties to lock and unlock containers' valuable assets ensure that a very detailed preprogrammed location or personnel-based control is achieved.

[0004] The goods in a container with the high security lock configuration according to the invention are secured by an internal locking mechanism being tamper-proof from outside as it is physically inaccessible from outside preventing malicious picking interferences.

[0005] A communication module in the present system may ensure that a cargo or trailer unit may report real-time information in respect of the position and/or security status of a container and transmit security logs to ensure whether preset security policies are met. The system hardware comprises two way pager/gsm or cellular/satellite communication modules.

[0006] The present invention's high security lock configuration provides a multi-point locking on the trailer and/or container wing and use of mechanical keys is eliminated and the opening closing control of the door is provided by an electronic locking system.

Objects of the Invention

[0007] Primary object of the present invention is to provide monitoring of stations relating to the position and security of a cargo contained in a vehicle associated with a high security lock.

[0008] Another object of the present invention is to provide selective and location-based authorization of employees or authorized third parties to lock and unlock a container's valuable assets such that a very detailed preprogrammed location or personnel-based control is achieved.

[0009] Another object of the present invention is to provide a high security lock with an internal locking mechanism being tamper-proof and physically inaccessible from outside hence preventing malicious picking interferences. In this way, by putting an end to the use of a key, opening by forcing the lock mechanism (or picking) is prevented.

[0010] A further object of the present invention is to provide a lock configuration that eliminates the use of a mechanical key.

Summary of the Invention

[0011] The invention relates to a system of a type in which providing information to predetermined and subsequently designated monitoring stations relating to the position and security of a cargo contained in a vehicle is achieved by centrally monitored locks with a central connection realized via GSM network or by means of Internet such that all of the data can be centrally monitored online. The system comprises a Global Positioning System (GPS) receiver, a microcontroller unit, a communication platform and a software platform.

[0012] The high security lock configuration according to the present invention configuration comprises an electronic control circuitry associated with said microcontroller unit for operating the electronic lock, located at a physically inaccessible position from outside, and a means of identification in communication with the control circuitry and positioned on the door wing. The means of identification may be a keypad, a fingerprint reader, an ID card reader (eg MIFARE card), an ID/IB/TOM key reader or may be with a remote control.

[0013] The high security lock arrangement according to the present invention features a multi-point bolt electronic lock system actuated by an electrical motor in response to a signal by said microcontroller unit. Said motor serves to advance a plurality of bolts in a door wing into respective slots in a simultaneous manner. Said bolts are attached to a carrier bar extending perpendicular to the locking axis along the longitudinal axis of said wing (19). Said carrier bar is further associated with upper and lower bolts which in turn advances into respective upper and lower slots.

Brief Description of the Figures

[0014] Accompanying drawings are given solely for the purpose of exemplifying an a high security lock configuration whose advantages over prior art were outlined above and will be explained in detail hereinafter: The scope of the present invention, which is explained with reference to the drawings below, cannot be limited to the disclosure of the drawings that are given solely for the purpose of exemplifying.

Fig. 1 demonstrates a schematic view of a lock arrangement of a cargo container or trailer according

to the present invention.

Fig. 2 demonstrates a schematic view of the lock arrangement of Fig. 1 in an enlarged view.

Fig. 3 demonstrates control units allowing operation of said high security lock arrangement according to the present invention.

Fig. 4a and 4b respectively demonstrates locked and unlocked positions of the lock arrangement on a wing to be locked according to the present invention. Fig. 4c demonstrates a perspective view of the wing of Fig. 4a and 4b.

Detailed Description of the Invention

[0015] The invention relates to a system of a type in which providing information to predetermined and subsequently designated monitoring stations relating to the position and security of a cargo contained in a vehicle is achieved by centrally monitored locks with a central connection realized via GSM network or by means of Internet such that all of the data can be centrally monitored online. The system comprises a Global Positioning System (GPS) receiver, a microcontroller unit, a communication platform and a software platform.

[0016] The high security lock (11) configuration according to the present invention configuration comprises an electronic control circuitry associated with said microcontroller unit for activating the electronic lock (11), located at a physically inaccessible position from outside, and a means of identification in communication with the control circuitry and positioned on the door wing. The means of identification may be a keypad, a fingerprint reader, an ID card reader (eg MIFARE card), an ID/IB/TOM key reader or may be with a remote control.

[0017] It can be provided the high security lock (11) configuration according to the present invention carries out the opening and locking procedures with the usage of password or ID buttons without having to build a connection with the center.

[0018] The configuration, security and the reporting parameters of the system being used standalone in the field have the same characteristics as the central connected system. All kind of managements, control and reporting could be handled on device through either hand terminal or certain service points.

[0019] The core software system running on a central server may be compatible with developed filtering and reporting, simultaneous management of all of the locks in the field, monitoring all activities, remote stepping in, diagnosis and maintenance possibility and possibility of data exchange with the interface softwares. The client softwares running on the respective electronic lock arrangements can store data during offline service and send them back to the center later on.

[0020] It is a routine task to assign different levels of authorization based on time & locking-unlocking (usage) for each user. This means that a given user's digital key is operable on selected vehicle doors for which the user is authorized. It is also possible to effect locking automatically, that is, on each time when door is closed, self locking would be made and for reopening either password entry or ID key usage is requested. Based on the preset security policies, all the access and exit activities are monitored online centrally. It is also possible to assign users by centrally approved One Time Codes (OTC).

[0021] The vehicle control and locking system embodied in a cargo container according to the present invention can be operated by means of a digital key which may be carried by an individual and used to lock/unlock the cargo container, which is fitted with a reader device which is associated with the high security lock arrangement (11) of the invention. Location-based authorization of a digital key is preferable as this allows that cargo container is only opened at a predetermined location (the preset longitude and latitude). The system also permits that current location information can be viewed through said communication module via satellite. Locking and unlocking from a remote location through communication module may be necessary for example in cases of emergency where preset security policies were breached or unexpected events necessitating involvement of security forces.

[0022] The GPS receiver module which may be one of a variety known to those skilled in the art typically receives the position information signal from a satellite system and outputs it to said electronic control circuitry associated with said microcontroller unit. Similarly a communication module receives and transmit information to remote stations, and sends received information to microcontroller. Said microcontroller controls a lock driver motor (13) associated with said high security lock arrangement (11) of the invention.

[0023] The microcontroller in the system processes the information received from GPS module and transmit the information either periodically or based on events and also controls the said high security lock arrangement (11). The most basic information being processed comprises, speed, location (current latitude/longitude), distance, direction and messages if any.

[0024] Accordingly, the present invention allows the continuous monitoring of an equipped vehicle such as the cargo container or truck trailer. The system uses a centralized database to store the input information and control communication between it, the container and authorized intermediate and end users.

[0025] The opening process in the lock configuration according to the present invention is realized by means of an electronic control circuit having a microcontroller. The electronic control circuitry is placed in a physically inaccessible manner from outside, to activate said electronic lock (11). A means of identification that is in communication with said control circuit and is placed on the door wing function as a user interface. Means of identification may be a keypad (12), a finger print reader (15),

an ID card reader (16, e.g. MIFARE card), an ID/IB/TOM key reader (17), a remote control receiver (14), or a signal to be transmitted over the Internet.

[0026] The high security lock arrangement (11) according to the present invention features a multi-point bolt (18) electronic lock system actuated by an electrical motor (13) in response to a signal by said microcontroller unit. Said motor (13) serves to advance a plurality of bolts (18) in a door wing (19) into respective slots (20) in a simultaneous manner. Said bolts (18) are attached to a carrier bar (23) extending perpendicular to the locking axis along the longitudinal axis of said wing (19). Said carrier bar (23) is further associated with upper and lower bolts (21) which in turn advances into respective upper and lower slots.

[0027] While Fig. 1 demonstrates said bolts (18) in non-advanced and non-locked position, in Fig. 2, said bolts (18) are moved into said slots (20). The locked position of the multi-point bolt security lock (11) according to the present invention is maintained as long as said microcontroller does not actuate said motor (13) to retract said carrier bar (23) such that said bolts (18) are advanced in the direction out from said slots (20). In this case, said upper and lower bolts (21) are also moved back by means of a transmission mechanism (22) at lower and upper sides of said wing (19). Said transmission mechanism (22) comprises a linear channel (24) inclined with respect to the longitudinal axis of said carrier bar (23) and in which a pin fixedly atached to said carrier bar (23) is movably guided. Movement of said pin in said channel (24) during movement of said carrier bar (23) towards said slots (20) typically provides that said upper and lower bolts (21) also move into respective slots. In other words, movement of said lateral bolts (18) is converted into a perpendicular movement of said upper and lower bolts (21) due to said inclined channel (24).

[0028] According to the present invention, said means of identification, for instance a keypad (12) may be arranged removably on the wing (19) such that it is installed only when it is intended to be used. Said means of identification may be suitable for establishing a data and power connection with said electronic lock (11) through an appropriate connection terminal, which in turn is also unseeable from outside when said means of identification is not installed.

[0029] As is conventionally practised in electronic locks, an onboard battery is used to provide power back-up for events when power supplied through an external power connector is disconnected or otherwise unavailable. Said means of identification can be connected to said power connector and can therefore recharge said onboard battery.

[0030] The high security lock arrangement (11) according to the present invention can be remotely operated to remove authorization of a given user. Further, it is also possible that a given user is forced to effect opening of the lock (11) by unauthorized persons, he/she can effect opening and in the same time informs the central server by inputting a special opening code.

Claims

1. An electronic lock (11) for a cargo container or a truck trailer door wing (19), said lock (11) comprising at least two bolts (18, 21) being movable in perpendicular directions and actuated by an electrical motor (13), an electronic control circuitry associated with a GPS receiver, a microcontroller unit and a communication module, said microcontroller unit activating said electronic lock (11) in response to a means of identification (12, 14, 15, 16 and 17) **characterized in that** said electronic lock (11) comprises a carrier bar (23) extending parallel to the opening axis of said wing (19) such that said at least two bolts (18, 21) are fixedly attached to said carrier bar (23).

2. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 1 wherein said electronic lock (11) is located at an inner location of said wing (19) physically unseeable from outside.

3. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 1 or 2 wherein said carrier bar (23) is attached to at least two bolts (18) movable in the same direction as said carrier bar (23).

4. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 2 or 3 wherein said carrier bar (23) is attached to at least two bolts (21) movable in a direction perpendicular to that of said carrier bar (23).

5. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 1, 3 or 4 wherein said carrier bar (23) is mechanically fixedly connected to a pin movably guided within a channel (24) of a transmission mechanism (22), said channel (24) being linear and inclined with respect to the longitudinal axis of said carrier bar (23).

6. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 1 or 5 wherein said electronic lock (11) is operated to effect opening and locking procedures such that said communication module does not establish a connection with a remote center.

7. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 1 or 6 wherein said electronic lock (11) stores data during offline service and synchonizes stored data when said communication module establishes a connection with a remote center.

8. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 1 or 7 wherein said electronic lock (11) wherein unlocking of said lock (11) is effected based on location-based authorization of said identification means.

9. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 1 or 8 wherein said electronic lock (11) processes speed, location, distance and direction information.

10. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 1 or 8 wherein said means of identification is a keypad (12), a finger print reader (15), an ID card reader (16), an ID/IB/TOM key reader (17), a remote control receiver (14), or a signal to be transmitted over the Internet.

11. An electronic lock (11) for a cargo container or a truck trailer door wing (19) as set forth in Claim 10 wherein said means of identification is removably installed on said wing (19) to establish a data and power connection with said electronic lock (11) such that an onboard battery of said electronic lock's (11) control circuitry is recharged.

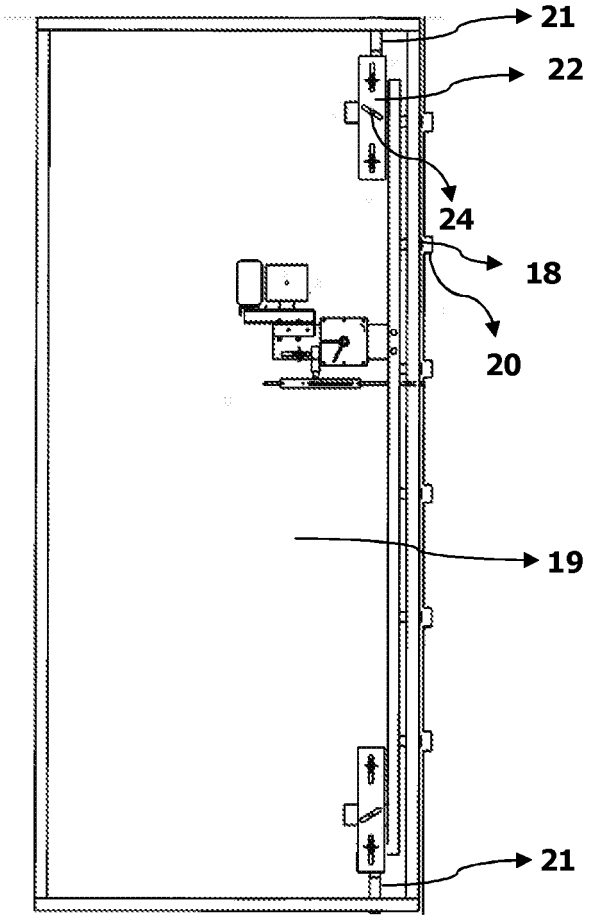

Fig. 1

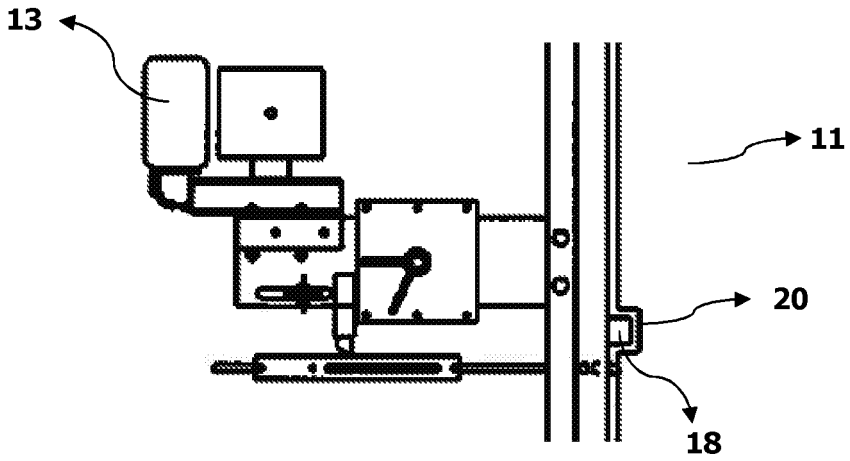

Fig. 2

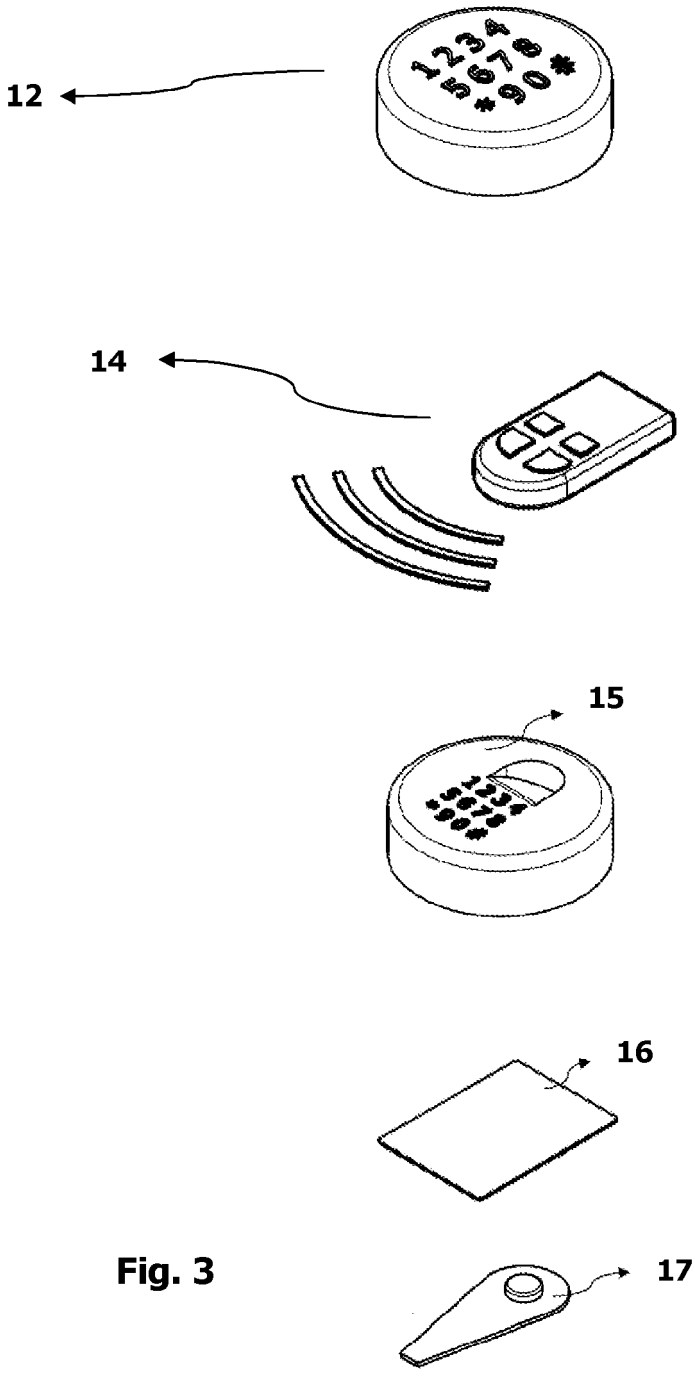

Fig. 3

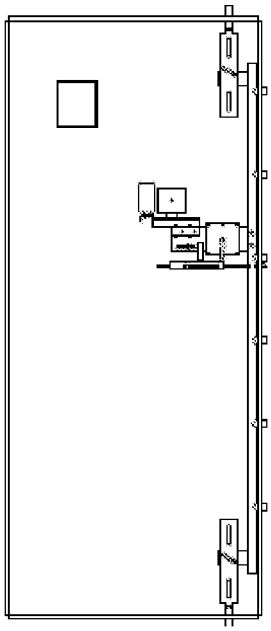

Fig. 4a

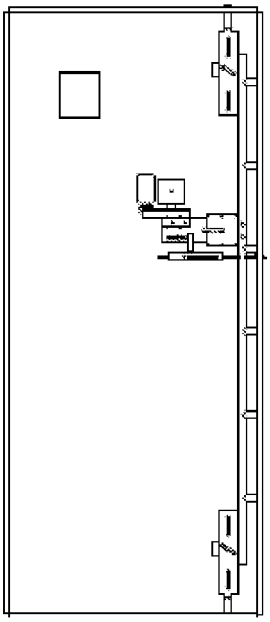

Fig. 4b

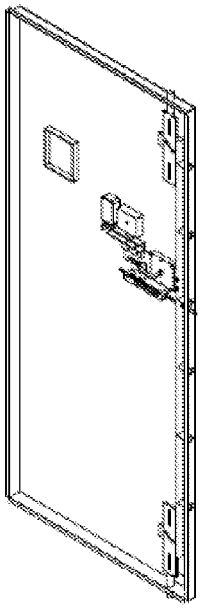

Fig. 4c

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 17 8547

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 95/00733 A1 (RIEFOLO LUIGI [IT]; ROSSI LUIGI [IT]; AUDINO FRANCESCO [IT]; LULLO LUC) 5 January 1995 (1995-01-05) * the whole document *	1-11	INV. E05B15/10 E05B47/00 E05B65/14 B65D90/54
Y	EP 0 077 254 A1 (ICB FRANCE [FR]) 20 April 1983 (1983-04-20) * the whole document *	1-3,6-11	G07C9/00
Y	WO 2011/066709 A1 (NINGBO YONGFA GROUP CO LTD [CN]; YANG ZAIFU [CN]; CAO ZHONGWEI [CN]) 9 June 2011 (2011-06-09) * the whole document *	1-4,6-11	
Y	US 2010/257904 A1 (RICKRODE C JOSEPH [US]) 14 October 2010 (2010-10-14) * the whole document *	1-11	
Y	US 2010/251785 A1 (ZAREI MAHMOOD [US]) 7 October 2010 (2010-10-07) * the whole document *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
Y	US 2003/179073 A1 (GHAZARIAN OHANES [US]) 25 September 2003 (2003-09-25) * the whole document *	1-11	E05B
A	EP 1 826 341 A1 (BJOERKBODA LAS OY AB [FI]) 29 August 2007 (2007-08-29) * the whole document *	5	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 March 2012	Geerts, Arnold

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

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 17 8547

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.

07-03-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9500733 A1	05-01-1995	AU 7072194 A	17-01-1995
		DE 69405749 D1	23-10-1997
		DE 69405749 T2	26-03-1998
		EP 0706601 A1	17-04-1996
		ES 2109000 T3	01-01-1998
		IT 1260875 B	29-04-1996
		WO 9500733 A1	05-01-1995
EP 0077254 A1	20-04-1983	DE 3271177 D1	19-06-1986
		EP 0077254 A1	20-04-1983
		FR 2514059 A1	08-04-1983
		US 4519640 A	28-05-1985
WO 2011066709 A1	09-06-2011	CN 101705758 A	12-05-2010
		WO 2011066709 A1	09-06-2011
US 2010257904 A1	14-10-2010	NONE	
US 2010251785 A1	07-10-2010	NONE	
US 2003179073 A1	25-09-2003	NONE	
EP 1826341 A1	29-08-2007	EA 200700183 A1	31-08-2007
		EP 1826341 A1	29-08-2007
		FI 120749 B1	15-02-2010

EPO FORM P0459

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