UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

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

23373 7590 11/12/2026

SUGHRUE MION, PLLC
2000 PENNSYLVANIA AVENUE, N.W.
SUITE 9000
WASHINGTON, DC 20006

EXAMINER	
PEERCE, MATTHEW J	

ART UNIT	PAPER NUMBER
2875	

NOTIFICATION DATE	DELIVERY MODE
11/12/2026	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):

PPROCESSING@SUGHRUE.COM
sughrue@sughrue.com
uspto@sughrue.com

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 9/28/2026.

☐ 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) 1-3 and 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) 1-3 and 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

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 1, 2 is/are rejected under 35 U.S.C. 103 as being unpatentable over Byrnes (U.S. 9,939,129) in view of McFadden (U.S. 7,806,572).

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; see col. 24 lines 52-55, results in 1.1 degree FWHM, i.e. not fully collimated), and

when the light source is viewed from a side of the projection lens via the meta region, a virtual image of the light source that is emitted through the projection lens via the meta-region is to be located rearward of an actual position of the light source (see fig. 4, meta lens reduces divergence which moves virtual image backwards, near infinite for collimated light, projection lens projects enlarged image).

Brynes does not teach an external casing that surround the light source, the meta-lens, and the projection lens; and

an internal casing that surrounds the light source, wherein

the meta-lens is part of the internal casing,

the internal casing is spaced apart from the external casing.

McFadden teaches an external casing (optics chamber 24, which includes base member 36) that surrounds the light source (light engine 60), the meta-lens (lens 76), and the projection lens (cover member 40); and

an internal casing (lens carrier 70) that surrounds the light source, wherein

the meta-lens is part of the internal casing (see fig. 1),

the internal casing is spaced apart from the external casing (see fig. 1).

It would have been obvious to a person having ordinary skill in the art at the time the invention was filed to have using an internal casing within the external casing as taught by McFadden to prevent entry of debris and therefore extend the life of the lighting device, see col. 1 lines 44-67).

The Examiner notes that Byrnes teaches that the meta lens emits "collimated light", however Byrnes later notes that the light is not completely collimated, but that it provides a "highly collimated" light, that is still divergent at 1.1 degree FWHM, or that diverges at 27 degrees as noted in col. 26. The claim states "a spreading angle larger than that of collimated light" but does not recite the amount of collimation in the example being compared to.

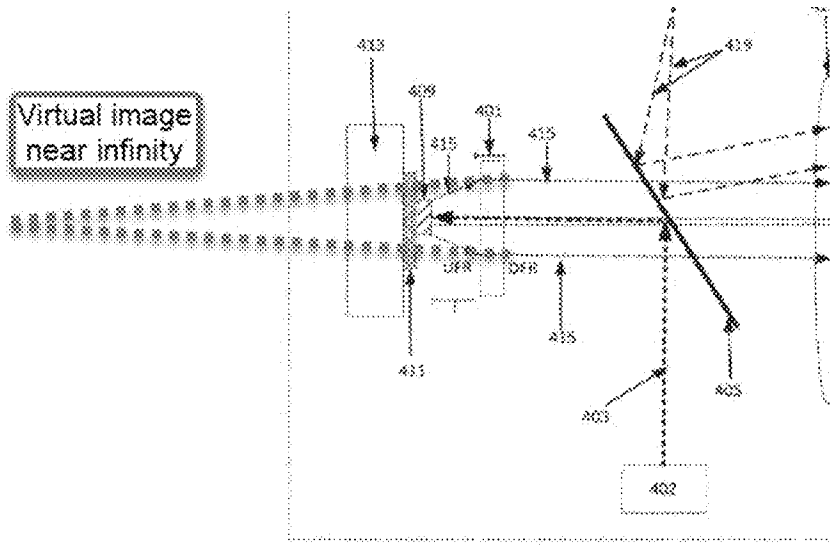

FIG. 4

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.

Claim 3 is/are rejected under 35 U.S.C. 103 as being unpatentable over Byrnes and McFadden in view of Lin (U.S. 11,057,115).

Regarding claim 3, Byrnes does not teach wherein a change in respective heights of the nanostructures an amount of change in a structure of the nanostructure increases from a center side toward an outer peripheral side of the meta-region.

Lin teaches a change in respective heights of the nanostructures an amount of change in a structure of the nanostructure increases from a center side toward an outer peripheral side of the meta-region (see fig. 4, metalenses 414-1 and 404-1).

It would have been obvious to a person having ordinary skill in the art at the time the invention was filed to have used different height nanostructures as taught by Lin for the metalens of Byrnes to enable finetuning of the refraction angles and the resulting beam profile, see col. Line 25-49).

The Examiner notes that Byrnes specifically teaches that it would be obvious to use different height nanostructures, see col. 8 lines 19-30.

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

Regarding claim 5, the combination of Byrnes and McFadden 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).

Response to Arguments

Applicant's arguments have been fully considered and are persuasive, Applicant has established a foreign priority before Okubo. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of McFadden

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.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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