



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 688 085 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.08.2006 Bulletin 2006/32

(51) Int Cl.:
A61B 5/00^(2006.01) A61M 5/142^(2006.01)

(21) Application number: **05002074.2**

(22) Date of filing: **02.02.2005**

(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 MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL BA HR LV MK YU

(71) Applicant: **Disetronic Licensing AG
3401 Burgdorf (CH)**

(72) Inventors:
• **Essenpreis, Matthias
3400 Burgdorf (CH)**
• **Haueter, Ulrich
3506 Grosshöchstetten (CH)**
• **Bernini, Nicole
3423 Ersigen (CH)**

• **Fankhauser, Sybille
3052 Zollikofen (CH)**
• **La Bastide Sebastiaan
3074 Muri b.Bern (CH)**
• **Meyer Olden, Gunnar
3400 Burgdorf (CH)**
• **Schoemaker, Michael
68183 Mannheim (DE)**
• **Heaton, Kelly
3423 Ersigen (CH)**

(74) Representative: **Küng, Peter
Disetronic Medical Systems AG
Kirchbergstrasse 190
CH-3401 Burgdorf (CH)**

(54) **Ambulatory medical device and method of communication between medical devices**

(57) The present invention relates to an ambulatory medical device and a method of communication between medical devices. The inventive medical device comprises a module for communication with at least a second medical device wherein said module for communication is adapted to be activated by a value of a physiological

parameter of an animal. The method of the present invention comprises a first medical device and at least a second medical device wherein the communication between said medical devices is activated by a value of a physiological parameter of an animal.

EP 1 688 085 A1

Description

Technical field of the invention

[0001] The present invention relates to an ambulatory medical device and a method of communication for medical devices.

Background Art

[0002] Ambulatory medical devices for the treatment of diabetes include e.g. extra corporal insulin pumps and blood glucose measuring devices such as e.g. hand held glucose meters. Insulin pumps allow a good control of blood glucose concentrations by continuously infusing a basic amount of insulin in a human body (basal insulin rate) and manually controlled additional "meal bolus" insulin quantities thereby reflecting the insulin secretion by the pancreas. Furthermore, the development of continuous glucose sensors will allow to measure in vivo glucose concentrations over the whole day. The measured glucose data can be used to adjust the diabetes therapy to individual needs.

[0003] In order to improve the treatment of diabetes it is important to provide means and methods to transfer data between medical devices in a quality assuring way

[0004] It is therefore the aim of the present invention to provide a medical device allowing a controlled data transfer between medical devices and a method of controlled data transfer.

Disclosure of the invention

[0005] In a first aspect, the present invention relates to a medical device comprising a module for communication with at least a second medical device wherein the module for communication in said medical device is adapted to be activated by a value of a physiological parameter of an animal.

[0006] The inventive medical device preferably comprises a telemetry system for wireless communication, preferably a telemetry system for RF communication.

[0007] Preferably the medical device is selected from the group consisting of a remote control, a PDA, an analyte measuring device, preferably a glucose measuring device such as e.g. a hand held glucose meter, more preferably a strip based glucose meter or combinations thereof.

[0008] The physiological parameter is preferably selected from the group consisting of an analyte concentration, a physiological characteristic like conductivity of an animal, a physiological vital sign like heart or breath rate, temperature, movement, air- or structure-borne sound, ECG (electrocardiogram) and the like.

[0009] In a preferred embodiment of the present invention the analyte concentration is a blood glucose concentration.

[0010] Preferably, the medical device of the present

invention comprises an electrochemical or photometric module for measuring blood glucose. Suitable medical devices are e.g. strip based glucose meters such as AccuChek Compact.

[0011] In a second aspect the present invention relates to a system of medical devices. Said system comprises a first medical device of the present invention as described in the previous section and at least a second medical device capable to communicate with said first medical device.

[0012] In a preferred embodiment the second medical device is selected from the group consisting of an extra corporal infusion pump, an implantable infusion pump, a pacesetter, an analyte or vital sign sensor, preferably a continuous analyte or vital sign sensor, more preferably a continuous glucose sensor.

[0013] In a further preferred embodiment the first medical device and the at least second medical device comprise a telemetry system for wireless communication, preferably a telemetry system for RF communication.

[0014] In a third aspect, the present invention relates to a method of communication between a first medical device and at least a second medical device wherein the communication between said medical devices is enabled and/or activated by a value of a physiological parameter of an animal.

In a preferred embodiment, the communication between the at least two medical devices is enabled and/or activated for a predetermined time. Time duration can be fixed, random or dependent on the physiological parameter enabling and/or activating the communication or other physiological parameters of the animal body.

[0015] The physiological parameter is preferably selected from the group consisting of an analyte concentration, a physiological characteristic like conductivity of an animal, a physiological vital sign like heart or breath rate, temperature, movement, air- or structure-borne sound, ECG (electrocardiogram) and the like. Preferably the analyte concentration is a blood glucose concentration.

[0016] In a preferred embodiment, the activation of communication between the medical devices is performed on the first medical device by a value of the physiological parameter.

[0017] In a further preferred embodiment, the first medical device is selected from the group consisting of a remote control, a PDA, an analyte measuring device, preferably a glucose measuring device, more preferably a strip based glucose meter.

[0018] The second medical device is preferably selected from the group consisting of an extra corporal infusion pump, an implantable infusion pump, a pacesetter, an analyte sensor, preferably a continuous analyte sensor, more preferably a continuous glucose sensor.

[0019] In a preferred embodiment, the communication between said medical devices is a wireless communication, preferably a RF communication.

[0020] In a further preferred embodiment, the first med-

ical device receives data from the second medical device.

[0021] In a further preferred embodiment, the first medical device sends commands to the second medical device controlling at least partially the function of said device.

Detailed description of the invention

[0022] In one aspect, the present invention relates to a novel method for controlling and/or enabling communication between medical devices, in particular medical sensory devices such as continuous glucose sensors and/or therapeutic devices such as insulin pumps and/or diagnostic medical devices such as glucose meters.

[0023] For example, the communication between a continuous glucose sensor applied to a human body and a blood glucose meter can only be established when a blood glucose measurement has been made in the blood glucose meter. The generation of the blood glucose value in the blood glucose meter enables and/or activates communication between the two devices for a specified time limit. During the time window data can be transferred from the sensor to the glucose meter and/or commands from the glucose meter can be sent to the sensor. After expiration of a time limit, communication between the two devices is deactivated. In order to establish a further communication, the communication link between the two devices has to be activated by generating a further blood glucose value in the glucose meter.

[0024] The term "generation of a value" as it is used herein encompasses any method or procedure for the determination of physiological parameters such as methods for the measurement of analyte values, in particular blood glucose values. Suitable methods for the determination of blood glucose values are e.g. electrochemical methods and photometric methods which are known to a person skilled in the art.

[0025] The dependence of the communication link between medical devices on an actual analyte value ensures the quality of the data transmitted from the medical sensory device and/or medical therapeutic device to the medical diagnostic device.

[0026] The data transferred from the sensor to the diagnostic device can be stored on the diagnostic device e.g. a glucose meter and be transferred to a third device such as a PDA or a computer, for further processing and/or analysis. By means of suitable software the data can be analyzed and used for e.g. bolus recommendation or adjustment of basal insulin rates for patients using an extra- or intra corporal insulin pump.

[0027] The communication link between the diagnostic device and a third device e.g. a computer, does not need activation by generation of a blood glucose value in said diagnostic device.

[0028] In a preferred embodiment, the present invention relates to a method of communication between a diagnostic medical device, preferably a blood glucose meter, and an infusion pump, preferably an extra corporal

insulin pump. In this specific embodiment, the diagnostic medical device is used as a remote control to control the function of the infusion pump. After a blood glucose value has been generated in the blood glucose meter a communication link between meter and pump is enabled and/or activated for a defined time and commands can be transferred from the remote control i.e. the glucose meter, to the pump. It is as well possible to transfer data stored on the pump to the diagnostic device during the communication time window.

[0029] When the remote control of the infusion pump does not comprise a module for measuring blood glucose concentration, the communication between pump and remote control is activated by entering a current blood glucose value measured in a blood glucose meter in the remote control. The value can e.g. be entered using buttons of the remote control or can be transferred via a wireless or wired connection to the glucose meter. After the blood glucose value has been entered in the remote control, a communication link between remote control and infusion pump is established, preferably for a predetermined time span. After expiration of the time span, the communication is interrupted and no data exchange between the two devices is anymore possible. A further round of communication needs a new activation of the communication by entering a new, current blood glucose value in the remote control. The term remote control as used herein encompasses PDA, smart phones, a handy and pump specific remote controls. The data transfer between the medical devices can be performed using known technologies and comprise wired connections as well as wireless communications. These technologies are known to a person skilled in the art. The preferred communication is a wireless communication, more preferably RF communication.

[0030] The data transfer between the devices can be encrypted in order to ensure that non-authorized third parties do not gain access to personal data of patients. Methods of encrypting data are known to a person skilled in the art.

[0031] In a further preferred embodiment, the communication between the medical devices is activated by a manipulation on the second medical device e.g. an insulin pump, such as pressing a button or lever, inserting a battery, using the touch screen, shaking, bumping or squeezing or the like.

[0032] In the following paragraph a preferred embodiment of the present invention is described.

[0033] The preferred system of medical devices comprises a continuous glucose sensor device which is placed on a human body in order to measure glucose value in interstitial fluid and a glucose meter. The sensor device comprises an electrochemical glucose sensor measuring the glucose concentration in the interstitial tissue in a predetermined manner. The sensor device further comprises an extra corporal part including processor means for controlling the sensor, memory for storing measured glucose values and a telemetry system for

transmitting the data to a glucose meter, preferably a strip-based glucose meter. The glucose values stored on the sensor device are then transferred to a glucose meter via the telemetry system.

[0034] The communication between the two devices i.e. the wireless link, is established and/or activated by measuring the glucose concentration in a blood sample of a patient using the glucose meter, preferably a strip-based glucose meter. When a strip-based glucose meter is used, the patient inserts a strip in the glucose meter and puts a droplet of blood on the strip. The glucose meter measures and indicates on its display the blood glucose value. After measurement of the blood glucose value, the communication link can then be activated/established either by pressing a button on the glucose meter e.g. an activation button or by a direct electronic link to the processor controlling the glucose telemetry system such that the completion of the blood glucose measurement automatically activates the wireless link between the devices.

[0035] The communication link is then established and a data transfer between the medical devices is possible for a defined time span. After expiration of the defined time span the communication link is deactivated and no further data/commands can be transmitted between the medical devices. A new blood glucose measurement in the glucose meter is then necessary to open a new wireless link between the medical devices.

[0036] In a further aspect, the present invention relates to a method of data processing or data use. Said method is characterised in that data processing or data use is only possible after activation by a value of a physiological parameter. The method is preferably used for the processing of medical data such as data measured by a sensor applied on a human body.

[0037] In a preferred embodiment, the method is used for the processing of medical data which have been measured by a sensor device applied on a human being, preferably a continuous glucose sensor. The data are then e.g. transferred to a diagnostic medical device, preferably a blood glucose meter. The data are preferably transferred via a wireless link from the sensor device to the diagnostic device. In this case, each of the at least two medical devices comprises a telemetry system for wireless communication. The wireless communication can be bidirectional or unidirectional.

[0038] There is preferably a permanent communication link between said two medical devices but the data stored e.g. in the memory of the medical sensor device and transferred to the diagnostic device can only be further processed on the diagnostic device after the processing has been activated by a value of a physiological parameter. After activation by a value of a physiological parameter, preferably a blood glucose value, the data stored in the memory of the diagnostic device can be processed or used. For example, data are transferred from a continuous glucose sensor to a glucose meter and stored in the memory of the glucose meter.

The further processing of these data is then only possible after activation of the processing by a value of a physiological parameter, preferably a blood glucose value.

[0039] In a preferred embodiment, the processing of the data is only possible for a limited time span after activation by a value of a physiological parameter. When the defined time span for data processing has lapsed, no further data processing is possible without a new activation by a value of a physiological parameter.

[0040] In a further aspect, the present invention relates to a medical device comprising a module for data processing which is adapted to be activated by a value of a physiological parameter. Preferably said module comprises a microprocessor with a memory for storing data.

[0041] Said medical device is preferably a blood glucose meter. Preferably, the processing of data stored in the memory of the blood glucose meter is either activated by pressing a button on the glucose meter (an activation button) or by a direct electronic link to the processor controlling the data processing module/system such that the completion of the blood glucose measurement automatically activates data processing

[0042] The terms "data processing" or "data use" as they are used herein refer to any manipulation of data and comprise analysis of data, presentation of data, interpretation of data and indication of data.

30 Claims

1. A medical device comprising a module for communication with at least a second medical device wherein the module for communication in said first medical device is adapted to be activated by a value of a physiological parameter of an animal.
2. The medical device of claim 1, wherein the module for communication is a telemetry system for wireless communication, preferably a telemetry system for RF communication.
3. The medical device of claim 1 or 2, wherein the medical device is selected from the group consisting of a remote control, a PDA, an analyte measuring device, preferably a glucose measuring device, more preferably a strip based glucose measuring device.
4. The medical device of claims 1 to 3, wherein the physiological parameter is an analyte concentration of an animal.
5. The medical device of claim 4, wherein the analyte concentration is a blood glucose concentration.
6. The medical device of claim 5, wherein the first medical device comprises an electrochemical module for measuring blood glucose.

7. The medical device of claim 5, wherein the first medical device comprises a photometric module for measuring blood glucose.
8. A system of medical devices comprising: 5
 a) a first medical device according to claims 1 to 7 and
 b) at least a second medical device capable to communicate with said first medical device. 10
9. The system of claim 8, wherein the second medical device is selected from the group consisting of an extra corporal infusion pump, an implantable infusion pump, a pacesetter, an analyte sensor, preferably a continuous analyte sensor, more preferably a continuous glucose sensor. 15
10. The system of claim 8 or 9, wherein the first medical device and the at least second medical device comprise a telemetry system for wireless communication, preferably a telemetry system for RF communication. 20
11. A method of communication between a first medical device and at least a second medical device wherein the communication between said medical devices is enabled and/or activated by a value of a physiological parameter of an animal. 25
30
12. The method of claim 11, wherein the communication is enabled and/or activated for a predetermined time window.
13. The method of claim 12, wherein the time window is established according to a value of a physiological characteristic of an animal or according to a set of data gained during previous time periods. 35
14. The method of claims 11 to 13, wherein the physiological parameter is selected from the group consisting of an analyte concentration of an animal, a heart rate, an electrophysiological value, preferably a blood glucose concentration. 40
45
15. The method of claim 11 to 14, wherein the activation of the communication is performed on the first medical device by generating a value of the physiological parameter in said first medical device. 50
16. The method of claims 11-15, wherein the first medical device is selected from the group consisting of a remote control, a PDA, an analyte measuring device, preferably a glucose measuring device, more preferably a strip-based glucose measuring device. 55
17. The method of claims 11-16, wherein the second medical device is selected from the group consisting of an extra corporal infusion pump, an implantable infusion pump, a pacesetter, an analyte sensor, preferably a continuous analyte sensor, more preferably a continuous glucose sensor.
18. The method of claims 11-17, wherein the communication between said medical devices is a wireless communication, preferably a RF communication.
19. The method of claims 11-18, wherein the first medical device receives data from the second medical device.
20. The method of claims 11-19, wherein the first medical device sends commands to the second medical device to control at least partially said second device.



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	US 2004/167464 A1 (IRELAND JEFFREY R ET AL) 26 August 2004 (2004-08-26) * abstract; figures 1-5 * * paragraphs [0007], [0034], [0037], [0057] - [0061] * -----	1-20	A61B5/00 A61M5/142
X	US 2004/225338 A1 (LEBEL RONALD J ET AL) 11 November 2004 (2004-11-11) * abstract; figures 1-3 * * paragraphs [0107], [0108], [0121], [0222] - [0227] * -----	1-20	
X	US 2002/049389 A1 (ABREU MARCIO MARC) 25 April 2002 (2002-04-25) * abstract; figures 70,71 * * paragraphs [0182] - [0185], [1018] - [1023] * -----	1-20	
X	EP 0 098 592 A (FUJISAWA PHARMACEUTICAL CO., LTD) 18 January 1984 (1984-01-18) * abstract; figures 1-3 * -----	1,8,11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A61B A61M
The present search report has been drawn up for all claims			
Place of search Berlin		Date of completion of the search 4 July 2005	Examiner Jonsson, P.O.
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 (P/04C01)

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

EP 05 00 2074

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.

04-07-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004167464 A1	26-08-2004	AU 2003256694 A1 WO 2004009161 A1	09-02-2004 29-01-2004
-----	-----	-----	-----
US 2004225338 A1	11-11-2004	US 2002173702 A1 CA 2396613 A1 CA 2396749 A1 EP 1248660 A2 EP 1248661 A1 JP 2003520111 T JP 2003520648 T WO 0154753 A2 WO 0152935 A1 US 2003069614 A1 US 2003176933 A1 US 2003212441 A1 US 2003028079 A1 US 2003028080 A1 US 2002198513 A1 US 2002058906 A1 US 2001041831 A1 US 2002065509 A1 US 2002065454 A1 US 2003065308 A1 US 2002016568 A1 US 2003055406 A1 US 2002019606 A1 US 2001041920 A1 US 2003009203 A1 US 2003028184 A1 US 2003065370 A1 US 2003050535 A1 US 6427088 B1 US 2002173830 A1 US 2002065540 A1 US 2002173703 A1 US 6668196 B1 US 2002049480 A1 US 2004193090 A1 US 2004210267 A1 US 2005010269 A1	21-11-2002 02-08-2001 26-07-2001 16-10-2002 16-10-2002 02-07-2003 08-07-2003 02-08-2001 26-07-2001 10-04-2003 18-09-2003 13-11-2003 06-02-2003 06-02-2003 26-12-2002 16-05-2002 15-11-2001 30-05-2002 30-05-2002 03-04-2003 07-02-2002 20-03-2003 14-02-2002 15-11-2001 09-01-2003 06-02-2003 03-04-2003 13-03-2003 30-07-2002 21-11-2002 30-05-2002 21-11-2002 23-12-2003 25-04-2002 30-09-2004 21-10-2004 13-01-2005
-----	-----	-----	-----
US 2002049389 A1	25-04-2002	US 6312393 B1 US 6120460 A US 5830139 A CA 2438141 A1 CN 1492735 A	06-11-2001 19-09-2000 03-11-1998 06-09-2002 28-04-2004

EPC FORM P0459

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

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

EP 05 00 2074

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.

04-07-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002049389 A1		EP 1370144 A1	17-12-2003
		JP 2005502389 T	27-01-2005
		WO 02067688 A1	06-09-2002
		US 2003139687 A1	24-07-2003
		US 2004039297 A1	26-02-2004
		US 2004039298 A1	26-02-2004
		AU 761842 B2	12-06-2003
		AU 1904900 A	22-05-2000
		CA 2348266 A1	11-05-2000
		CN 1328432 A	26-12-2001
		EP 1126781 A1	29-08-2001
		IL 128825 A	25-07-2004
		JP 2002528212 T	03-09-2002
		WO 0025662 A1	11-05-2000
		US 2003069489 A1	10-04-2003
		US 6123668 A	26-09-2000
		US 6213943 B1	10-04-2001
		US 2002049374 A1	25-04-2002
		AU 741461 B2	29-11-2001
		AU 4177897 A	26-03-1998
		BR 9711993 A	18-01-2000
		CA 2264193 A1	12-03-1998
		CN 1229345 A	22-09-1999
		EP 0926979 A1	07-07-1999
		JP 2000517231 T	26-12-2000
		WO 9809564 A1	12-03-1998

EP 0098592 A	18-01-1984	JP 1648691 C	13-03-1992
		JP 3009750 B	12-02-1991
		JP 59008968 A	18-01-1984
		JP 59016445 A	27-01-1984
		JP 59014857 A	25-01-1984
		DE 3378304 D1	01-12-1988
		EP 0099508 A2	01-02-1984
		EP 0098592 A2	18-01-1984
		US 4515584 A	07-05-1985
		US 4636144 A	13-01-1987

专利名称(译)	移动医疗设备和医疗设备之间的通信方法		
公开(公告)号	EP1688085A1	公开(公告)日	2006-08-09
申请号	EP2005002074	申请日	2005-02-02
[标]申请(专利权)人(译)	迪斯特朗尼克许可公司		
申请(专利权)人(译)	DISETRONIC许可AG		
当前申请(专利权)人(译)	DISETRONIC许可AG		
[标]发明人	ESSENPREIS MATTHIAS HAUETER ULRICH BERNINI NICOLE FANKHAUSER SYBILLE LA BASTIDE SEBASTIAAN MEYER OLDEN GUNNAR SCHOEMAKER MICHAEL HEATON KELLY		
发明人	ESSENPREIS, MATTHIAS HAUETER, ULRICH BERNINI, NICOLE FANKHAUSER, SYBILLE LA BASTIDE SEBASTIAAN MEYER OLDEN, GUNNAR SCHOEMAKER, MICHAEL HEATON, KELLY		
IPC分类号	A61B5/00 A61M5/142		
CPC分类号	A61B5/0002 A61B5/14532 A61M5/14244 A61M5/14276 A61M2205/3523 A61M2205/3569 A61M2205/3592 A61M2230/201		
代理机构(译)	KÜ吴, 彼得		
外部链接	Espacenet		

摘要(译)

本发明涉及一种移动医疗设备和医疗设备之间的通信方法。本发明的医疗设备包括用于与至少第二医疗设备通信的模块，其中所述用于通信的模块适于由动物的生理参数的值激活。本发明的方法包括第一医疗设备和至少第二医疗设备，其中所述医疗设备之间的通信由动物的生理参数的值激活。

DOCUMENTS CONSIDERED TO BE RELEVANT		Relevant to claim	CLASSIFICATION OF THE APPLICATION (Incl. 7)
X	US 2004/167464 A1 (IRELAND JEFFREY R ET AL) 26 August 2004 (2004-08-26) * abstract; figures 1-5 * * paragraphs [0007], [0034], [0037], [0057] - [0061] * -----	1-20	A61B5/00 A61M5/142
X	US 2004/225338 A1 (LEBEL RONALD J ET AL) 11 November 2004 (2004-11-11) * abstract; figures 1-3 * * paragraphs [0107], [0108], [0121], [0222] - [0227] * -----	1-20	
X	US 2002/049389 A1 (ARREU MARCIO MARC) 25 Apr 11 2002 (2002-04-25) * abstract; figures 70, 71 * * paragraphs [0182] - [0185], [1018] - [1023] * -----	1-20	
X	EP 0 098 592 A (FUJISAKA PHARMACEUTICAL CO., LTD) 18 January 1984 (1984-01-18) * abstract; figures 1-3 * -----	1, 6, 11	TECHNICAL FIELDS SEARCHED ** (Incl. 7) A61B A61M

The present search report has been drawn up for all claims.

1	Berlin	4 July 2005	Jonsson, P.O.
---	--------	-------------	---------------

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
 Y: pertinent to the state of the art
 A: non-written disclosure
 D: non-written disclosure
 P: intermediate document

I: theory or principle underlying the invention
 A: general information
 D: other literature
 C: documents cited for other reasons
 B: member of the same patent family, corresponding document