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

(11) EP 2 906 062 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
16.03.2016 Bulletin 2016/11

(21) Application number: **14700984.9**

(22) Date of filing: **14.01.2014**

(51) Int Cl.:
A41H 1/02 (2006.01) ***G01B 11/25*** (2006.01)
A61B 5/107 (2006.01) ***A61B 5/00*** (2006.01)

(86) International application number:
PCT/EP2014/050633

(87) International publication number:
WO 2014/111391 (24.07.2014 Gazette 2014/30)

(54) **FITTING ROOM MIRROR**

ANKLEIDERAUMSPIEGEL

MIROIR DE CABINE D'ESSAYAGE

(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

(30) Priority: **16.01.2013 EP 13151448**

(43) Date of publication of application:
19.08.2015 Bulletin 2015/34

(73) Proprietor: **Van de Velde NV**
9260 Schellebelle (BE)

(72) Inventors:
- **LAAN, Dominicus**
B-3971 Driebergen-Rijsenburg (BE)
- **VERMEIRE, Lieve**
B-9260 Zwijnaarde (BE)
- **VAN DER BIEST, Geert**
B-9340 Wanzele (BE)
- **BAL, Michael**
B-Merelbeke 9820 (BE)
- **DOTREMONT, Sabine**
B-9040 Sint Amandsberg (BE)
- **DE RIJCK, Roel**
B-9040 Sint Amandsberg (BE)
- **VERBEEREN, Tim**
B-9450 Denderhoutem (BE)

(74) Representative: **LC Patents**
Crutzenstraat 24
3500 Hasselt (BE)

(56) References cited:
EP-A1- 2 538 188
WO-A1-00/36370
US-A- 5 339 198
US-A- 5 530 652
US-A1- 2002 126 295
US-A1- 2004 227 752
US-A1- 2008 294 012
US-A1- 2010 073 461

Printed by Jouve, 75001 PARIS (FR)

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a fitting room mirror including image capturing means and image processing means enabling the determination of body dimensions and in providing cloth-fitting advice to the user.

BACKGROUND TO THE INVENTION

[0002] There is a growing interest to the application of three-dimensional measurement of bodily dimensions in providing garment-fitting advice to people. At present such three-dimensional (3D) measurement is typically done using 3D-scanners such as the TC2 Scanner of Textile/Clothing Technology Corp., the scanner of Human Solutions GmbH and the automatic installation of Telmat Ind. SA as described in EP1207367. In the majority of said cases, the process of acquiring the 3D model includes the use of light, such as for example the use of structured light wherein a recognizable pattern of lines or pixels of lights is projected on the subject to be measured. Other methodologies employ laser triangulation, photogrammetry, and time-of-flight determinations. Recent developments in 3D-measurement techniques are the low cost body scanners, such as for example based on MS Kinect or comparable depth camera's, such as for example the TC2 KX16 scanner (see above), the styku-scanner or the scanner of Bodymetrics.

[0003] The existing techniques and environment for 3D scanning are very technically oriented and do not result in the perception that you expect to find in a fitting room, such as seclusion, curtain, mirror, lighting. Instead of a fitting room the user first enters a scan area within which the scanning equipment is installed. Said scan area is specifically adapted to the scan equipment, which results in a complete different experience to the user when compared to a standard fitting room. In order not to influence the measurements that are based on the use of light, ambient light is normally dimmed, thus exposing the user to flashes of light and/or light patterns of the laser beam used in the measurement. Further, to obtain a complete scan of the person cameras are either installed around, or move around the person to be measured. The scan result is subsequently used to give customized garment fitting advice, allowing the user to choose proper fitting clothes. The user's next step is to go from the scan area to the fitting room. The scan area and fitting room are clearly separated by a totally different experience. For many people this is a problem, both for consumers and for the shop owners: the consumer prefers to go to the fitting room directly and wants to avoid the technical scan area, the shop owner needs extra space for the scan area and also prefers to help the consumer directly in the fitting room. It would accordingly be desirable to have 3D scanning apparatus that could be seamlessly integrated in a standard garment fitting room without adaptations, i.e. without the need to change for example ambient light exposure and without the need to install visible scan equipment.

[0004] An effort to combine cameras with mirrors in 3D measurement devices is for example provided in PCT publication WO2008150343, also published as US2008/294012. In said reference the camera is positioned behind a semi-transparent mirror, or a flickering device that is driven electronically to switch between reflecting and transmitting states. However, a problem associated with this configuration is that it is necessary to find a compromise between the requisite of a good mirror image and sufficient transparency for the camera behind it. Improving the mirror image will inevitably result in a worsening of the camera transparency and vice versa. For example a semi-transparent mirror with 50% reflection and 50% transmission will result in a mirror with a dark mirror image since 50% of the incident light is not reflected. Improving the mirror characteristics in increasing the reflection to 80% will improve the mirror image, but have a detrimental effect on the camera image, in particular when combined with structured light as part of the 3D scanning technique. In said instance only a fraction of the projected light is captured by the camera due to inevitable losses in the light transfer from the subject to the camera, with in particular the limited transparency (only 20%) of the mirror. In case the structured light is also projected from behind such a semi-transparent mirror the transparency of the mirror has an even bigger effect on the quality of the camera image as the light is passing the mirror twice. First in projecting the structured light onto the subject to be measured and second in capturing the reflected light with the camera. Using for example a mirror with a transparency of 20%, only up to (20% of 20%) 4% of the projected light may reach the camera. This is clearly insufficient.

[0005] It is accordingly an object of the present invention to address the aforementioned problems in 3D measuring devices and enable a 3D measuring device that can be seamlessly integrated in a garment fitting room as a fitting mirror, such that;

- it can be used as a standard fitting mirror
- it provides a good mirror image, i.e. bright with little or no change in colour (true colour)
- it works under light conditions typically found in a fitting room
- it does not generate undesired light effects like light flashes or laserbeams
- it is capable to provide a complete 3D image of the user.

SUMMARY OF THE INVENTION

[0006] In a first aspect the present invention provides a three-dimensional measuring device for use in a garment fitting room comprising at least one image capturing means, a projector, and a wavelength specific mirror characterized in that said image capturing means is positioned behind said wavelength specific mirror, and characterized in that said wavelength specific mirror is only efficient in transmitting electromagnetic waves with wavelengths in a range outside of the visible spectrum, and in the infrared spectrum. In other words, the wavelength specific mirror transmits such infrared waves for at least 70% of infrared light with wavelengths of at least 750 nm and reflects at least 70% of visible light wavelengths from about 380 nm to about 740 nm. As evident from the examples provided in figures 4 and 5, in a preferred embodiment the wavelength specific mirror transmits at least 90% of the wavelengths in the infrared spectrum, more in particular it transmits at least 70%, 75%, 80%, 85%, 90% or more of the wavelengths in the infrared spectrum; even more in particular wavelengths in the near infrared spectrum; in one embodiment wavelengths of at least 750 nm; more in particular near infrared light with wavelengths from about 800 nm to about 2500 nm. In one embodiment, both the image capturing means and the projector are positioned behind said wavelength specific mirror.

[0007] As detailed further hereinafter, the wavelength specific mirror used in the three-dimensional measuring device according to the present invention reflects at least 70% of visible light wavelengths. In other words it reflects electromagnetic waves with wavelengths in the visible spectrum (from about 380 nm to about 740 nm) and is transparent for electromagnetic waves with wavelengths outside of said spectrum and within the infrared spectrum.

[0008] In reflecting the visible light wavelengths, said wavelengths may be fully reflected, but in an alternative embodiment and in particular when combined with further displaying means, the mirror reflects the visible light wavelengths for at least 70%, 75%, 80%, 85%, 90% or more.

[0009] In the present invention the wavelength specific mirror is efficient in transmitting infrared light, namely infrared light with wavelengths of at least 750 nm; more in particular near infrared light with wavelengths from about 800 nm to about 2500 nm.

[0010] In the three-dimensional measuring method the projector preferably , projects structured electromagnetic waves on the three-dimensional object to be measured. In said process a known pattern is projected, typically consisting of a grid or a set of parallel stripes, on the three-dimensional object to be measured. By determining the way this pattern deforms on the surface of said object, an exact geometric reconstruction of the surface can be calculated.

[0011] Where the optical resolution of this measurement technique is to an important extend determined by the width of the stripes used and their optical quality, further improvement can be realized by capturing a plurality of images with a slightly shifted pattern. Thus in a particular embodiment the measuring method as provided, is further characterized in that at least 3 exposures are taken with slightly shifted pattern. Shifting of the pattern may be realized by moving the image capturing means and/or the projector, alternatively by moving the object to be measured. In a particular embodiment capturing of the images is accordingly realized using a high-frame-rate structured light camera(s). In further embodiment, capturing of the images is realized using a high-frame-rate structured light camera(s) having a frame rate of at least 10 frames per second.

[0012] Instead of moving the projector and/or image capturing means behind the wavelength specific mirror, capturing of slightly shifted patterns could also be realized by using a plurality of image capturing means and/or projectors. Within a particular embodiment of the present invention the three-dimensional measuring device comprises two or more image capturing means; in particular two image capturing means. In another embodiment the three-dimensional measuring device comprises two or more projectors; in particular two projectors. In a more particular embodiment of the present invention the three-dimensional measuring device comprises two or more image capturing means, and two or more projectors; even more in particular two image capturing means, and two projectors.

[0013] In as far there is no particular limitation regarding the mutual orientation of said two or more image capturing means and/or projectors; in a preferred embodiment said image capturing means and/or projectors are oriented along the same vertical axis.

[0014] As already mentioned hereinbefore, and in particular when the wavelength specific mirror only partially reflects the visible wavelengths, the three-dimensional measuring device according to present invention, may further comprise display means positioned behind said wavelength specific mirror. This display could for example be used to display garment fitting information or user instructions to the subject using the three-dimensional measuring device according to the present invention.

[0015] In a further aspect the present invention provides the use of the three-dimensional measuring device(s) as described herein, as mirror; in particular as mirror in a garment fitting room.

[0016] It is also an object of the present invention to provide a method for the acquisition of three-dimensional shapes of an object, in particular human subjects; more in particular garment sizes of said subject, said method comprising; placing the three dimensional object to be measured in front of a wavelength specific mirror as defined herein; projecting structured electromagnetic waves, in particular infrared light, on said object from a projector positioned behind said wavelength specific mirror; capturing images from the structured waves, in particular from the structured infrared light, projected on the object using image capturing means positioned behind said wavelength specific mirror; transmit said captured images from said image capturing device to a computer processor and have said computer processor process said image to determine the three-dimensional shape of said object.

[0017] Further to the above, one method to shift the pattern on the object to be measured is by moving said object, accordingly in a further embodiment the measuring method includes the step of rotating the object or causing said object to rotate in front of the wavelength specific mirror.

[0018] In a further embodiment of the method according to the invention, the images are captured at high frame rates.

[0019] In another embodiment of the method according to the invention, the projector projects structured near infrared light on the object to be measured.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] With specific reference now to the figures, it is stressed that the particulars shown are by way of example and for purposes of illustrative discussion of the different embodiments of the present invention only. They are presented in the cause of providing what is believed to be the most useful and readily description of the principles and conceptual aspects of the invention. In this regard no attempt is made to show structural details of the invention in more detail than is necessary for a fundamental understanding of the invention. The description taken with the drawings making apparent to those skilled in the art how the several forms of the invention may be embodied in practice.

Fig. 1: Schematic drawing of the 3D measuring device according to the present invention, showing the mirror and the position of the 3D cameras behind the mirror. Within this presentation the number of cameras and position are only given as an example. Actual number and position will depend among others on scan technology, scan task, and size of mirror.

Fig. 2: Schematic drawing showing the step of moving the subject in front of the mirror in the measuring method. In the exemplified embodiment the user is requested to rotate in front of the mirror, preferably whilst raising his arms.

Fig. 3: Schematic drawing showing a further step in the processing of the captured images, in the 3D measuring method according to the present invention. The captured images are combined into a 3D image in a voxel grid volume surrounding the user.

Fig. 4: Representative wavelength reflection diagram for a wavelength specific mirror to be used in the present invention. As evident from this scheme, this mirror quasi fully reflects visual light wavelengths.

Fig. 5: Representative wavelength reflection diagram for a wavelength specific mirror to be used in the present invention. This mirror is partially transparent for visual light in that it reflects about 80% of the visual light wavelengths.

DETAILED DESCRIPTION OF THE INVENTION

[0021] The invention as described herein addresses the problems associated with the present 3D measuring devices, in particular when for use in garment fitting room. As already detailed hereinbefore, the 3D measuring device of the present invention presents itself as a mirror, with hidden integration of the 3D cameras and processing means. As schematically represented in Figure 1, the camera(s) and processing means are positioned behind a wavelength specific mirror. In a particular embodiment along a vertical axis over the length of said mirror.
This mirror can simply be placed as a standard mirror in a fitting room. Thus different from the prior art scanning devices, there is no longer a separate scanning room, but the user can directly go to the fitting room and only sees a mirror with a high quality mirror image, as he / she would expect. To make the 3D scan available, the user only needs to turn around in front of the mirror (see Figure 2). Again no particular adaptations of the environmental conditions are required; there is no need to change (dim) the lightning in the fitting room and the user will - experience no annoying flashing lights or lasers. The scan can then be used for example for providing cloth-fitting advice or for other purposes.

[0022] To achieve the foregoing and as reflected in the wording of the different embodiments of the present invention, the measuring device combines the following features. It makes use of wavelengths outside the visible spectrum, in particular wavelengths within the infrared spectrum, and it makes use of a wavelength specific mirror that is only efficient in transmitting electromagnetic waves with wavelengths in a range outside of the visible spectrum and within the infrared spectrum.

[0023] In the 3D measuring method it preferably uses structured electromagnetic waves with wavelengths outside of the visual spectrum; more in particular structured infrared wavelengths. Further optimization in the 3D measuring method resides in the image sampling frequency, consequently preferably high frame rate cameras are used. As already explained herein above, when using structured light the projectors project a pattern on the object to be measured. Deformation of the pattern by said object is captured by the camera (image capturing device) and can be used to determine geometry of said object. As used herein, structured waves are chosen outside the visible spectrum, and in particular consist of near infrared waves. As such, there is no visual experience to the user, rendering the method less intrusive when compared to the use of structured visible light.

[0024] Irrespective of the chosen wavelength, the use of structured waves results in a stable and fast method of rendering a complete and detailed 3D model of the object being measured, in particular when used with high frame rate cameras. As already explained above, quality of the 3D image improves in case images are taken with slightly shifted patterns. This may be achieved by moving the cameras, but again and in order to minimize measuring perception to the user, in the methods of the present invention the cameras are preferably kept stationary during the actual measurement. In said instance, shifting of the pattern can only be realized by moving the object (rotation in front of the mirror) instead. In order to have sufficient detail, and images that are only slightly shifted in pattern, it is in said embodiment accordingly desirable to use high frame rate cameras as mentioned above. A typical example of a high frame rate camera that can be used in the methods of the present invention, is the Microsoft ® Kinect using a near infrared light pattern.

[0025] Thus in one particular embodiment of the present invention, the person is requested to make a full 360° rotation in front of the mirror in a comfortable rate of about 4 seconds. During this movement a pattern of structured waves outside the visual spectrum are projected on said person and images (preferably using stationary cameras) are captured at a frame rate of at least 10 frames per second, preferably 20 frames per second, more preferably at least 25 frames per second; even more preferably at least 30 frames per second or more. The thus obtained images are processed in a virtual voxel gridbox surrounding said person (see figure 3) and combined to yield a complete 3D scan of the person in front of the mirror. Throughout this process the camera(s) are positioned out of sight to the user in that they are positioned behind the wavelength specific mirror. Where the cameras are stationary during the measurement, just prior to the measurement their position may be adjusted to the bodily dimensions of the person using the measuring mirror. In other words, the position of the image capturing device(s) behind the mirror is adjustable.

[0026] In a particular embodiment of the present invention the projector is also positioned behind the wavelength specific mirror. In either instance, the mirror is characterized in that it is only efficient in transmitting electromagnetic waves within the infrared spectrum. In other words, the mirror reflects visible lights, i.e. for at least 70%. As such, to the eyes of a human, the measuring mirror behaves as a standard mirror with a bright mirror image with no or only little change in colour. Such wavelength specific mirrors could be obtained using particular coatings, such as for example provided by Thin Metal Films Ltd from the UK. Dependent on the non-visible wavelengths chosen to be detected by the image capturing device a given coating will be required. For example, when using near infrared light a cold mirror with a wavelength reflection diagram comparable to Figure 4 could be used. In case the measuring mirror is further combined with an information display positioned behind the mirror the latter should have a limited transparency for visible light. Thus in one embodiment the mirror may be chosen to be not nearly 100% reflective to the visible spectrum (see Figure 4), but for example, 80% (Fig. 5). The mirror looks still bright and colourfast. The limited permeability to visible light can be used to put an information display behind the mirror. The limited (20%) visible light transmittance can be compensated in using a display with a high degree of brightness.

Claims

1. A three-dimensional measuring device for use in a garment fitting room comprising at least one image capturing means, a projector, and a wavelength specific mirror **characterized in that** said image capturing means is positioned behind said wavelength specific mirror, and **characterized in that** said wavelength specific mirror is configured to transmit at least 70% of infrared light with wavelengths of at least 750 nm and to reflect at least 70% of visible light wavelengths from about 380 nm to about 740 nm.

2. The three-dimensional measuring device according to claim 1, wherein the projector projects structured infrared light on the three-dimensional object to be measured.

3. The three-dimensional measuring device according to claim 1, wherein the capturing means consists of structured light camera(s) having a frame rate of at least 10 frames per second.

4. The three-dimensional measuring device according to claim 1, further comprising display means positioned behind said wavelength specific mirror.

5. The three-dimensional measuring device according to claim 1, comprising two or more image capturing means.

6. The three-dimensional measuring device according to claim 5, wherein said image capturing means are oriented along the same vertical axis.

7. The three-dimensional measuring device according to claim 1, comprising two or more projectors.

8. The three-dimensional measuring device according to claims 1 or 7, wherein said projector(s) are positioned behind the wavelength specific mirror.

9. The three-dimensional measuring device according to claim 8, wherein said two or more projectors are oriented along the same vertical axis.

10. A method for the acquisition of three-dimensional shapes of an object, said method comprising; placing the three dimensional object to be measured in front of a three-dimensional measuring device as defined

in any one of claims 1 to 9; projecting structured near infrared light on said object from a projector; capturing images from the structured near infrared light waves projected on the object using image capturing means positioned behind said wavelength specific mirror; transmit said captured images from said image capturing device to a computer processor and have said computer processor process said image to determine the three-dimensional shape of said object.

11. The method according to claim 10, further including the step of rotating the object or causing said object to rotate in front of the wavelength specific mirror.

12. The method according to claim 10, wherein the images are captured at a frame rate of at least 10 frames per second.

Patentansprüche

1. Ein 3D-Messgerät zur Verwendung in einem Anproberaum, bestehend aus mindestens einer Bilderfassungsvorrichtung, einem Projektor und einem wellenlängenspezifischen Spiegel, **dadurch gekennzeichnet, dass** diese Bilderfassungsvorrichtung hinter dem genannten wellenlängenspezifischen Spiegel positioniert ist und **dadurch gekennzeichnet, dass** dieser wellenlängenspezifische Spiegel so konfiguriert ist, dass er mindestens 70 % des Infrarotlichts mit Wellenlängen von mindestens 750 nm überträgt und mindestens 70 % der Wellenlängen des sichtbaren Lichts von ca. 380 nm bis ca. 740 nm reflektiert.

2. Das 3D-Messgerät nach Anspruch 1, wobei der Projektor strukturiertes Infrarotlicht auf das zu messende 3D-Objekt projiziert.

3. Das 3D-Messgerät nach Anspruch 1, wobei die Erfassungsvorrichtung aus einer oder mehreren Strukturlicht-Kameras mit einer Bildwechselfrequenz von mindestens 10 Bildern pro Sekunde besteht.

4. Das 3D-Messgerät nach Anspruch 1, das darüber hinaus Anzeigevorrichtungen umfasst, die hinter dem wellenlängenspezifischen Spiegel positioniert sind.

5. Das 3D-Messgerät nach Anspruch 1, das zwei oder mehr Bilderfassungsvorrichtungen umfasst.

6. Das 3D-Messgerät nach Anspruch 5, wobei die Bilderfassungsvorrichtungen längs derselben vertikalen Achse ausgerichtet sind.

7. Das 3D-Messgerät nach Anspruch 1, das zwei oder mehr Projektoren umfasst.

8. Das 3D-Messgerät nach Anspruch 1 oder 7, wobei dieser bzw. diese Projektoren hinter dem wellenlängenspezischen Spiegel positioniert sind.

9. Das 3D-Messgerät nach Anspruch 8, wobei die zwei oder mehr Projektoren längs derselben vertikalen Achse ausgerichtet sind.

10. Ein Verfahren zur Erfassung von dreidimensionalen Formen eines Objekts, wobei dieses Verfahren folgendes umfasst: Anordnung des zu messenden dreidimensionalen Objekts vor einem 3D-Messgerät wie in einem der Ansprüche 1 bis 9 definiert; Projizierung von strukturiertem Nahinfrarot-Licht von einem Projektor auf das genannte Objekt; Erfassung von Bildern von den auf das Objekt projizierten strukturierten nahinfrarot-Lichtwellen unter Verwendung von hinter dem wellenlängenspezifischen Spiegel positionierten Bilderfassungsvorrichtungen; Übertragung dieser von der Bilderfassungsvorrichtung erfassten Bilder auf einen Computerprozessor und Verarbeitung dieser Bilder durch den Computerprozessor zur Bestimmung der dreidimensionalen Form des Objekts.

11. Das Verfahren nach Anspruch 10, das ferner den Schritt enthält, dass man das Objekt vor dem wellenlängenspezifischen Spiegel dreht oder drehen lässt.

12. Das Verfahren nach Anspruch 10, bei dem die Bilder mit einer Bildrate von mindestens 10 Bildern pro Sekunde erfasst werden.

Revendications

1. Un dispositif de mesure tridimensionnel pour utilisation dans une cabine d'essayage pour vêtements comprenant au moins un dispositif de capture d'images, un projecteur et un miroir d'une longueur d'onde spécifique **caractérisé en ce que** ledit dispositif de capture d'image est positionné derrière ledit miroir d'une longueur d'onde spécifique, et **caractérisé en ce que** ledit miroir d'une longueur d'onde spécifique est configuré pour transmettre au moins 70 % de la lumière infrarouge avec des longueurs d'onde d'au moins 750 nm et pour refléter au moins 70 % de longueurs d'onde de lumière visible d'environ 380 nm à environ 740 nm.

2. Le dispositif de mesure tridimensionnel selon la revendication 1 où le projecteur projette de la lumière infrarouge structurée sur l'objet en trois dimensions à mesurer.

3. L'appareil de mesure tridimensionnel selon la revendication 1 où le système de capture se compose de caméras à lumière structurée avec un taux d'échantillonnage d'au moins 10 images par seconde.

4. Le dispositif de mesure tridimensionnel selon la revendication 1 comprend en outre des moyens d'affichage positionnés derrière le miroir à la longueur d'onde spécifique.

5. Le dispositif de mesure tridimensionnel selon la revendication 1 comprend au moins deux dispositifs de capture d'image.

6. Le dispositif de mesure tridimensionnel selon la revendication 5 où les dispositifs de capture d'image sont orientés le long du même axe vertical.

7. Le dispositif de mesure tridimensionnel selon la revendication 1 comprend au moins deux projecteurs.

8. Le dispositif de mesure selon la revendication 1 ou 7 où le(s) projecteur(s) est (sont) positionné(s) derrière le miroir à longueur d'onde spécifique.

9. Le dispositif de mesure tridimensionnel selon la revendication 8 où les aux moins deux projecteurs sont orientés le long du même axe vertical.

10. Une méthode d'acquisition des formes tridimensionnelles d'un objet, cette méthode comprenant ; le placement de l'objet tridimensionnel à mesurer devant un appareil de mesure tridimensionnel tel que défini dans l'une des revendications 1 à 9 ; la projection de la lumière presque infrarouge structurée sur ledit objet à partir d'un projecteur ; la capture d'images des ondes de lumière presque infrarouge structurée projetée sur l'objet à l'aide de dispositifs de capture d'image positionnés derrière le miroir à longueur d'onde spécifique ; la transmission des images captées sur le dispositif de capture d'images vers un processeur d'ordinateur et faire traiter par le processeur informatique l'image pour déterminer la forme tridimensionnelle de l'objet.

11. La méthode selon la revendication 10, comprenant en outre l'étape consistant à pivoter l'objet ou à le faire tourner devant le miroir à longueur d'onde spécifique.

12. La méthode selon la revendication 10 où les images sont captées à un taux d'échantillonnage d'au moins 10 images par seconde.

Fig. 1

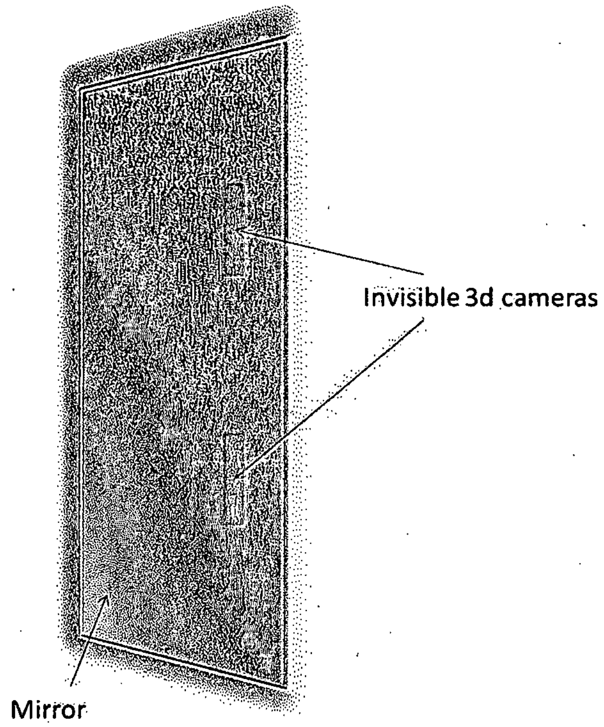

Invisible 3d cameras
Mirror

Fig. 2

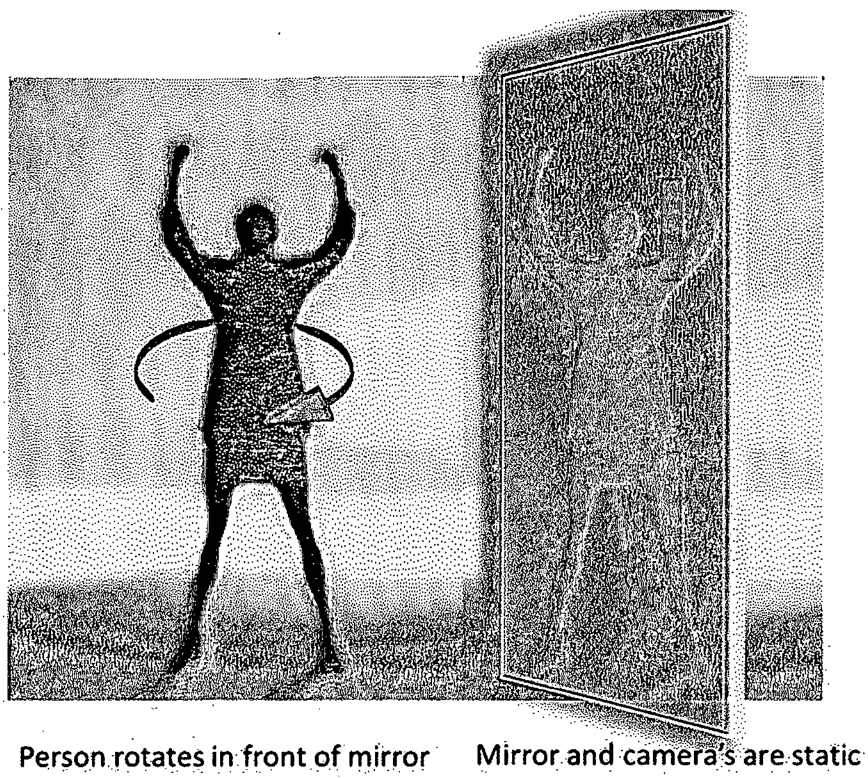

Person rotates in front of mirror
Mirror and camera's are static

Fig. 3

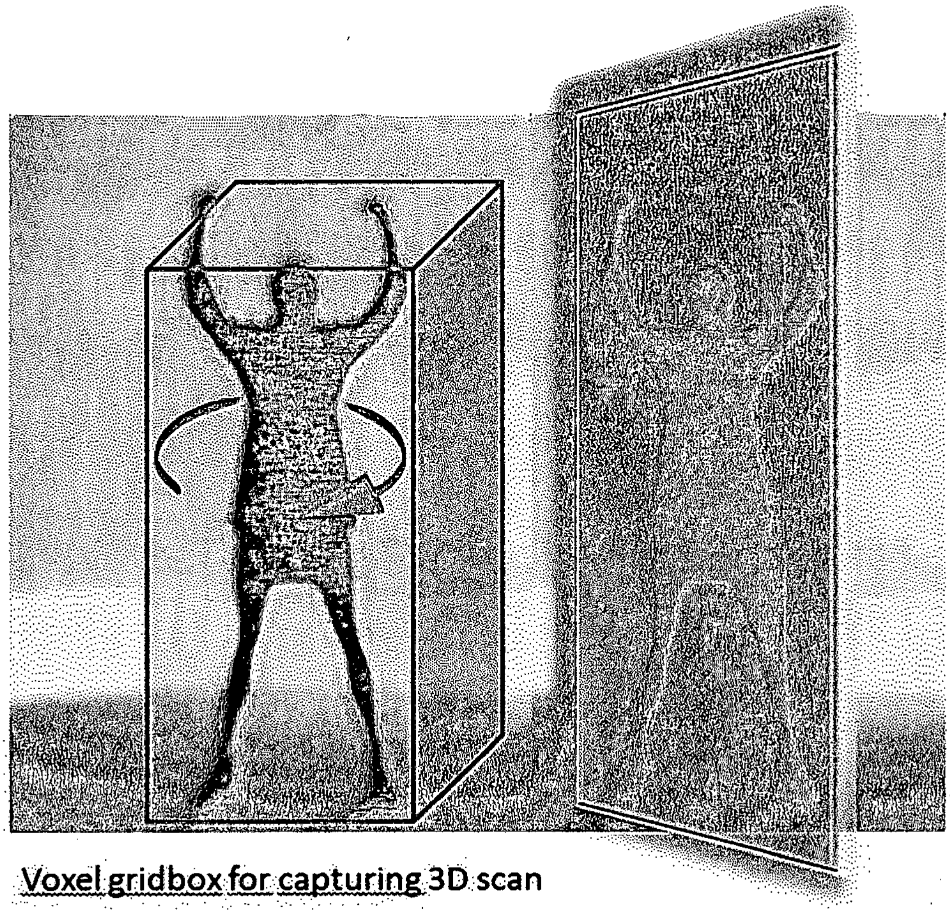

Voxel gridbox for capturing 3D scan

Fig. 4

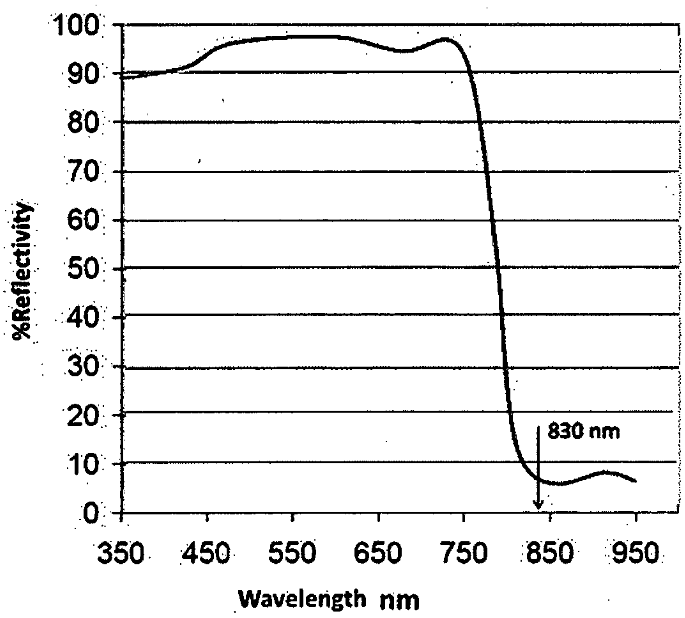
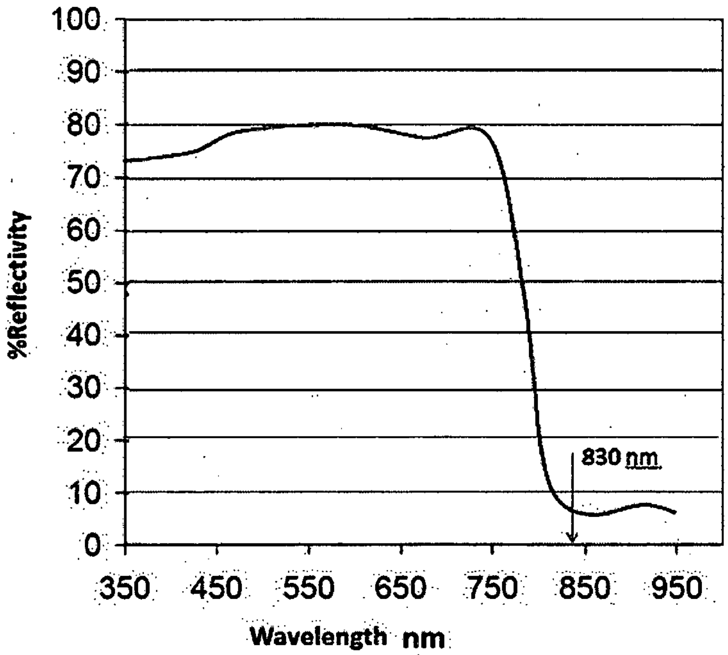

100
90
80
70
60
50
40
30
20
10
0
%Reflectivity
830 nm
350
450
550
650
750
850
950
Wavelength nm

Fig. 5


100
90
80
70
60
50
40
30
20
10
0
%Reflectivity
830 nm
350
450
550
650
750
850
950
Wavelength nm

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1207367 A **[0002]**
- WO 2008150343 A **[0004]**
- US 2008294012 A **[0004]**

专利名称(译)	试衣镜		
公开(公告)号	EP2906062B1	公开(公告)日	2016-03-16
申请号	EP2014700984	申请日	2014-01-14
申请(专利权)人(译)	范德维德NV		
当前申请(专利权)人(译)	范德维德NV		
[标]发明人	LAAN DOMINICUS VERMEIRE LIEVE VAN DER BIEST GEERT BAL MICHAEL DOTREMONT SABINE DE RIJCK ROEL VERBEEREN TIM		
发明人	LAAN, DOMINICUS VERMEIRE, LIEVE VAN DER BIEST, GEERT BAL, MICHAEL DOTREMONT, SABINE DE RIJCK, ROEL VERBEEREN, TIM		
IPC分类号	A41H1/02 G01B11/25 A61B5/107 A61B5/00		
CPC分类号	A61B5/1079 A41H1/02 A61B5/0046 A61B5/1072 A61B5/1077 A61B5/6888 A61B2503/12 G01B11/25 G01B11/2513 G02B27/141 G06T7/00 G06T17/00 G06T2200/08 G06T2210/16 H04N13/239 H04N2013/0081		
优先权	2013151448 2013-01-16 EP		
其他公开文献	EP2906062A1		
外部链接	Espacenet		

摘要(译)

装配室镜子技术领域本发明涉及一种装配室镜子，其包括图像捕获装置和图像处理装置，其能够确定身体尺寸并向用户提供布料配合建议。

Fig. 1

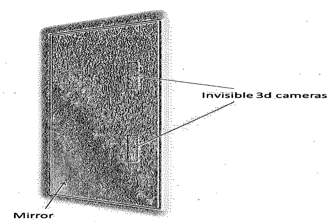


Fig. 2