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RAYTHEON COMPANY C/O DALY, CROWLEY, MOFFORD & DURKEE, LLP ONE UNIVERSITY AVENUE SUITE 201B WESTWOOD, MA 02090			BLAN, NICOLE R	
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* COLIN S. WHELAN, MATTHEW D. THOREN,  
ANDREW M. PIPER, and JOSEPH C. DIMARE

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Appeal 2019-002677  
Application 15/684,029  
Technology Center 1700

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Before KAREN M. HASTINGS, N. WHITNEY WILSON, and  
MICHAEL G. McMANUS, *Administrative Patent Judges*.

WILSON, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) from the Examiner's April 20, 2018 decision finally rejecting claims 12–14, 16–18, 20, 22, and 29 (“Final Act.”)<sup>2</sup>. We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We affirm-in-part.

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<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Raytheon Company, as the real party in interest (Appeal Br. 2).

<sup>2</sup> Claims 15, 19, 21, 26–28, and 30 have been withdrawn from consideration (Final Act. 2) and are not part of this appeal.

### CLAIMED SUBJECT MATTER

Appellant's disclosure relates to a system for anti-fouling a biofouled surface (Abstract). The system includes a UV light source and an optical medium coupled to receive UV light from the UV light source (*id.*). The optical medium is configured to emit UV light proximate to a surface from which biofouling is to be removed once the biofouling has adhered to the protected surface. Details of the claimed method are set forth in representative claim 12, which is reproduced below from the Claims Appendix to the Appeal Brief (*emphasis added*):

12. A system for anti-biofouling a protected surface disposed upon an object configured to be immersed in water, comprising:

an ultraviolet light source operable to generate ultraviolet light;

*an optical medium disposed under the protected surface, the optical medium coupled to receive the ultraviolet light and configured to disburse the ultraviolet light; and*

a degradable layer disposed over the protected surface, wherein the degradable layer is disposed to receive portions of the ultraviolet light that escape the optical medium, wherein the degradable layer is responsive to the ultraviolet light such that selected portions of the degradable layer are configured to change mechanical properties and to be removable in response to the ultraviolet light, facilitating removal of biological material on the degradable layer.

### REJECTIONS

1. Claim 29 is rejected under 35 U.S.C. § 112, 4th paragraph as not further limiting the claim from which it depends.

2. Claims 12–14, 16, and 29 are rejected under 35 U.S.C. § 103(a) as unpatentable over Hein,<sup>3</sup> in view of Titus,<sup>4</sup> Hatch,<sup>5</sup> Kuczynski,<sup>6</sup> and Daniel.<sup>7</sup>

3. Claims 17, 18, 20, and 22 are rejected under 35 U.S.C. § 103(a) as unpatentable over Hein, in view of Titus, Hatch, Kuczynski, Daniel, and further in view of Ostervold.<sup>8</sup>

## DISCUSSION

**Rejection 1.** Claim 29 reads as follows: “The system of Claim 12, wherein the optical medium is disposed over the object.” The Examiner determines that this language does not further limit claim 12 because claim 12 recites “a protected surface disposed on an object” and that the “optical medium is disposed under the protected surface” (Final Act. 5). The Examiner finds that this language “requires the order of components to be the object with the optical medium disposed over it followed by the protected surface disposed over the optical medium.” Appellant does not make a substantive argument disputing the Examiner’s finding,<sup>9</sup> which

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<sup>3</sup> Hein, US 5,997,951, issued December 7, 1999.

<sup>4</sup> Titus et al., US 5,322,569, issued June 21, 1994.

<sup>5</sup> Hatch, US 6,607,826 B1, issued August 19, 2003.

<sup>6</sup> Kuczynski et al., US 2007/0287766 A1, published December 13, 2007.

<sup>7</sup> Daniel, US 4,234,907, issued November 18, 1980.

<sup>8</sup> Ostervold et al., WO 2011/095531 A1, published August 11, 2011.

<sup>9</sup> The totality of Appellant’s argument is as follows: “The Examiner asserts that Claim 29 fails to ‘further limit the subject matter of the claim[] [from] which it depends.’ Applicant respectfully disagrees and request[s] reconsideration.”

appears to be consistent with the claim language. Accordingly, we affirm the rejection under § 112, 4<sup>th</sup> paragraph.

**Rejection 2.** Our analysis will focus on the rejection of claim 12 over Hein, Titus, Hatch, Kuczynski, and Daniel. Claim 14 is argued separately, and will be addressed below. The remaining claims stand or fall with claim 12.

The Examiner's findings supporting this rejection are set forth at pages 6–9 of the Final Action. Appellant contends, inter alia, that the cited art does not teach or suggest the limitation in claim 12 that the optical medium is disposed under the protected surface (“an optical medium disposed under the protected surface”) (*see*, Appeal Br. 9). The Examiner finds that this limitation is not taught by the combination of Hein, Titus, Hatch, or Kuczynski (Final Act. 8). The Examiner relies on Daniel, finding that Daniel:

teaches it is known to incorporate a woven ultraviolet light emitting coating [reads on “optical medium”] on boat hulls wherein the coating includes an ultraviolet light source such that the ultraviolet light travels within the coating and at points along the surface of the coating, respective portions of the ultraviolet escape the coating [reads on "optical medium coupled to receive the ultraviolet light and configured to disburse the ultraviolet light"] and the ultraviolet emitting coating can be used in biological studies.

(*id.*, citations omitted). According to the Examiner, it would have been obvious to have used Daniel's UV-emitting coating and light source with Heim's system

because [Daniel] teaches [its system is] usable on hulls as well as in biological studies. By incorporating the ultraviolet light emitting coating and ultraviolet source on the hull, it will allow

biofouling removal to be performed at any time it is needed rather than having to dock the ship where the device is located, which will improve fuel economy due to reduced friction when sailing. All of the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination, (i.e. the combination of known elements into a single device) would have yielded predictable results to one of ordinary skill in the art at the time of the invention. Because the optical medium coating is disposed on the object, the optical medium is disposed under the protected surface.

(Final Act. 8–9).

As argued by Appellant (Appeal Br. 9–10), Daniel discloses a light emitting fabric which can be used in composite materials, such as fiberglass materials which are used in some boat hulls (Daniel, Abstract). Daniel also states that the use of its fabrics in composite materials allows for the manufacture of products with “enhanced decorative and safety features” (Daniel, 4:10–13). Daniel also discloses that UV light can be used to illuminate clothing or other articles containing fluorescent dyes or inks, and UV-emitting fabrics can provide UV illumination for, inter alia, “biological studies” (Daniels 5:59–6:2).

Appellant contends that, contrary to the Examiner’s position, Daniel does not suggest using its UV-emitting mesh in a fiberglass boat hull to permit biofouling removal to be performed (Appeal Br. 11). As persuasively argued by Appellant, the evidence of record does not suggest that “biological studies,” as described by Daniel, is related in any manner to removal of biofouling.

However, as explained by the Examiner (Ans. 4–5), the rejection does not rely on Daniel to suggest the use of UV-light for assistance in removal of biofouling. Instead, the rejection relies on Daniel for teaching the use of an optical medium under the protected surface. The Examiner has provided a reason why a person of skill in the art would have incorporated the teachings of Daniel with those of the other references (to provide a system which travels with the boat, rather than a dock-based system).

Appellant’s arguments with regards to Daniels are, essentially, arguing the references separately, and do not take into account that the rejection is based on the combined teachings of the references. Similarly, Appellant’s argument that Daniel is not enabled for biofouling removal is not persuasive of reversible error because Daniel is not relied on for that purpose.

Appellant’s argument (Appeal Br. 12–13) that the proposed combination requires modification of the references such that they would be inoperable for their intended purposes is not persuasive. Appellant merely argues that there are differences between what is disclosed in the individual references and the claimed invention. However, that fact is not disputed. The only specific example argued by Appellant is that it would be impractical to put a UV-light source under the road paint of Kuczynski. However, this is not persuasive that the use of Kuczynski’s UV-sensitive paint on a boat would render Kuczynski’s paint inoperable for its intended purpose.<sup>10</sup>

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<sup>10</sup> Appellant makes an argument in the Reply Brief that suggests that Kuczynski is non-analogous art and, therefore, is not properly combinable to

With respect to claim 14,<sup>11</sup> the Examiner finds that Daniel's mesh has no breaks, and is the functional equivalent of a coating, and is, therefore, a continuous coating (Ans. 9). Appellant argues that Daniel's light-emitting mesh would not be understood by a person of skill in the art as a "continuous coating," as required by the claim, because a mesh has "a large number of voids or breaks, and is not continuous" (Reply Br. 4). In this instance, Appellant's argument is persuasive. The Specification contrasts a continuous coating with a coating made up of a series of optical fibers, which are like the Daniel mesh (i.e. not continuous). Accordingly, we determine that Appellant has shown reversible error in the rejection of claim 14.

**Rejection 3.** Appellant relies on the arguments set forth in conjunction with Rejection of claim 12 to seek reversal of Rejection 3 (Appeal Br. 15). These arguments are similarly unpersuasive in conjunction with Rejection 3. Appellant separately argues the rejection of claim 22, which recites, inter alia, the presence of penetrating structure configured to penetrate through the protected surface (Appeal Br. 15). The Examiner relies on Ostervold to teach the use of a penetrating structure (Final Act. 12–13). Ostervold discloses a tool for cleaning biofouling using pressurized water (Abstract). As explained by Appellant, the Examiner's finding that

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reject the claims on appeal (Reply Br. 2). However, this argument was not raised in the Appeal Brief, and is not a response to additional findings by the Examiner. Accordingly, we will not consider it.

<sup>11</sup> Claim 14 recites that "the optical medium comprises a continuous optical coating over the object, wherein the optical coating is configured to provide the propagation path for the ultraviolet light."

the body of Ostervold’s cleaning mechanism “reads on ‘penetrating structure’” is not adequately supported by the evidence of record. Accordingly, we reverse the rejection of claim 22.

### CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
29	112, 4 <sup>th</sup> paragraph	Claim fails to further limit claim from which it depends	29	
12–14, 16, 29	103	Hein, Titus, Hatch, Kuczynski, Daniel	12, 13, 16, 29	14
17, 18, 20, 22	103	Hein, Titus, Hatch, Kaczynski, Daniel, Ostervold	17, 18, 20	22
<b>Overall Outcome</b>			12, 13, 16–18, 20, 29	14, 22

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART