A61J 7/00 (2006.01) G06F 19/00 (2006.01)

Abstract:

The invention relates to a system (1) for handling drugs. The system comprises a drug delivery control device (1b) being arranged to have access to information (I) for handling medication of a particular patient, characterized in that the device (1b) comprises a risk identification unit (9) arranged to automatically identify risks for the medication of the patient and in that the control device (1b) is furthermore arranged to contribute to providing a cartridge with an unique composition of drugs and/or drug doses for the medication of a particular patient and arranged to contribute to provide the cartridge (2) with machine readable marking means (3) having patient specific information. The invention is also related to a method and a computer program product. By means of the present invention, risks are automatically identified for a medication of a patient in an absolute secure way the marking is secured for the patient since the cartridge of the patient is marked with machine readable information concerning medication. Since the marking is achieved in a controlled and secure way, the marking will always be correct.
METHOD, DEVICE AND SYSTEM FOR HANDLING DRUGS

General description
Timely, correct and secure medication of patients with the correct dose is pivotal and poses a considerable challenge to the medical society. Problems which may cause risks for the patients arises when a large number of drugs, often hundreds, from a large number of suppliers must be handled, for instance on a care institution or a pharmacy during medication of different patients. Risk of exchange between different drugs and doses may arise such that the wrong patient receives the wrong drug or dose.

Unwanted interactions may also arise between different types of drugs in such a way that some combinations of drugs are unsuitable, at least to some patients. Some drugs or combinations of drugs and some doses of drugs could be directly life-threatening to some patients. In this case, there are considerable risks when handling drugs.

Based on the above mentioned it is easy to understand that also the best educated personnel and the best control systems may fail and that simply the wrong drug could be administered to the wrong patient, in particular drugs which for a particular patient interact in an undesired or in worst case dangerous way, i.e. there are considerable problems when handling drugs. In particular there are problems with identifying risks with a patient's medication.

These risks are impossible to identify in a satisfying way secure for the patient by means of conventional method and systems. In particular, it is impossible to completely identify these risks manually in a satisfying way.

An object of the present invention is to solve all of these problems or at least some of these problems; in particular there is demand to be able to eliminate faults, to be able to localize faults, also afterwards, and in particular to identify patient specific risks during medication.

This object is obtained according to an aspect of the present invention by means of a method for handling drugs, the method comprising the steps of:
- automatically identifying risks for medication of a particular patient, intended to be provided by a dispensing device having a cartridge comprising drugs and/or drugs doses being unique for medication of a particular patient, the risks being identified by means of an automatic risk identification unit;
- filling the cartridge with a unique composition of drugs and/or drug doses for medication of a
particular patient;
-marking the cartridge of the particular patient provided with patient specific machine readable information for medication;
-during medication by means of a machine reading the patient specific information for verification of the correct cartridge provided with correct unique composition of drugs and/or drug doses.

The risk identification unit is provided in the form of a computer program product comprising means for identifying and/or calculating risks during medication of a particular patient having a specific identity, wherein the risk identification unit is arranged to use one or more of the following parameters: patient identity, diagnosis, dispensing requirement, drug and pharmacology. The large number of parameters that is handled/risk calculated automatically and the way the risk identification unit operates (automatically) should not be possible to provide by means of conventional methods for instance by means of manually looking up drug registers and control proposed drugs. Conventional methods therefore possess considerable deficiencies as regards patient security. According to the present invention it is also possible afterwards to track sources of error or to simply confirm that medication was indeed made correctly. In this way, the present invention is also a support for users such as doctors to be able to afterwards prove that medication was performed correctly. This is not possible to achieve by means of conventional methods lacking this automatic feature and tracking capability where the source of error cannot be tracked correctly.

By means of this method risks are identified for the medication of the patient and in an absolute secure way medication is secured for the patient by means of the risk identification unit. Further security is achieved by means of the patient's dispensing device being marked with machine readable information concerning medication. Since the marking is provided in a controlled and secure way, the marking is always correct.

According to another aspect of the present invention there is provided a drug delivery control device for handling drugs. The drug delivery control device comprises a risk identification unit, per se, or by means of an interface being arranged to have access to information for identifying risks for the medication of a particular patient. The drug delivery control device is furthermore arranged to contribute to providing a cartridge with a unique composition of drugs and/or drug dosages for the medication of a specific patient and arranged to contribute to provide the cartridge with machine readable labeling means having patient specific information.
Typically, the drug delivery control device could be embodied in the form of a computer program product which is directly loadable into a digital computer.

According to another aspect of the present invention, there is provided a system for handling drugs.

The system comprises a drug delivery control device being arranged to have access to information such as patient journals, treating doctor (PAL), treating nurse (PASK), drug registers, type of dispensing etc. The drug delivery control device is furthermore arranged to contribute to provide a cartridge with a unique composition of drugs and/or drug dosages for medication of a specific patient, the drug delivery control device being arranged to contribute to provided the cartridge with machine readable marking means having patient specific information, following a certified, normally responsible for the patient user such as a treating doctor (PAL), and/or treating nurse (PASK) having signed. The cartridge typically has compartments for drugs, where each compartment contains a particular dosage of one or more drugs, the cartridge being arranged for medication by means of a dispensing device. For instance a printer for printing marking means could be connected to the system and being a part thereof. Typically, the marking is provided in the form of a sigil or a label having patient specific machine readable information. The label could be provided as a label having bar code.

Typically, the system comprises a reader for reading information labels, typically having bar codes. Typically, a bar code reader is used for reading bar codes on different drug containers. In the drug delivery control device there is provided a control unit which compares data from the patient data base with data being collected from the bar codes on the drug containers.

The system possesses capability to identify risks for medication of a particular patient and secure these for the patient.

The patient specific marking could also be provided by means of an RFID-chip being provided with data from the drug delivery control device. This could be provided automatically or manually.

The present invention according to one embodiment also concerns a system provided for dispensing drugs at particular points in time in a patient secure way. This is achieved by means of a particular designed dispensing device, typically being mounted at home of the
patient and being arranged and embodied to receive cartridges with drugs. The dispensing
device typically being mounted in the home location of a patient, for instance mounted on a
wall surface or on any other location provides control of the personalization of the cartridge. If
the control renders a positive outcome, medication is allowed, if not, medication is denied. In
that case, the dispensing fails and the patient do not receive any drugs. Typically,
responsible caretaker and/or relative is alarmed that medication of the patient at home is no
more functioning. Such a dispensing device, marketed under the trade mark Dosell™ is
described for instance in the Swedish patent 0602131-5. In the system according to the
present invention, preferably the dispensing device is provided with a reader for reading the
marking means having patient specific information and a locking means locking the
dispensing device and hindering use thereof if not the correct cartridge has been inserted
and verified by the reader. This reader could be a conventional bar code reader. Medication
is thus only possible if the correct cartridge, i.e. a cartridge having verified information has
been fitted into the dispensing device.

The dispensing device is provided to be fitted on a wall, whereby the medicaments would
easily drop out of the dispensing device at the pre-set times by way of gravity. The device
may be fitted with an integral cup for easy access to the medicaments.

The device may as was mentioned above be closed by way of conventional fastening
means, such as snap fitting, screws, bolts, optionally with a lock such as a padlock or a
combination lock. The fastening means may be such that the device cannot again be opened
once closed, i.e. the whole device would be tamperproof and hence disposable. The device
could be loaded at e.g. a pharmacy and handed to the subject, ensuring patient safety.

The cartridges may be disposable and are e.g. made out of a polymeric material. The
cartridges may (following filling thereof) be fitted with e.g. an aluminum or plastic foil, glued or
heated to the open side of the cartridge. The foil improves handling of compositions other
than tablets according to the description above, and may be easily removed by hand. In one
embodiment, the device may be fitted with a mechanical device for making a hole in the foil,
of a dimension sufficient to allow passage of the pre-filled drugs.

In use, the device is pre-loaded with drugs for more than one instance of administration,
either by the patient himself or probably more commonly by a relative or professional staff
such as caretakers or nurses. The device may alternatively be loaded at a pharmacy. After
loading, the cover on the device may be locked, facilitating correct medication of the patient.
Consequently, the patient has access to the medicaments only at specific, pre-determined
times. This is an advantage not the least for dependence-producing medicaments that have an alternative market as substances of abuse and may thus be stolen or given away. The invention thus facilitates correct medication. Moreover, the alarm function has considerable value for dementia patients and other patients that may forget medications. More in particular, the invention is advantageous for patients being medicated several times a day, in which instance non-intentional non-compliance may easily occur.

The present invention will now be described with reference to the accompanying drawings. The embodiments shall merely be seen as an illustration of the spirit and scope of the current invention, and in no way whatsoever as a limitation.

Brief description of the drawings

Fig. 1 shows a system for handling drugs according to an embodiment of the present invention;

Fig. 2a-e show step-by-step how the invention is implemented, wherein Fig. 2a shows reading bar codes, Fig. 2b a patient's drugs in a box, Fig. 2c a cartridge with drugs, Fig. 2d a seal-label printer and Fig. 2e a dispensing device at a home location of a patient, wherein Fig. 2c is a perspective view of the upper part of a cartridge;

Fig. 2e is a side view of a wall mounted embodiment of the dispensing device according to the invention, showing medicaments easily leaving the device for the inherent cup for easy dispensing of drugs and Fig. 3 shows a flow-chart of a method according to an embodiment of the present invention.

Detailed description of the embodiments

Fig. 1 shows a system 1 for handling drugs according to an embodiment of the present invention. The system comprises a drug delivery control device 1b for controlling filling of drug doses in a cartridge 2 provided with a patient specific identity 3 and a dispensing device 4 provided with an identity reader 5 for reading the identity 3 of the cartridge 2. The drug delivery control device 1b further comprises an automatic risk identification unit 9.

Now is also referred to Fig. 2a-e.

In the embodiment shown in Fig. 1, the system 1 includes a drug delivery control device 1b for controlling filling of drug doses in a cartridge 2. The device 1b contains or can be connected to a patient data base 1d, containing patient data. The patient data base 1d is connected to or contains an electronic patient journal (of which the latter is not explicitly shown). The design of the patient journal is know per se and there are a number of electronic journals available for the present invention. The patient data base 1d can contain patient
journals: herein a journal for a typical patient “Alma Larsson”, having a personal id, herein 020202-0000, a diagnosis issued by a doctor, herein “diabetes”, hypertonic, insomnia, treating doctor (PAL), herein Dr. Ask, treating nurse, herein “nurse Karin”, a list of drugs (medicaments) and doses, different search features, pharmacology (herein: interaction, kidney functionality, recommended drugs) and a means such as a soft-ware implemented button 1c (“print seal”) for printing label/seal 3 on a printer 1 connected to the system 1 (See Fig. 2d). The data of the patient data base 1d can be accessed by means of a user such as a doctor or a nurse on a treatment site, such as a care institute which is about to treat a patient logs in to a relevant patient data base 1d instructing how medication for a particular patient should be handled and by means of a reader, for instance a bar code reader 7 reads content of the drug containers 6 from which drugs are taken.

The drug delivery control device 1b performs, typically following log in, patient specific tasks and prints information, typically a) for controlling correct person being treated; this can be achieved simply by entering a patient’s personal id being unique for only one person. In countries where personal id does not exist some other type of similar unique code can be used instead;

b) that the drugs selected do not interact in any unwanted way; c) that the kidney functionality is not disturbed; and d) that drugs selected are suitable for this particular patient.

The kidney specific information can for instance be collected from the same or a different caretaker, for instance a care institution and be collected by means of a blood sample taken from the patient. The caretaker can be a pharmacy for instance, where competent pharmacy personnel by means of relevant data bases have access to information about the patient, for instance about the kidney functionality. The user, for instance a doctor checks all functions concerning pharmacology by means of following control of each parameter for instance interaction, kidney functionality, recommended drugs by means of sealing buttons 9b typically provided as touch sensitive soft-ware implemented buttons signs each parameter. To this end, the user has a number of supporting functions 9c. All of this or parts thereof provides the automatic risk identification unit 9.

The risk identification unit 9 is thus provided as a computer program product containing means for identifying and/or calculating risks during medication of a particular patient having a specific identity, wherein the risk identification unit is provided to be controlled by one or more of the following parameters: patient identity, diagnosis, dispensing need, drugs or pharmacology. The risk identity unit comprises or communicates with the user via one or more interfaces and/or in-out put means such as search and sign buttons 9b, c.
If all requirements according to a-d) are fulfilled the drug delivery control device 1b responds with data for filling a cartridge 2 with drug doses by means of a caretaker, for instance pharmacy personnel, or personnel at a care institute responsible for treatment, filling the cartridge 2 according to a drug delivery list obtained from the drug delivery control device, being printed following signing, for instance by means of signing button 1c and providing the cartridge 2 with a marking means 3 (ID card) for instance a label having a bar code or a seal obtained from the seal-label printer (see Fig. 2d) following signing. The signing by means of button 1c is typically a requirement for a marking means 3 to be printed on the printer of the system. Thus, it is impossible to fill the cartridge 2 (See Fig. 2c) with drugs not suitable for the specific patient. The marking means 3 can alternatively or in addition comprise an RFID-chip programmed with relevant information. According to a preferred embodiment a marking means 3 in form of a paper or plastic seal is employed, typically in the form of a label having a bar code. As seal, also a mechanical lock or the like can be used instead or combined with the marking means, i.e., the label/seal 3.

Parts of the system 1 according to the invention, typically the drug delivery control device 1b can be provided as a computer program product provided for a care institute, wherein the computer program product permits log in by means of the identity of the patient, typically comprising a personal id number. The computer program product handles set up to the drug register such as Janus in Stockholms Lans Landsting (SLL) and typically contains features for handling drug interaction. Furthermore, the program permits linking to the patient journal having information about kidney functionality such as creatinine clearance, as well as link to drug registers such as LSkemedelsverket and their list of recommended and/or forbidden drugs, for instance for elderly or dement patients.

The label 3 on the cartridge 2 typically contains the following:
   a) the drugs of the particular patient
   b) that these drugs can interact
   c) that the kidney functionality of the patient is good enough for the drugs given
   d) that no/none of the drugs is/are unsuitable according to LSkemedelsverket or any other control institute

Examples of drugs according to b) interacting are for instance anti blood coagulators sold under the trademark Wafarin (Waran) administered together with the pain releasing drug acetylsalicylic acid for instance sold under the trademark Treo, Magnecyl or the like, risk for damages occur or in worst case death in severe bleedings, such as bleeding in brain.
Examples of c) are: If kidney functionality is impaired and simultaneous full dose treatment with anti-inflammatory drugs of the type Naproxen (Naprosyn) are administered severe kidney damage and heart failure can arise.

Examples of drugs according to d) are: administration of an anti-psykofarmaka such as the one sold under the trademark Risperdon (Risperdal) to aggressive patients is unsuitable in particular.

As already described above, the system also comprises a dispensing device 5 provided with a cartridge 2, and a cover 8 and a timer 10, which is connected to a reminder means 5 and/or an alarming means 21 via for instance GSM, IP, Bluetooth. The dispensing device 1 is typically already installed (typically fitted on a wall) of a patient, wherein caretaking personnel (not necessary being the same as the one filling the cartridge) bring the filled cartridge 2 provided with the recognition means to the patient for fitting the cartridge 2 in the dispensing device 5. If the dispensing 5 does not confirm the cartridge 2 filled with drugs the cover 8 of the dispensing device 1 will not be possible to be opened but remains in locked position. The cover 8 being locked is trigged by the correct cartridge 2 having the correct marking means 3 being combined with the correct dispensing device 5. Alternatively, the cartridge 2 is locked in a position in which it cannot rotate.

The cartridge 2 can also be provided with some type of seal being provided by the person having filled the cartridge following filling of drugs. This seal can be the same as described above or be combined with the same.

In an alternative embodiment of the present invention, the cartridge 2 is filled with a number of standard drugs for a particular group of patients. Following fitting into the dispensing device, the dispensing device can be programmed such that a particular combination of drugs is administered to a particular patient. Still, the requirement that patient security is satisfied has to be fulfilled as described above.

The cartridge, in the simplest form, comprises a compartment consisting of a tray and a cover. In the cartridge, there is an aperture for access of drugs doses.

The cartridge has a compartment for drug doses. The drug doses are arranged in the cartridges such that the cartridge having a patient identity, for instance in the form of an electronic label provided with relevant patient data is filled with drug doses taken from a container having machine readable codes. The codes, for instance in the form of bar codes
indicating the content of the containers are compared with patient data from the patient data base 1d simultaneously as the cartridge 2 is filled. This is typically performed in a comparator. If patient data does not coincide (regarding patient risks) with the content of the containers, it is not possible to fill the cartridges. The size of the cartridges is suitable for containing doses of one or more drugs. The cartridges can advantageously contain other compositions than pills such as powder, liquids, and syrups.

The dispensing device 5 also comprises a reader 10, for instance an RFID-reader controlling that the correct cartridge is fitted into the dispensing device. If not, the dispensing device 5 is locked and an error message is provided. The correct cartridge 2 means that it is for the correct patient.

The dispensing device 5, according to an embodiment, can also be connected to a scale for weighting the patient. Suitably, in that case, the dispensing device contains electronics and software for collecting and storing weight data. Corresponding meters for heart functionality, blood, blood sugar, coagulation of blood such as a Varan machine), blood pressure etc can also be provided. Typically, there are some type of electronics and software for providing transferring of such data to the patient journal or any other suitable location. The identity reader can also comprise a bar code reader for controlling personnel and, or be connected to a photo cell in the patient's door at home such that the patient cannot leave at an undesired point in time. Alarm can then be provided depending on different parameters.

Now is referred to Fig. 3 which a block-schematic is showing a method for handling drugs according to an embodiment of the present invention. The method comprises the steps of:

- handling medication of a specific patient, intended to be provided by means of a cartridge containing a unique composition of drugs and/or drug doses for medication of a particular patient, step 301a, which step comprises automatically identifying risks for a particular patient's medication, intended to be provided by a dispensing device having a cartridge comprising drugs and/or drugs doses being unique for a specific patient's medication, which step comprises to automatically identify risks for the medication of a particular patient, step 301a, the risks being identified by means of an automatic risk identification unit;
- filling the cartridge with an unique composition of drugs and/or drug doses specific for medication of a particular patient, step 301b;
- marking the specific cartridge with machine readable information for medication of a particular patient, step 302;
- during medication by means of a machine reading the patient specific information for verification of the correct cartridge provided with the correct unique composition of drugs and/or drug doses, step 303.
CLAIMS

1. A method for handling drugs, the method comprising the steps of:
   - handling medication of a particular patient, intended to be provided by means of a cartridge containing a unique composition of drugs and/or drug doses for medication of a particular patient, step 301a; characterized in automatically identifying risks for medication of a particular patient, the risks being identified by means of an automatic risk identification unit;
   - filling the cartridge with a unique composition of drugs and/or drug doses specific for medication of a particular patient, step 301b;
   - marking the specific cartridge with machine readable information for medication of a particular patient, step 302;
   - during medication by means of a machine reading the patient specific information for verification of the correct cartridge provided with the correct unique composition of drugs and/or drug doses, step 303.

2. The method according to claim 1, wherein the step identifying risks comprises reading information on drug containers to be used for medication.

3. A drug delivery control device (1b) being arranged to have access to information (1f) for handling medication of a particular patient, characterized in that the device (1b) comprises a risk identification unit (9) arranged to automatically identify risks for the medication of the patient and in that the control device (1b) is furthermore arranged to contribute to providing a cartridge with a unique composition of drugs and/or drug doses for the medication of a particular patient and arranged to contribute to provide the cartridge (2) with machine readable labeling means (3) having patient specific information.

4. Computer program product directly loadable in the internal memory of a digital computer, characterized in that said product comprises software code means for implementing the device according to claim 3.

5. System (1) for handling drugs, said system comprising a drug delivery control device (1b) being arranged to have access to information (1f) for handling medication of a particular patient, characterized in that the device (1b) comprises a risk identification unit (9) arranged to automatically identify risks for the medication of the patient and in that the control device (1b) is furthermore arranged to contribute to providing a cartridge with an unique composition of drugs and/or drug doses for the medication of a particular patient and arranged to
contribute to provide the cartridge (2) with machine readable marking means (3) having patient specific information.

6. System according to claim 5, wherein the drug delivery control device (1b) comprises (7), such as a bar code reader for machine reading information on drug containers (6).

7. System according to claim 5 or 6, wherein the marking means (3) is an RFID-chip.

8. System according to claim 5 or 6, wherein the marking means (3) is a bar code.

9. System according to claim 5 or 6, wherein the reader (10) is provided to read RFID-chips.

10. System according to any one of the claims 5, 6, 7, 8 or 9, wherein the patient specific identity (2b) can be provided by means of providing an RFID chip with data from the drug delivery control device (1b) for controlling filling of a cartridge (2).
INTERNATIONAL SEARCH REPORT

INTERNATIONAL application No. PCT/SE2010/050412

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: A61J, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 7061831 B2 (DE LA HUERGA), 13 June 2006 (13.06.2006), column 7, line 4 - column 8, line 48, figures 7-10</td>
<td>1-10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>US 20070296598 Al (KIM), 27 December 2007 (27.12.2007), figure 3, abstract</td>
<td>1-10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>US 20040158350 Al (OSTERGAARD ET AL), 12 August 2004 (12.08.2004), figure 1, paragraphs (00008)-(0016)</td>
<td>1-10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>EP 1704844 Al (TOSHO INC.), 27 Sept 2006 (27.09.2006), figures 1-2, abstract</td>
<td>1-10</td>
</tr>
</tbody>
</table>

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent but published on or after the international filing date
  "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  "O" document referring to an oral disclosure, use, exhibition or other means
  "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international Slngle date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
20 July 2010

Date of mailing of the international search report
28 July 2010

Name and mailing address of the ISA/Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer
Leif Brander / JA A
Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 2009)
## DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US 20040172163 Al (VARIS), 2 Sept 2004 (02.09.2004), figures 1-4, abstract</td>
<td>1-10</td>
</tr>
<tr>
<td>A</td>
<td>US 4972657 A (MCKEE), 27 November 1990 (27.11.1990), figures 1-5, abstract</td>
<td>1-10</td>
</tr>
<tr>
<td>A</td>
<td>US 7040077 B2 (YASUOKA ET AL), 9 May 2006 (09.05.2006), figures 1-1-6, abstract</td>
<td>1-10</td>
</tr>
</tbody>
</table>
International patent classification (IPC)

A61J 7/00 (2006.01)
G06F 19/00 (2006.01)

Download your patent documents at www.prv.se

The cited patent documents can be downloaded:

• From "Cited documents" found under our online services at www.prv.se (English version)
• From "Anförda dokument" found under "e-tjanster" at www.prv.se (Swedish version)

Use the application number as username. The password is GREIWXYZFE.

Paper copies can be ordered at a cost of 50 SEK per copy from PRV InterPat (telephone number 08-782 28 85).

Cited literature, if any, will be enclosed in paper form.
<table>
<thead>
<tr>
<th>Country</th>
<th>Application Number</th>
<th>Date</th>
<th>Patent Number</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>20070296598 A1</td>
<td>27/12/2007</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>20040158350 A1</td>
<td>12/08/2004</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>US 20070150092 A</td>
<td>28/06/2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WO 2005065627 A</td>
<td>21/07/2005</td>
</tr>
<tr>
<td>US</td>
<td>20040172163 A1</td>
<td>02/09/2004</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>4972657 A</td>
<td>27/11/1990</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>7040077 B2</td>
<td>09/05/2006</td>
<td>CN 1222441 C</td>
<td>12/10/2005</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CN 1408614 A</td>
<td>09/04/2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>KR 20030027785 A</td>
<td>07/04/2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>US 20030074868 A</td>
<td>24/04/2003</td>
</tr>
</tbody>
</table>