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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
19/120,393	04/11/2025	Kazuya MOTOHASHI	Q308105	1485

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EXAMINER	
PEERCE, MATTHEW J	

ART UNIT	PAPER NUMBER
2875	

NOTIFICATION DATE	DELIVERY MODE
01/09/2026	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 19/120,393	Applicant(s) MOTOHASHI, Kazuya	
	Examiner MATTHEW J PEERCE	Art Unit 2875	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 4/11/2025.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-5 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-5 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 4/11/2025 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☑ All b)☐ Some** c)☐ None of the:

1.☑ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Information Disclosure Statement

The information disclosure statement (IDS) submitted is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

Claim 1 objected to because of the following informalities:

Claim 1 recites "in a case where the light source is viewed from a side of the projection lens via the meta- region". The limitation "in a case" is an unclear limitation as it does not appear to be optional.

The limitation is unclear, the Examiner believes a more accurate limitation would read "wherein when the light source is viewed from a side of the projection lens via the meta region".

The Examiner suggests to reframe the limitation in the structure or optical effects instead of based on the perspective of a viewer. E.g. "wherein the virtual image of the light source that is emitted through the projection lens via the metaregion is located rearward of the location of the light source".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5 rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Claim 1 sets forth "in a case where the light source is viewed from a side of the projection lens via the meta- region, an image of the light source appears at a position farther than a position of the light source, and also appears smaller than the image of the light source **seen in a case where a convex lens is arranged instead of the meta-lens…"** [emphasis added]. The limitation is indefinite as it recites a function setting forth a relationship between the claimed invention and an undefined convex lens. As the "convex lens" is not defined, the Examiner is unable to interpret such a limitation.

The Examiner has interpreted the limitation to read

"wherein the virtual image of the light source that is emitted through the projection lens via the metaregion is located rearward of the location of the light source and emits light at a divergence angle from the meta lens".

Claim 2 recites "wherein, in the case where the light source is viewed from the side of the projection lens via the meta-region, the image of the light source appears equal in size to the light source at the position farther than the position of the light source." It is unclear which light source and image the claim is referring to, i.e. the light source as claimed or when viewed through the convex lens.

Furthermore, it is unclear what structural or functional relationship is being specifically set forth and what structure is required to achieve the relationship set forth. Claim 2 appears to contradict the function set forth in claim 1.

I.e. claim 1 recites that the image of the light source appears farther and smaller than it would through the use of a convex lens, while claim 2 now recites that the light source would appear farther and the same size as the actual light source.

Claim 3 recites "an amount of change in a structure of the nanostructure increases from a center side toward an outer peripheral side of the meta region". No amount of change in the structure has been set forth and it is unclear what "amount of change" is referring to.

The Examiner notes with respect to claims 2 and 3 that it appears that there is essential structures or details of the invention absent from the claims. Such essential structure may give rise to a 112(a) rejection.

Claims 4 and 5 are rejected for being dependent on a rejected claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

Claim(s) 1, 3 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Byrnes (U.S. 9,939,129).

Regarding claim 1, Byrnes teaches a vehicle headlight (see col. 15 lines 15-25, may be used as a headlamp, see fig. 4) comprising:

a light source (light source 402);

a meta-lens (metalens 401) including a meta-region (region with nanostructures) in which a plurality of nanostructures each having a width smaller (see col. 7 lines 24-49, for visible light applications has width less than or equal to 500 nm) than a largest wavelength

(largest wavelength is about 700 nanometers, see col. 6 lines 1-12) of light emitted from the light source is arranged and through which the light emitted from the light source is transmitted; and

a projection lens (optics 423, such as projection optics see col. 13 line 64) through which the light emitted from the meta-lens is transmitted, wherein the meta-lens reduces a divergence angle of the light incident on the meta-region from the light source and emits the light (see fig. 4, reduces divergence from 409 and collimates the light), and

wherein the virtual image of the light source that is emitted through the projection lens via the metaregion is located rearward of the location of the light source and emits light at a divergence angle from the meta lens (see fig. 4, meta lens reduces divergence which moves virtual image backwards, near infinite for collimated light, projection lens projects enlarged image).

Regarding claim 3, Byrnes appears to teach that an amount of change in a structure of the nanostructure increases from a center side toward an outer peripheral side of the meta-region (figure 8, 12, 16 appear to teach changes in the nanostructures, change increases with respect to radius for at least one section).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is/are rejected under 35 U.S.C. 103 as being unpatentable over Byrnes.

Regarding claim 2, Byrnes does not specifically teach that in the case where the light source is viewed from the side of the projection lens via the meta-region, the image of the light

source appears equal in size to the light source at the position farther than the position of the light source.

Byrnes teaches that the image of light source appears farther and of some size larger than the actual light source (as the metalens reduces divergence similarly to Applicant's). It is unclear if the structure of Byrnes teaches that the image of the light source is the same size as the appearance of the light source.

It would have been obvious to a person having ordinary skill in the art at the time that the invention was made to have optimized the image size of the light source. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F. 2d 454, 456. Optimizing the image size of the light source is an obvious optimization to one of ordinary skill in the art to comply with headlight requirements for vehicles (i.e. emission area standards) and to align with projection optics to properly project a low beam light distribution.

Claims 4, 5 is/are rejected under 35 U.S.C. 103 as being unpatentable over Byrnes in view of Kanayama (U.S. 2018/0245757).

Regarding claim 4, Byrnes does not teach comprising:

an external casing that surrounds the light source, the meta-lens, and the projection lens; and

an internal casing that surrounds the light source, wherein the meta-lens is a part of the internal casing.

Kanayama teaches an external casing (case 21) that surrounds the light source, the meta-lens, and the projection lens (surrounds all optics); and

an internal casing (fixing member 26) that surrounds the light source, wherein the meta-lens (lens 42) is a part of the internal casing.

It would have been obvious to a person having ordinary skill in the art at the time the invention was filed to have used a two portion casing as taught by Kanayama to mount the

structures of Byrnes in a manner that protects the overall optics and enables for the easy installation, repair, and further protection for the inner optics, as is known in the art.

Regarding claim 5, the combination of Byrnes and Kanayama teaches that the nanostructure is formed on an internal space side of the internal casing (nanostructures are formed on the interior side of 401, i.e. facing 409; which when placed in the internal casing of Kanayama is the interior side).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J PEERCE whose telephone number is (571)272-6570. The examiner can normally be reached 8-4pm EST.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Greece can be reached on (571) 272-3711. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Matthew J. Peerce/
Primary Examiner, Art Unit 2875