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

(11) EP 2 381 427 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.10.2011 Bulletin 2011/43

(51) Int Cl.:
G07D 7/20 *(2006.01)* ***G06K 9/00*** *(2006.01)*

(21) Application number: **11163396.2**

(22) Date of filing: **21.04.2011**

(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

(30) Priority: **22.04.2010 SE 1050398**

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(54) Method and device for automatic renewal of an identitiy document

(57) The present invention relates to a method for automatic renewal of an identity document, comprising the steps
a) registering a current identity document comprising data regarding a current identification,
b) registering data regarding a new identification of a person,
c) comparing at least one parameter of the new identification with at least one parameter of the current identification in order to determine by this comparison if both identifications indicate the same person and create a positive response if so, and
d) if a positive response has been created, transmitting the new identification together with at least one data item to a centre for creating a new identity document.

The invention also relates to a system for automatic renewal of an identity document.

EP 2 381 427 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a method for automatic renewal of an identity document, comprising the steps

a) registering a current identity document comprising data regarding a current identification,
b) registering data regarding a new identification of a person,
c) comparing at least one parameter of the new identification with at least one parameter of the current identification in order to determine by this comparison if both identifications indicate the same person and create a positive response if so, and
d) if a positive response has been created, transmitting the new identification together with at least one data item to a centre for creating a new identity document.

BACKGROUND ART

[0002] The renewal of identity documents such as passports, driver's licences and the like are generally an important and time consuming process. Since the created document is of great importance to the person owning it, and also to the state or country for which it is manufactured, it is important to safeguard against frauds or mistakes that render the identity document invalid, such as matching the wrong photograph to a name or allowing the same person to create more than one similar document. Therefore, the renewal process is generally a multi-step process that needs to be carefully supervised and managed.

[0003] One related technology is shown by US5,717,776 (Watanabe), where a certificate card is manufactured by printing a photographic image onto a card and testing said image to determine a sufficient level of quality. Additionally, an eye sight test is performed on the person for whom the certificate card is made, and at the same time a retina image of the person is captured for identification purposes.

[0004] Another technology is disclosed by US2002/0100802 (Sehr), where a multi-purpose card or a passport that can serve both as identification and as a ticket and itinerary for a journey is created. Biometric data is included for identification of the owner of the card.

[0005] These technologies, however, disclose methods and systems for renewal or manufacture of documents that are generally cumbersome and time-consuming and require the assistance of a human operator to assure the proper use of the methods and to prevent forgery. Since identity documents are renewed more often than before, often once every five years as opposed to once every ten years, and these documents now generally comprise more data than before and the security demands are higher, a way to manage these shifting conditions is also required.

[0006] There is therefore generally a need for new method and system for renewing an identity document, where the operations required can be performed in an easier and more convenient manner, while at the same time maintaining a high level of security and reliability.

DISCLOSURE OF THE INVENTION

[0007] It is an object of the invention to eliminate or at least to minimise the problems mentioned above. This is achieved through a method and system according to the appended independent claims. Thereby, a renewed identity document can be created by an automatic process where the risk for frauds or mistakes in the issuing of the renewed document can be prevented and where the process is performed in a convenient and efficient manner without requiring human intervention by an operator.

[0008] By using a newly captured visual image of the person requesting the renewal and comparing this to a current visual image contained in the current identity document, biometric data from both images can be compared to establish without a doubt if they show the same person. Thereby, the issuing of a renewed identity document to the wrong person can be prevented, without needing to consult a database or an external register. As an alternative to basing identification on a visual image, other biometric data such as fingerprints, retinal or iris scans or signature identification can be performed, provided that such biometric data is contained in the current identity document.

[0009] After a secure identification of the person requesting the renewal, additional identifying information in the form of desired biometric data can be collected by instructing the person to write his or her signature, register fingerprints, etc., and these data can be placed into the new identity document, thus providing an increased amount of reliable data for further identification of the person when travelling with the new identity document, or for identification on the next renewal of the document.

[0010] The system for renewal can be adapted to each new person using it, such as adjusting a placement height of a camera for capturing an image or a pad for writing a signature, by altering the height automatically based on height data collected from the current document, and/or based on a detection of the person by a sensor, for instance. Thereby, and by providing visual or acoustic instructions in the form of symbols or acoustic signals, respectively, and/or alternately by providing written or oral instructions that are displayed to the person, the system is decidedly easy and convenient to use and does not require the assistance of another person such as an operator. Further, this feature may allow the use of a further biometric parameter (height) to be used for eliminating fraud.

[0011] The person can further be allowed to choose

the visual image to be used from a series of such images captured by the camera, after the system has determined which of the captured images are suitable for use in an identity document with respect to their quality and a position and facial expression of the person they show.

[0012] In order to prevent an identity document from being issued to the wrong person and/or with biometric data from a second person entering and interacting with the system after a visual image of a first person has been captured, a designated area where the person is required to stand while interacting with the system can be monitored, so that a removal of the first person and/or interaction of a second person will result in the method of renewal being interrupted and/or optionally also of an alarm function being activated.

[0013] Further advantages and features of the method and system for renewal of an identity document will become apparent from the description below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The invention will now be described in more detail with reference to the appended drawings, wherein

- Fig. 1a shows a schematic view of a system comprising a device according to a preferred embodiment of the invention,
- Fig. 1b shows a schematic view of a second preferred embodiment of a system comprising a device according to the invention, and
- Fig. 2 shows a schematic view of the basic steps of the method according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0015] Fig. 1a shows a schematic view of a device 1 in a system for automatic renewal of an identity document, according to a preferred embodiment of the present invention. Said device 1 comprises registration means 11, capturing means in the form of a camera 12, display means in the form of a screen 13, a pad 14 for registering a signature and fingerprint recording means 15. Said registration means 11 are in this embodiment a registration device for registering a Machine Readable Zone (MRZ) of an identity document and an RFID device for registering information from a chip present in said identity document. On each side of the camera 12 are lighting means 16 that serve to provide additional light for said camera 12. The device 1 is mounted on a holder in the form of a pillar 8 in such a way that the device 1 itself can be moved vertically in the directions of arrows displayed on the side of said pillar 8. A designated area 9 is provided adjacent to the device 1 on the pillar 8, for purposes described further below. A position registration device 21 is arranged at the top of said pillar 8, to enable good control of a person within the designated area 9. Further there is also schematically indicated a data processor, e.g. in the form of a server 22 interconnected with the device by means of an appropriate connection 23 allowing flexibility regarding execution of desired soft ware and also exchange of desired data as well desired control of the capture process. Of course, also the device 1 itself will also be equipped with one or more data processor/s.

[0016] In Fig. 1b, a second preferred embodiment is shown, with a device 1 mounted on a holder in the form of a pillar 8 and comprising capturing means 12 in the form of a camera, lighting means 16, display means in the form of a screen 13, fingerprint recording means 15 and a pad 14 for registering a signature. Registration means 11 are also provided, here in the form of an optical reader. A screen 2 is mounted adjacent to the device 1 so that a person can stand between said device 1 and said screen 2. The screen 2 then provides a suitable background for any visual images captured by the camera 12. A designated area is placed adjacent to the pillar 8 and placed so that a person standing between the device 1 and the screen 2 will be standing on the designated area 9. Here it is shown that a number of position registration devices 21 be used e.g. using different technologies for registration of the position of the person, and/or merely using a plurality thereof to increase security.

[0017] Said current identity document 3 can be a national passport, a driver's licence or an access card, for instance, and said data can be contained in a chip, be imprinted in a card or be present in or in conjunction with the current identity document 3 in any suitable way. For instance, said current identity document 3 can comprise data that points towards additional information such as a visual image or other identification data in a database or the like. Said registration means 11 can be a RFID unit, a scanner or another unit suitable for registering data.

[0018] The current identity document 3 can be registered by any suitable registration means 11. In the first preferred embodiment shown in Fig. 1a, a RFID device is provided for registering information from a chip placed in the current identity document 3. Before the information can be read from the chip, a Machine Readable Zone (MRZ) of the current identity document 3 is registered and the chip is thereby activated so that the information can be read by the RFID device. In the second preferred embodiment shown in Fig. 1b, the registration means 11 comprises an optical reader where the current identity document 3 is placed with a data page displayed so that the information can be read from the current identity document 3.

[0019] In general, when information is to be read from the current identity document 3, the process is divided into three steps. In a first step, security features of the current identity document 3 are registered and analysed to ascertain that the current identity document 3 is a genuine identity document such as a passport. In a second step, a chip or similar device is registered to make sure that the current identity document 3 is valid and has not been blocked, a fact that might indicate that the current

identity document 3 has been lost or stolen and may be used in an attempted fraud. In a third step data regarding a current identification 30 and any other data items can be read from the chip.

[0020] In Fig. 2, the steps for performing the method according to a preferred embodiment of the invention are shown. In a registration step 101, a current identity document 3 is registered by a registration means 11 for registering data in the form of a current identification 30. This current identification 30 can in this preferred embodiment be in the form of a current facial image 31 or facial image data, but could also be in the form of a current fingerprint 32, a current iris scan 33, or any other suitable form of data by which a specific person can be identified. The registration is performed by the person possessing the current identity document 30 by following instructions provided by the device 1, for instance in the form of visual signals, such as symbols, or acoustic signals, such as beeps or the like that are emitted at suitable times, such as when a person interacts with the device 1 in an undesirable way, or conversely when the interaction is correct, depending on the particular embodiment. Instructions may also be provided in the form of a text on the screen 13 or as prerecorded spoken instructions transmitted by a loudspeaker, or by a sign provided near the device 1, for instance.

[0021] In a second step 102, capture means 12 captures a new identification 40 of a person. In this preferred embodiment, said new identification 40 is a new visual image 41. Preferably, a series of new visual images 41 are captured within a short space of time and are evaluated to determine if each of them is suitable for use as identification. Those that are deemed suitable are displayed in a display step 102' to the person who, in a selection step 102" can select one of the visual images 41 that is the most appealing to him or her. The selection can be made by touching the screen, by pressing a button, or in any other suitable manner. The evaluation to determine a suitability of said new visual image 41 is performed by evaluation means, for instance in the form of a processor unit.

[0022] In a third step 103, the selected new visual image 41 is compared to the current visual image 31 in order to determine whether they both identify the same person. This step serves to ensure that the new identity document 3 that is to be created comprises data referring to the same person as the current identity document 4. The comparison can be performed in any suitable way. In one embodiment, each visual image 31, 41 is analysed and a location of the eyes of the person is determined. Starting from this location, a number of other features are located and their distance to the eyes are calculated. Depending on the quality of the comparison, a different number of such features are located and a likeness between the current visual image 31 and the new visual image 41 is determined. If a similarity is large enough, i.e. over some predetermined threshold value, the images 31, 41 are determined to display the same person. A similar evaluation can be performed for comparing a current and new fingerprint, iris image or signature. The evaluation and comparison of the new identification and the current identification are performed by comparison means, for instance in the form of a data processor.

[0023] It is important that the threshold value is chosen so that as many as possible of the persons attempting to renew their identity documents are successful, i.e. that their new visual images 41 are accepted as identical to the current visual images 31. At the same time, the threshold value must be high enough so that the risk for a new visual image 41 of another person than that shown by the current visual image 31 is falsely approved.

[0024] The threshold value may for instance be such that less than 1 in 10 000 are given a false positive result, or 1 in 100 000, for instance.

[0025] If it has been established that the current visual image 31 and the new visual image 41 display the same person, the new identification 40 is transmitted in a fourth step 104, together with at least one data item 34, such as a name, social security or personal number, or demographical data in the event of a renewed passport, or security clearance in the event of a key card for use in an office building, for instance. Said data item or items 34 are thus transmitted to a location 6 together with the new identification 40 and a new identity document 4 can be created. The transmission is performed by transmission means, for instance in the form of an electronic link from the system for renewal to the location 6 directly of via a larger electronic network.

[0026] Before the transmission of the fourth step 104, additional identifying information in the form of a fingerprint 32 captured by the fingerprint recording means 15 or a signature 45 recorded by the person writing on the pad 14, or in any other suitable form, can be captured and included with the data items 34 that are to be transmitted. The location 6 can be a remote location or can be placed in conjuncture with the system for renewal itself.

[0027] When new fingerprints 32 are captured, it is important that a correct digit is chosen for the print. If an index finger is desired and another finger is registered instead, problems may arise later when the person uses the new identity document 4 as proof of his or her identity. In order to ascertain which fingers are used for registering the fingerprints 32, a camera may for instance supervise the registering and, using pattern recognition methods, recognise the position of a hand of the person when the correct digit is presented to the fingerprint recording means 15. In another embodiment, multiple fingers from the same hand may be registered simultaneously on a wide pad and the relative position of the different digits being used to determine which of the recorded new fingerprints 32 is suitable for use with the new identity document 4.

[0028] The process of renewing an identity document will now be described in more detail, with the assumption that the current identity document 3 to be renewed is a

national passport comprising information such as a name, a social security or personal number, a passport number, and a visual image of the person possessing the passport. The same process applies mutatis mutandis to the renewal of another identity document such as a driver's license, a key card or access card, or the like.

[0029] A person that wishes to renew his or her passport can go to a site where a system for renewal of an identity document is placed and approach the system, bringing an old passport, i.e. the current identity document 3, to the site.

[0030] The system for renewal may be placed together with other similar systems in a larger space and be monitored by an operator who can supervise the process and assist any persons requiring special attention or intervene if an attempt at fraud is detected. The device 1 may be surrounded by open air, such as shown in Fig. 1a and 1b above, or may alternately be and integrated part of a closed structure such as a conventional photo booth, for instance. In this closed structure, a quality of registered new visual images 41 may be increased due to the increased opportunities of controlling a light distribution inside the booth.

[0031] The person is required to step into a designated area between the device 1 and the screen 2. Instructions are provided adjacent to the device 1, are displayed on the screen 13 or as spoken prerecorded instructions, for instance. Following instructions, the person presents the current identity document/old passport 3 to the registration unit 11 and information contained in a chip on the old passport 3 is recorded.

[0032] When the old passport 3 is recorded, the data regarding identity of a person can be controlled against a database to ascertain that the person does not have a criminal record or is in other ways unsuitable for independent and automatic renewal of a passport. In such cases, as well as in other cases where the method is for some reason interrupted, for instance if the person is unable to achieve a suitable new visual image 41 or has problems understanding the instructions presented, the person can be guided towards an alternative system where an operator can perform the steps of the method and aid the person.

[0033] Among the recorded information can be data regarding the height of the person, and based on this information, the system for renewal can use height adjustment means such as a motor or the like to automatically move the device 1 vertically along its holder 8 to assure that the camera 12 is placed in a suitable height for capturing a new visual image 41 of a face of the person. Alternatively, or together therewith, the device 1 can comprise sensor means for detecting a height of the person standing in the designated area and adjust the vertical position of the device 1 based on data from these sensor means. Thanks to the height adjustment, a person sitting down in a wheelchair or the like may also use the method.

[0034] A series of new visual images 41 is created in the second step 102 by photographing the person. The screen 2 that serves to limit the size of the designated are also serves as a neutral backdrop to the photograph and can optionally be lit in a manner that is regarded as especially beneficial to a quality of the visual images that are to be taken by the camera 12. The series of visual images 41 is processed to determine which of them are suitable for use in a passport. The evaluation of each new visual image 41 is performed based on a number of criteria and values for each criterion are calculated. For each criterion, a threshold value can be set and any visual images 41 for which the calculated values are on a correct side of each threshold value is approved as a suitable new visual image 41. Alternately, it can be decided that some of the criteria are more important than others and that an incorrect value can be accepted in the case of a few of the criteria, while a correct value is essential for other criteria.

[0035] The criteria used can be among the following: centered image, low motion blur, clear eyes, head size, contrast, glare, eyes open, shadows in eye sockets, uniform lighting, facial shadows, background uniformity, background shadows and brightness, etc. A factor for determining the likelihood of the new visual image 41 being used successfully in future comparisons for identifying the person can also be calculated. A method for determining a suitability of a visual image for use as identification according to the above may be a focus for a future separate patent application.

[0036] The visual images 41 that are deemed to be suitable for use in a passport are displayed to the person on the screen 13 and the person is allowed to choose which one he or she prefers. Since a passport is generally renewed every five years or so, having the opportunity to select the visual image 41 that is to be displayed in the passport is generally very beneficial for the person.

[0037] In one embodiment of the present invention, the system for renewal of identity documents can be arranged to provide feedback to the person so that the person can be taught why a particular new visual image 41 or other identification data is unsuitable for use as identification. Thereby, the person may faster arrive at an approved identification, since a mistake once made when posing for an image, for instance, can be prevented from happening again.

[0038] The selected visual image 41 is now compared to the current visual image 31 and if they are determined to display the same person, the renewal process is allowed to continue. Otherwise, the renewal process is interrupted and optionally an alarm can be activated to indicate that a fraud might be attempted. Since a passport is a very important document, it is equally important to guarantee that no falsifications can be performed. For this purpose, position registration means 21 in the form of a sensor/sensors, for instance, can be used to continually monitor the person in the designated area to assure that the person that registers an old passport, is photo-

graphed and will later register fingerprints and signature is the same person. Many different known kind of sensors may be used, e.g. conventional CCTD-sensors (i.e. within the visual field) and/or sensors based on capturing infra red radiation, and/or sensors using ultra high frequencies, e.g. radar. The latter kind is generally more preferred due to the fact that more accurate control/supervision may be achieved. This designated area and monitoring system may have two purposes, the first is avoiding exchange ofbiometric data or individuals during the capture process, the second is keeping optimal distance to sensors such as cameras thereby avoiding geographical distorsions.

[0039] If the new visual image 41 is found to match the current visual image 31, the renewal process is allowed to continue. The person is now asked to register additional identity information in the form of fingerprints 42 and a signature 45. This information, together with the new visual image 41 and the data item 34 comprising other information such as name, demographical data, old passport number, social security of personal number, is transmitted in the fourth step 104 to the location 6 where the new passport is created. The renewal process is now finished, and the person can step away from the designated area and leave the system ready for the next user.

[0040] The device can be adjusted vertically along the process in order to be at a suitable height for the part of the process taking place, such as being in a comfortable writing position when a signature 45 is to be recorded, or being sufficiently low for fingerprints 42

[0041] Thanks to the person interacting directly with the system for renewal, no other person such as an operator or the like is required for performing the steps of the method, or for instructing the person. Thereby, the process for renewal can be performed in a convenient and simple manner while at the same time assuring that the risk for a mistake or a fraud is kept very low.

[0042] Optionally the systems for renewal may also be supervised by surveillance cameras or the like and tapes be recorded and saved so that the renewal of a passport of a particular person can be viewed at a later time if it suspected that an attempt at fraud has taken place. However, thanks to the arrangement according to the invention, allowing secure identification of the person based on biometric data (one or more parameters) in combination with secure monitoring/control of the process, any extra surveillance may normally be disposed of.

[0043] In order to further protect the integrity of the person, the registration in the first step 101 of the current identity document 3 is performed by the user actively registering the current identity document 3 in the registration unit 11 before its data are being registered by a RFID unit reading data from a chip. Thereby, the person actively allows the system to register the data and remains in control of when personal information is given away. Also, by screening the registration means 11 including the RFID unit, any attempts by a third party to intercept the information can be prevented. This is also very beneficial for the satisfaction of the person him/herself, as it makes him or her in charge of the process of distributing the information.

[0044] If a person for some reason is not suitable for using the system for renewal on their own, for instance because of a criminal record, an altered appearance or simply being unable to perform the steps of the method for physical or cognitive reasons, a separate way is presented where the person can be assisted by an operator.

[0045] The basic steps of the method as described herein may also be used after a new identity document 4 has been manufactured and the person wants to collect the identity document 4. The steps of registering a new identification 4 such as a new visual image 41 and comparing this to a current identification on the newly manufactured identity document may be employed for ascertaining that the person collecting the new identity document 4 is the same as the person whose identification is comprised by the new identity document 4. This may be the focus of a separate patent application.

[0046] The invention is not to be seen as limited by the preferred embodiments described above, but can be varied within the scope of the appended claims, as will become readily apparent to the person skilled in the art. For instance, the steps of the method as described herein may be performed in a different order and any features of the invention described herein may be the focus of a separate patent application.

Claims

1. Method for automatic renewal of an identity document, comprising the steps

   a) registering a current identity document (3) comprising data regarding a current identification (31),
   b) registering data regarding a new identification (41) of a person,
   c) comparing at least one parameter of the new identification (41) with at least one parameter of the current identification (31) in order to determine by this comparison if both identifications (31, 41) indicate the same person and create a positive response if so,
   d) if a positive response has been created, transmitting the new identification (41) together with at least one data item (34) to a centre for creating a new identity document (4), and
   e) registering a presence in a designated area (9) of a person suitable for creating the new identification (41) of step b), continuously monitoring a position of said person and interrupting the steps of the method if an unaccepted occurrence is detected by a monitoring system.

2. Method for automatic renewal according to claim 1,

wherein said current identification (3) and said new identification (4) comprise each comprise a visual image.

3. Method for automatic renewal according to claim 1 or 2, wherein said method comprises a step registering at least one additional identifying information such as a fingerprint, and iris scan or a signature.

4. Method for automatic renewal according to claim 2, wherein the method further comprises evaluating if the visual image created in step b) is suitable for use as a visual image for identifying a person.

5. Method for automatic renewal according to claim 2 or 4, wherein the method further comprises a step adjusting a position of a visual image capture means (12) according to a height data comprised in the data regarding a current identification of step a).

6. Method for automatic renewal according to claim 2, 4 or 5, comprising creating a series of visual images in step b) and allowing a person to choose which one should be used with the method and transmitted as new identification in step d).

7. Method for automatic renewal according to claim 1, wherein said current identification (31) and said new identification (41) each comprise a fingerprint or and iris scan.

8. Method for automatic renewal according to any of the previous claims, wherein said method comprises the step of monitoring that said person is all the time during step b) present in the designated area (9).

9. A system for automatic renewal of an identity document, comprising registration means (11) for registering a current identity document (3) comprising at least one current identification (31) of a person, capture means (12) for registering data regarding a new identification (41) of a person, comparison means for determining whether said new identification indicates the same person, and transmitting means for transmitting said new identification together with at least one data item (34) to a centre for creating a new identity document, **characterised in** said system being arranged to interact automatically with the person for renewing an identity document, and also simultaneously interacting with a monitoring system arranged to monitor a designated area (9).

10. A system according to claim 9, wherein said current identification (3) and said new identification (4) each comprise a visual image, namely a current visual image (31) and a new visual image (41), respectively.

11. A system according to claim 9 or 10, wherein said system further comprises means for registering an additional identity information.

12. A system according to any of claims 9-11, wherein said system comprises evaluation means for evaluating said new visual image for determining a suitability for use as a new identification.

13. A system according to any of claims 10-12, wherein said system is arranged to register a series of visual images and present them to a person for choosing a suitable new visual image for use as a new identification.

14. A system according to any of claims 9-13, wherein said system further comprises height adjustment means for adjusting a height of the system in relation to a height of a person.

15. A system according to any of claims 9-14, wherein said monitoring system comprises at least one position registration means (21) arranged to detect a presence of a person in said designated area (9) and continuously monitor said presence.

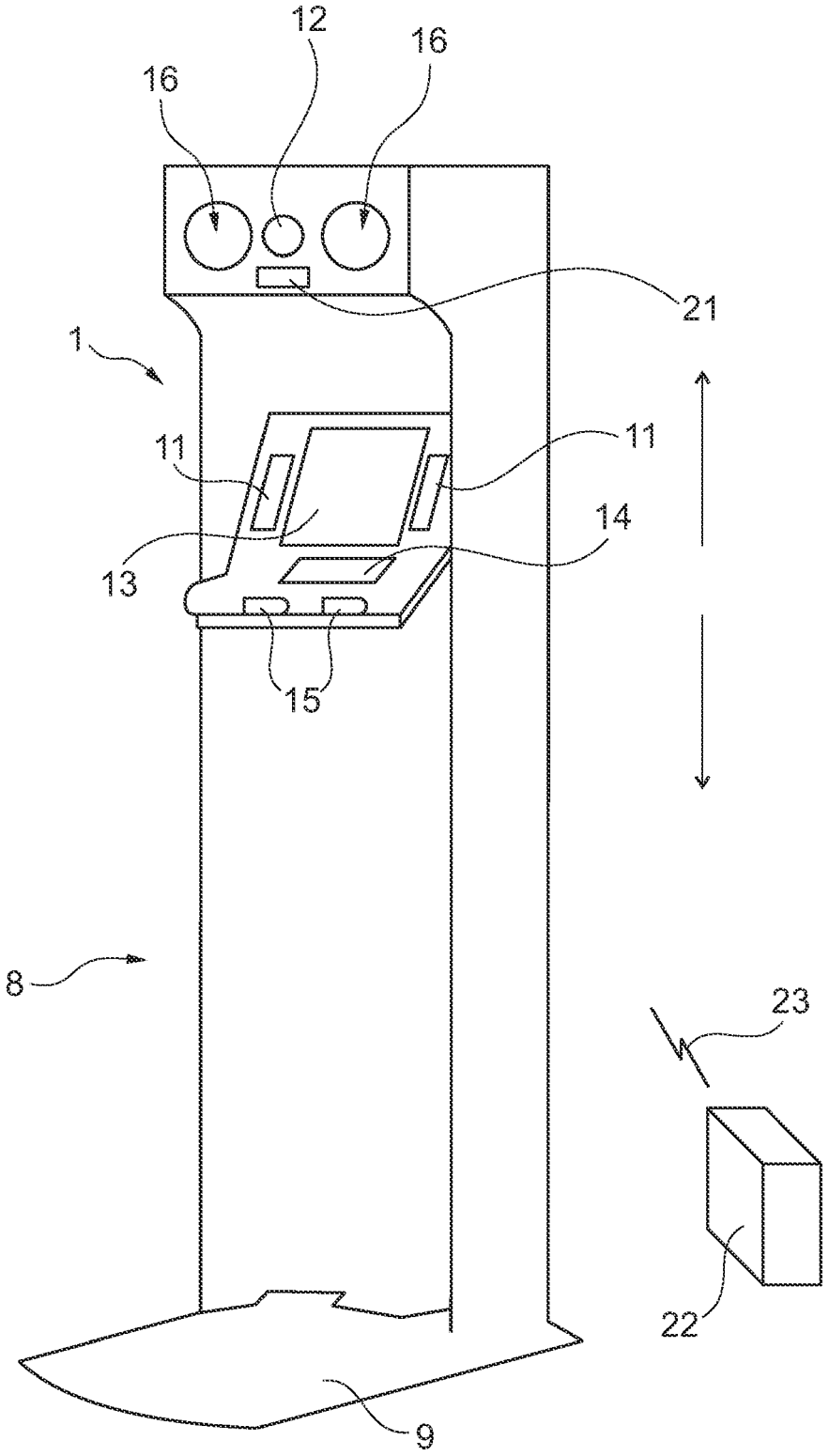

Fig. 1a

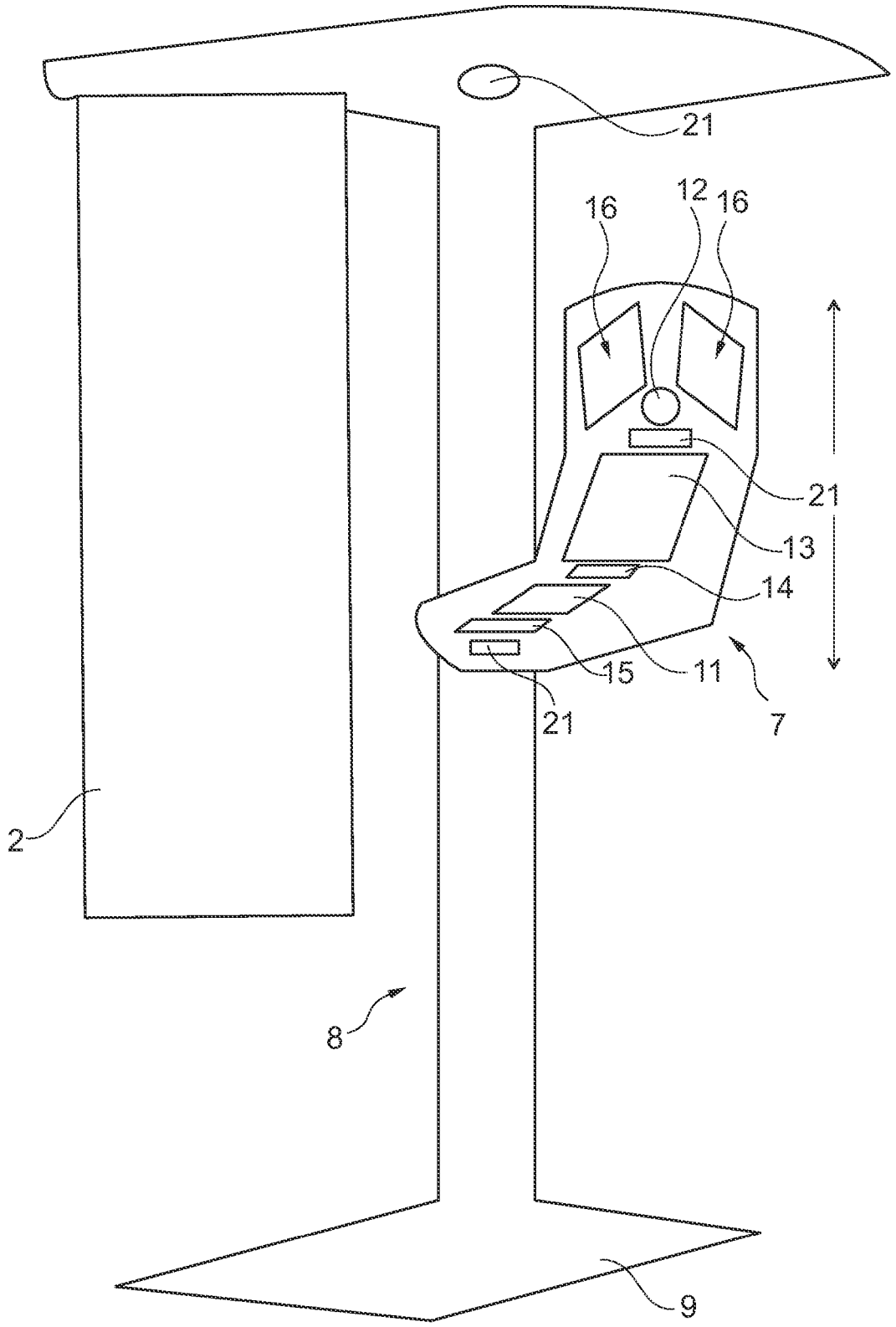

Fig. 1b

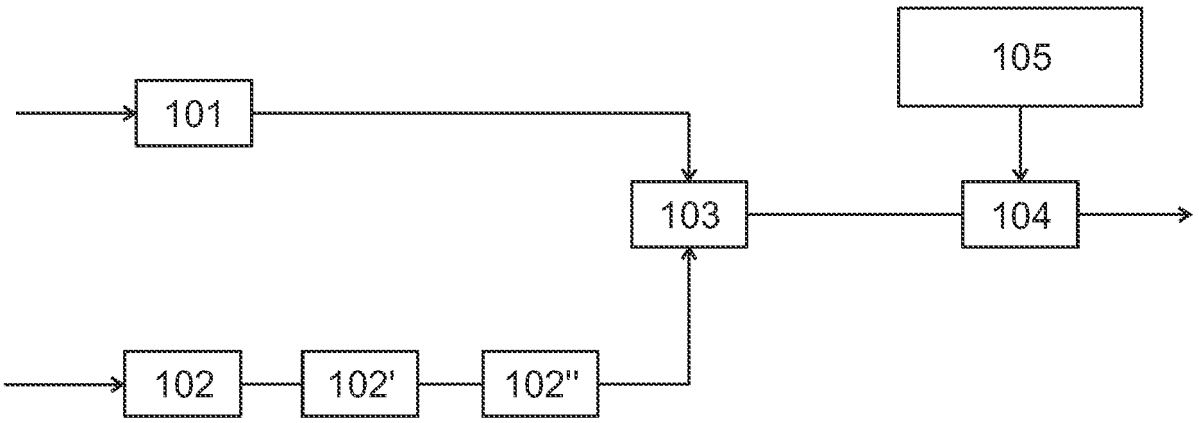

Fig. 2

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 11 16 3396

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2003/116630 A1 (CAREY MARTIN [CH] ET AL) 26 June 2003 (2003-06-26) * paragraph [0014] * * paragraphs [0035] - [0044] * * paragraphs [0069] - [0073], [0080] * * paragraphs [0083], [0084] * * figures 1,2,7,8 *	1-15	INV. G07D7/20 G06K9/00
X	WO 2004/017265 A1 (ENSCHEDE SDU BV [NL]; D AGNOLO CARLO ANTONIO GIOVANN [NL]) 26 February 2004 (2004-02-26) * page 2, line 12 - page 4, line 13 * * page 6, line 31 - page 7, line 19 * * page 7, line 31 - page 9, line 2 * * figures 1,2 *	1-15	
X	WO 00/31677 A1 (BEECHAM JAMES E [US]) 2 June 2000 (2000-06-02) * page 5 - page 7 * * pages 8,9 * * pages 15-17 * * pages 22,23 * * pages 38-41 * * figures 1-4,8 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) G07D G07C G06K
X	WO 2005/111950 A1 (DEXRAD PROPRIETARY LTD [ZA]; TAME GAVIN RANDALL [ZA]) 24 November 2005 (2005-11-24) * page 2 - page 5 * * pages 6,7 * * pages 11-13 * * figure 1 *	1-15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 July 2011	Espuela, Vicente

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
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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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 16 3396

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
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21-07-2011

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