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(71) Applicant: **META COMPANY** [US/US]; 459 Old Spanish Trail, Portola Valley, CA 94028 (US).

(72) Inventors: **GRIBETZ, Meron**; 501 W. 121st St., Apt. 56, New York, New York 19808 (US). **MANN, W. Steve G.**; 330 Dundas Street West, Toronto, Ontario M5T 1G5 (CA). **LO, Raymond**; 219 Strathearn Avenue, Richmond Hill, Ontario L4B 3C3 (CA).

(74) Agents: **BODENDORF, Andrew** et al.; Law Office of Andrew Bodendorf, 6909 Clemson Dr., Alexandria, VA 22307 (US).

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11 December 2014

(54) Title: EXTRAMISSIVE SPATIAL IMAGING DIGITAL EYE GLASS FOR VIRTUAL OR AUGMEDIATED VISION

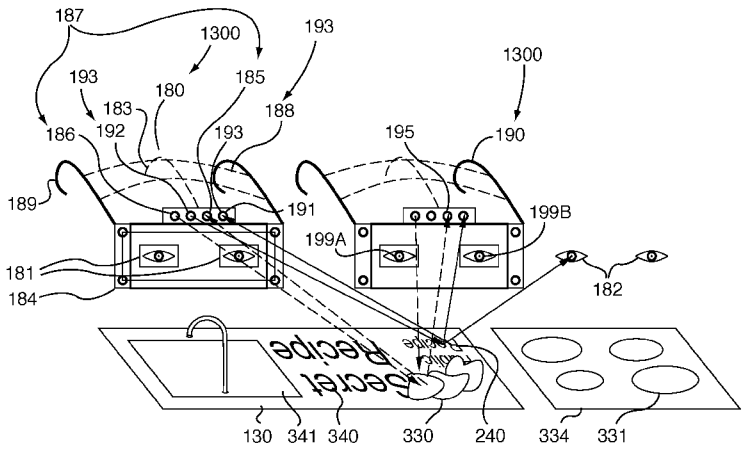



FIG. 3

(57) Abstract: A sensing and display apparatus, comprising: a first phenomenon interface configured to operatively interface with a first augmediated-reality space, and a second phenomenon interface configured to operatively interface with a second augmediated-reality space, is implemented as an extramissive spatial imaging digital eye glass.

WO 2014/106823 A3

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 14/58042

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G09G 5/00 (2014.01)
CPC - G02B 27/0101
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8): G09G 5/00 (2014.01)
CPC: G02B 27/0101

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8): G09G 5/00 (2014.01) USPC: 348/61 or 348/115 or 345/7 or 345/345/8; CPC: G02B 27/0101 or G02B 27/01 or G02B 27/017 or G02B 2027/0118 or G02B 2027/0187

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Patbase; Google Scholar; virtual, augmented, reality, effector, space, environment, signals, commands, phenomenon, interface, lidar, sonar, hologram, project, depth sense, sensor

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | US 2012/0262558 A1 (Boger et al.) 18 October 2012 (18.10.2012) entire document (especially para [0043]-[0048], [0054]-[0056], [0060]-[0065], [0081]-[0084], [0094]-[0099], [0103]) | 1-36 |
| A | US 2010/0040238 A1 (Jang et al. ) 18 February 2010 (18.02.2010) entire document | 1-36 |
| A | US 2008/0150899 A1 (Lin) 26 June 2008 (26.06.2008) entire document | 1-36 |

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 28 August 2014 (28.08.2014) | 16 September 2014 (16.09.2014) |
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US, Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-3201 | Authorized officer:<br>Lee W. Young<br>PCT Helpdesk: 571-272-4300<br>PCT OSP: 571-272-7774 |

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 14/58042

**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

-- see extra sheet --

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-36

**Remark on Protest**

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 14/58042

Continuation of Box III:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: claims 1, 2-22, 23-26, 27, 28, 29-36 are drawn to an apparatus/method/interface comprising a first interface exchange signals/interface first spaces and a second interface exchange signals/interface second space.

Group II: claims 37-39, 40-44 are drawn to an interface/system comprising: a three-dimensional vision system, a display... the exposure integrator responsive to an input from the three-dimensional vision system.

Group III: claims 45-50, 51-52 are drawn to allocating and clearing an exposure buffer; sensing a degree of exposure strength of an exposer; sensing a location...of an exposer; adding to the exposure buffer, by an amount proportional to the exposure strength, in association with the location of the exposer.

Group IV: claims 53-59 are drawn to a spaceglass apparatus for viewing scannable subject matter comprising a spatial imaging camera... the spatial imaging display is responsive to at least one output of the processor, and the spatial imaging display provides a Point-of-Eye image derived from at least some of the scannable subject matter.

Group V: claims 60-61, 68-71 are drawn to shared augmediated reality system for spaceglasses comprising a first spaceglass comprises a first spatial imaging camera; the second spaceglass comprises a second spatial imaging camera, wherein the first and second spatial imaging cameras are configured for spatial imaging of a subject matter; and a spatial imaging multiplexer for multiplexing a scanning from the first and second spatial imaging cameras.

Group VI: claims 62-67 are drawn to a digital eye glass apparatus for being viewed by one or both eyes of a wearer of the digital eye glass, comprising: at least one sensor for sensing light from a plurality of different directions; and said display provides a point-of-eye image.

Group VII: claims 72 are drawn to a spatial imaging device comprising: a lightspace analysis glass; a lightspace synthesis glass responsive to an output of said processor; and a lightspace collinearizer.

Group VIII: claims 73-91, 130-148, 164-182, are drawn to method/apparatus comprising assigning at least one environmental object identifier to the first environmental object; identifying at least one spatial coordinate associated with the first environmental object; associating a coordinate system with the environmental object identifier based on the at least one spatial coordinate.

Group IX: claims 92, 93-114 are drawn to an apparatus comprising a sensor; determining the spatial position presenting the at least one display item/component via the at least one output display.

Group X: claims 115-129, 149-163, 183-203 are drawn to a method/apparatus comprising provide a plurality of icons for display via at least one headmounted output display, receive user gesture data via the at least one gesture tracking sensor; access a hierarchy of icons based on the selection of the selected icon; and provide part of the hierarchy of icons for display via the at least one head-mounted output display based on the selected icon.

The inventions listed as Groups I through X do not relate to a single general inventive concept under PCT Rule 13.1 because under PCT Rule 13.2 they lack the same or corresponding technical features for the following reasons:

Special Technical Features

The special technical feature of Group I is an apparatus/method/interface comprising a first interface exchange signals/interface first spaces and a second interface exchange signals/interface second space, not required in any other group.

The special technical feature of Group II is an interface/system comprising: a three-dimensional vision system, a display... the exposure integrator responsive to an input from the three-dimensional vision system, not required in any other group.

The special technical feature of Group III is allocating and clearing an exposure buffer; sensing a degree of exposure strength of an exposer; sensing a location...of an exposer; adding to the exposure buffer, by an amount proportional to the exposure strength, in association with the location of the exposer, not required in any other group.

The special technical feature of Group IV is a spaceglass apparatus for viewing scannable subject matter comprising a spatial imaging camera... the spatial imaging display is responsive to at least one output of the processor, and the spatial imaging display provides a Point-of-Eye image derived from at least some of the scannable subject matter, not required in any other group.

The special technical feature of Group V is a shared augmediated reality system for spaceglasses comprising a first spaceglass comprises a first spatial imaging camera; the second spaceglass comprises a second spatial imaging camera, wherein the first and second spatial imaging cameras are configured for spatial imaging of a subject matter; and a spatial imaging multiplexer for multiplexing a scanning from the first and second spatial imaging cameras, not required in any other group.

-Continuation in Next Supplemental Box-

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB 14/58042

-Continuation in Preceding Supplemental Box-

The special technical feature of Group VI is a digital eye glass apparatus for being viewed by one or both eyes of a wearer of the digital eye glass, comprising: at least one sensor for sensing light from a plurality of different directions; and said display provides a point-of-eye image, not required in any other group.

The special technical feature of Group VII is a spatial imaging device comprising: a lightspace analysis glass; a lightspace synthesis glass responsive to an output of said processor; and a lightspace collinearizer, not required in any other group.

The special technical feature of Group VIII is a method/apparatus comprising assigning at least one environmental object identifier to the first environmental object; identifying at least one spatial coordinate associated with the first environmental object; associating a coordinate system with the environmental object identifier based on the at least one spatial coordinate, not required in any other group.

The special technical feature of Group IX is an apparatus comprising a sensor; determining the spatial position presenting the at least one display item/component via the at least one output display, not required in any other group.

The special technical feature of Group X is a method/apparatus comprising provide a plurality of icons for display via at least one headmounted output display, receive user gesture data via the at least one gesture tracking sensor; access a hierarchy of icons based on the selection of the selected icon; and provide part of the hierarchy of icons for display via the at least one head-mounted output display based on the selected icon, not required in any other group.

Common Technical Features:
Groups IV, V and VII share the technical feature of spaceglasses including spatial image device/camera configured for scanning/imaging subject matter. However, these shared technical features does not represent a contribution over the prior art:

US 2011/0007138 A1 (Zhang et al.) (hereinafter Zhang) 13 January 2011 (13.01.2011)

Zhang teaches spaceglasses including spatial image device/camera configured for scanning/imaging subject matter (e.g. a head-mounted stereo display, para [0026]; e.g. camera 102 may include any camera or camera system suitable for capturing images from which a three-dimensional point cloud...a conventional video image of the scanned subject matter, para [0031]).

Groups II, IV, V, VI, and X share the technical feature of a three-dimensional vision system/ digital eye glass apparatus/ spaceglasses/ headmounted output display. However, these shared technical features does not represent a contribution over Zhang.

Zhang teaches a three-dimensional vision system/ digital eye glass apparatus/ spaceglasses/ headmounted output display (e.g. a head-mounted stereo display....three-dimensional display, para [0026]).

Groups VI and IX share the technical feature of a sensor. However, these shared technical features does not represent a contribution over the prior art:

US 2013/0004060 A1 (Bell et al.) (hereinafter Bell) 03 January 2013 (03.01.2013)

Bell teaches a sensor (e.g. multiple sensors, para [0020]-[0021]).

Group IV and VI share the technical feature of a display provides a point-of-eye image. However, these shared technical features does not represent a contribution over Bell.

Bell teaches point-of-eye image (e.g. point of view that would be used to render a view of the hole, para [0072]).

Groups V, VIII, and IX share the technical feature of spatial coordinates/positions. However, these shared technical features does not represent a contribution over Bell.

Bell teaches spatial coordinates/positions (e.g. The XYZ spatial coordinates may be presented in absolute coordinates relative, para [0018]).

Group II and III share the technical feature of an exposure. However, these shared technical features does not represent a contribution over the prior art:

US 2011/0096381 A1 (Leister et al.) (hereinafter Leister) 28 April 2011 (28.04.2011)

Leister teaches an exposure (direct exposure in high-energy beam sensitive...areal contact or proximity exposure, para [0037]-[0038]).

Therefore, Groups I-X lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.