Patent
Attorney Docket No. 0079124-000233-T1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	**MAIL STOP: AMENDMENT**
Rune FISKER	Group Art Unit: 2484
Application No.: 16/217,943	Examiner: Jose M. Mesa
Filing Date: December 12, 2018	Confirmation No.: 1097
Title: FOCUS SCANNING APPARATUS	

INTERVIEW SUMMARY

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Examiners Tran and Mesa are thanked for the courtesy of the interview granted Applicant's attorney (William Rowland) and Applicant's representative (Mads Demenikov) on March 7, 2019, and for the interview granted Applicant's attorney on March 12, 2019.

During the first interview, the claims and applied art were discussed.

Claim 2 refers to a scanner for determining the 3D geometry and color of at least a part of the surface of an object. The scanner includes, among other elements, an optical system for transmitting the probe light towards the object along an optical path thereby illuminating at least a part of the object in a plurality of configurations and for transmitting at least a part of the light returned from the object to the at least one camera. The plurality of configurations is in the form of a time-varying illumination pattern, such that the 3D geometry is determined based on the time-varying illumination pattern.

3SHAPE EXHIBIT 2002
Medit v. 3Shape
IPR2023-01316

The Office Action acknowledged, in the middle of page 4, that *Babayoff* does not teach that the object is illuminated with the claimed plurality of configurations in the form of a time-varying illumination pattern. The Examiner then attempted to overcome this deficiency with *Heinz*. The Office Action alleged that "*Heinz* explicitly teaches wherein the plurality of configurations is in the form of a time-varying illumination pattern, such that the 3D geometry is determined based on the time-varying illumination pattern".

However, *Heinz* does not teach or suggest illuminating the object with the claimed plurality of configurations in the form of a time-varying illumination pattern. The Office Action referred to paragraph [0069] and Figure 8 of *Heinz* to allegedly teach that "3D geometry is determined based on a time-varying illumination pattern (i.e. the multimode interference pattern that illuminates detector 805 is time-varying in accordance with the movement of surface 804 (or end 814 or d)) as described in fig. 8 paragraph 69)".

However, *Heinz* uses a detector 108 to measure changes in the intensity of radiation incident on the detector 108. Paragraph [0069] states that "[o]ptical radiation 806 that reflects from surface 804 will exhibit time-varying changes if ***surface 804*** vibrates," and further states that "[t]he multimode interference pattern that illuminates detector 805 is ***time-varying in accordance with the movement of surface*** 804 (or end 814 or d)" (emphasis added). In other words, the radiation incident on the object 804 is constant, and the light reflected back to the sensor may vary with time based on movement of the object itself.

This is in contrast to claim 2, which states that the probe light ***illuminating the object*** includes a plurality of configurations is in the form of a time-varying illumination pattern. In *Heinz*, the radiation incident on the object 804 does not include a plurality of configurations in the form of a time-varying illumination pattern.

The Examiners appeared to agree with this position. However, they inquired as to whether the claims could be amended to more clearly state that the light illuminating the object included a plurality of configurations in the form of a time-varying illumination pattern. They further inquired as to whether more detail could be included as to how the 3D images are created.

On March 12, 2019, the Examiner telephoned the Applicant's attorney and advised him that proposed claims sent to the Examiner on March 7, 2019 would place the application in condition for allowance. The Examiner will enter the amendments by Examiner's Amendment.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: March 12, 2019

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T 703 838 6510

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PROPOSED AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Please amend the application as follows:

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Cancelled)

2. (Currently Amended) A scanner for determining the 3D geometry and color of at least a part of the surface of an object, said scanner comprising:

at least one camera accommodating an array of sensor elements,

a light source for generating a probe light with a plurality of configurations in the form of a time-varying illumination pattern, and

an optical system for transmitting the probe light towards the object along an optical path thereby illuminating at least a part of the object with the time-varying illumination pattern, ~~in a plurality of configurations~~ and for transmitting at least a part of the light returned from the object to the at least one camera to form a plurality of 2D images,

wherein ~~the plurality of configurations is in the form of a time-varying illumination pattern, such that~~ the 3D geometry is determined based on the plurality of 2D images and the time-varying illumination pattern, and

a hardware processor configured to:

selectively switch a color of the probe light, thereby illuminating the object with different colors at different times,

record different images by the at least one camera at the different times, thereby recording images of the object with the different colors, and

combine the different colors from the different images, thereby obtaining the color of the surface of the object.

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3. (Previously Presented) The scanner according to claim 2, wherein the different colors are provided by at least three monochromatic light sources.

4. (Previously Presented) The scanner according to claim 3, wherein the at least three monochromatic light sources are LEDs.

5. (Previously Presented) The scanner according to claim 3, wherein the at least three monochromatic light sources are in the form of a segmented LED.

6. (Previously Presented) The scanner according to claim 3, wherein the hardware processor selectively switches the color of the probe light by switching on and off the at least three monochromatic light sources.

7. (Previously Presented) The scanner according to claim 2, wherein the optical system is substantially achromatic.

8. (Previously Presented) The scanner according to claim 2, wherein the time-varying illumination pattern is a line pattern.

9. (Previously Presented) The scanner according to claim 2, wherein the at least one camera is two cameras.

10. (Currently Amended) A method for determining the 3D geometry and color of at least a part of the surface of an object, said method comprising:

~~generating~~ using a light source to generate a probe light with a plurality of configurations in the form of a time-varying illumination pattern ~~light source~~;

transmitting the probe light towards the object along an optical path thereby illuminating at least a part of the object with the time-varying illumination pattern, ~~in a plurality of configurations~~ and for transmitting at least a part of the light returned from the object to at least one camera accommodating an array of sensor elements to form a plurality of 2D images,

wherein ~~the plurality of configurations is in the form of a time-varying illumination pattern, such that~~ the 3D geometry is determined based on the plurality of 2D images and the time-varying illumination pattern;

selectively switching a color of the probe light, thereby illuminating the object with different colors at different times;

recording different images by the at least one camera at the different times, thereby recording images of the object with the different colors; and

combining the different colors from the different images to obtain the color of the surface of the object.

11. (Previously Presented) The method according to claim 10, wherein the light source comprises at least three monochromatic light sources.

12. (Previously Presented) The method according to claim 11, wherein the at least three monochromatic light sources are LEDs.

13. (Previously Presented) The method according to claim 11, wherein the at least three monochromatic light sources are in the form of a segmented LED.

14. (Previously Presented) The method according to claim 11, wherein the selective switching of the color of the probe light includes switching on and off the at least three monochromatic light sources.

15. (Previously Presented) The method according to claim 11, wherein the probe light is transmitted through an optical system that is substantially achromatic.

16. (Previously Presented) The method according to claim 11, wherein the time-varying illumination pattern is a line pattern.

17. (Previously Presented) The method according to claim 11, wherein the at least one camera is two cameras.