

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARRIS GROUP, INC., TELLABS, INC.
ALCATEL-LUCENT USA, INC., and SOURCE PHOTONICS, INC.,
Petitioner,

v.

CIRREX SYSTEMS LLC,
Patent Owner.

Case IPR2014-00815
Patent 6,404,953 B1

Before MEREDITH C. PETRAVICK, TRENTON A. WARD, and
BRIAN P. MURPHY, *Administrative Patent Judges*.

WARD, *Administrative Patent Judge*.

DECISION
FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

We have statutory authority under 35 U.S.C. § 6(c). This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

With respect to the grounds instituted in this trial, we have considered the papers submitted by the parties and the evidence cited therein. For the reasons discussed below, we determine Petitioner has shown by a preponderance of the evidence that claim 30 of U.S. Patent No. 6,404,953 B1 (Ex. 1001, “the ’953 patent”) is unpatentable.

A. BACKGROUND

Arris Group, Inc., Tellabs, Inc., Alcatel-Lucent USA, Inc., and Source Photonics, Inc. (collectively, “Petitioner”) filed a Petition requesting an *inter partes* review of claim 30 of the ’953 patent. Paper 1 (“Pet.”). Petitioner included a Declaration of W. John Tomlinson, Ph.D. Ex. 1003. Symantec Corporation (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 7 (“Prelim. Resp.”).

In our Decision Instituting *Inter Partes* Review, we granted review as to the challenged claim. Paper 8 (“Dec. on Inst.”). Patent Owner filed a Response to the Petition. Paper 12 (“PO Resp.”). Petitioner filed a Reply to the Response. Paper 14 (“Pet. Reply”). On August 19, 2015, all parties were present for an oral hearing. Paper 17 (“Tr.”).

B. RELATED PROCEEDINGS

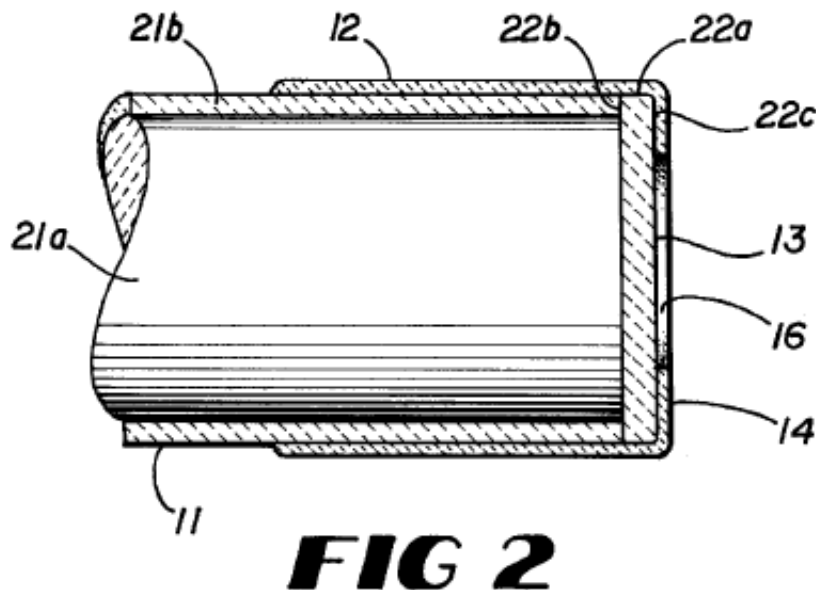
The parties indicate that the ’953 patent is the subject of the following pending federal district court case: *Cirrex Systems, LLC v. Verizon*

Communications, Inc. et al., Case No. 1:13-cv-00921 (D. Del.). Pet. 6; Paper 4, 3.

C. THE '953 PATENT

The '953 patent is titled “Optical Assembly With High Performance Filter” and generally relates to an apparatus for optical noise reduction in optical assemblies by controlling or limiting undesirable photon entrance, reflection, departure, or appearance in or from the assembly. Ex. 1001, 2:36–39. The '953 patent describes how in a preferred embodiment high performance filters can be combined with masking to eliminate significant sources of unwanted light penetration in an optical assembly. *Id.* at 3:65–67.

Figure 2 of the '953 patent is reproduced below.



As shown above in Figure 2 of the '953 patent, the end of an elongated waveguide is shown in optical fiber 11 having mask 12 and filter 13. *Id.* at 3:44–47. The '953 patent describes that mask 12 covers filter edge surface 22a, the area of junction between filter 13 and end face 22b of

fiber 11, the area of junction between the filter edge surface and filter face 22c, and the peripheral portion of filter face surface 13 distal to fiber 22d. *Id.* at 6:63–7:3. The '953 patent describes “thin-film filters having a large number of alternating high/low refractive indices, stacked layers deposited on a substrate.” *Id.* at 4:14–17.

Claim 30, reproduced below, is illustrative of the claimed subject matter:

30. An optical assembly comprising
a waveguide having at least one end face,
a thin-film filter in optical communication with said waveguide, said filter having a first face surface optically closer to said waveguide end face and a second face surface opposed to said first face, and
a mask in intimate contact with at least one of said filter surfaces, said mask substantially opaque in at least some spectral region.

D. INSTITUTED GROUNDS AND PRIOR ART

We instituted an *inter partes* review of claim 30 of the '953 patent on the following grounds (Dec. on Inst. 17):

Reference	Basis
Nicholson ¹	§ 102
Yokoyama ²	§ 102
Shih ³	§ 103

¹ U.S. Patent No. 4,883,062 (Ex. 1005) (“Nicholson”).

² U.S. Patent No. 5,457,558 (Ex. 1007) (“Yokoyama”).

³ U.S. Patent No. 5,546,486 (Ex. 1004) (“Shih”).

II. ANALYSIS

A. CLAIM CONSTRUCTION

The Board will interpret claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent. *See* 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1275–79 (Fed. Cir. 2015). Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor may rebut that presumption by providing a definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

1. “mask”

Petitioner proposes that the term “mask” be construed to mean a “material that blocks the passage of at least selected photons.” Pet. 14 (citing Ex. 1003 (Declaration of W. John Tomlinson, Ph.D.) ¶¶ 42, 62, 64, 67). Petitioner quotes portions of the ’953 patent Specification, describing that:

The mask is substantially opaque in at least some selected spectral region to impact the extent to which photons in that spectral region can pass through the filter and to the waveguide member.

Pet. 15 (citing Ex. 1001, Abstract). Furthermore, Petitioner quotes the statement in the '953 patent Specification that:

Mask 12 is opaque to at least some wavelengths of light. Accordingly, light of the opacity wavelengths do not penetrate mask 12 thereby eliminating unwanted optical noise that would result from such light penetration of the mask covered areas.

Pet. 15 (citing Ex. 1001, 3:47–51).

Patent Owner does not comment on the construction of “mask” in its Response. In view of the plain and ordinary meaning of the term “mask” and the disclosure in the '953 patent Specification, we determine that the broadest reasonable interpretation of “mask” is “a material that blocks the passage of at least selected photons.”

2. “*thin-film filter*”

Claim 30 recites “a thin-film filter in optical communication with said waveguide.” In the Decision on Institution, we construed the term “thin-film filter” to mean “a filter comprised of stacked layers for filtering light.” Dec. on Inst. 6. Patent Owner argues that this construction is improper and that the broadest reasonable interpretation of the term “thin-film filter” is the following:

a filter comprised of stacked layers for filtering light, where the layers are free from defects and voids such that the material characteristics of the layer approaches that of a bulk solid and the packing factors of the layers approach 100%

PO Resp. 1–2 (citing Ex. 1001, 4:22–25). Patent Owner argues that reading these limitations into the term “thin-film filter” is appropriate based upon an explicit definition in the specification of the '953 patent. *Id.* at 2.

Particularly, Patent Owner argues that Specification expressly states that “thin-film filters” must have the features recited in its proposed construction.

Id. The portion of the Specification relied upon by Patent Owner as providing this explicit definition of “thin-film filter” is reproduced below:

[D]esirable filter performance properties are achieved in high performance filters, thin-film filters having a large number of alternating high/low refractive indices, stacked layers deposited on a substrate. Between 20 and 150 layers are usually required depending on such factors as: 1) the performance required for the end use; 2) the refractive index differential between materials in adjacent filter layers; 3) the consistency and purity of the filter layer; and 4) the sophistication of the filter design process. And, *the layers must be* free from defects and voids such that the material characteristics of the layer approaches that of a bulk solid and the packing factor of the layer approaches 100%. Achieving high-density packing requires the molecules depositing onto the substrate to be highly energetic.

Ex. 1001, 4:14–27 (emphasis added). Patent Owner argues that the statement as to what “the layers must be,” constitutes an explicit definition for the claim term “thin-film filter.” PO Resp. 2.

Petitioner disagrees and argues that the ’953 patent Specification fails to redefine the term “thin-film filter” to mean something other than its plain and ordinary meaning and, thus, the Board’s construction in the Decision on Institution is the correct construction. Pet. Reply 3–5.

a. Disclosure in the Specification regarding the “thin-film filter”

Patent Owner argues that the ’953 patent Specification explicitly defines “thin-film filter,” but Petitioner counters that the portion of the ’953 patent Specification cited by Patent Owner refers to “high

performance” thin-film filters, not all types of thin-film filters. Pet. Reply 5 (citing Ex. 1001, 4:14–25). We note that in the disclosure from the Specification relied upon by Patent Owner regarding what “the *layers* must be,” the term “layers” refers to the “stacked layers deposited on a substrate” identified earlier in the cited paragraph, which are recited as an element of the “high performance filters, thin-film filters” being described. Ex. 1001, 4:14–17.

Petitioner argues that it would be improper to read limitations from the Specification regarding some thin-film filters, namely high performance thin-film filters, into the definition of “thin-film filters.” Pet. Reply 6. Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor may rebut that presumption by providing a definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Patent Owner did, in fact, provide an express definition of a claim term in the Specification of the ’953 patent in accordance with the typical and conventional format of describing how a term is “used herein.” Ex. 1001, 1:45. More particularly, the Specification states the following:

The term “waveguide” is used herein to refer to an optical structure having the ability to transmit light in a bound

propagation mode along a path parallel to its axis, and to contain the energy within or adjacent to its surface.

Ex. 1001, 1:45–49 (emphasis added). Although the Patent Owner chose to use this common format for defining the term “waveguide” recited in claim 30 of the ’953 patent, it did not use such a format with respect to the term “thin-film filter.” The description of high performance thin-film filters relied upon by Patent Owner, moreover, is a description of a particularly preferred embodiment. The description does not expressly limit all claimed thin-film filters only to those comprising stacked layers free from defects and voids and having a packing factor approaching 100%, with the requisite clarity, deliberateness, and precision mandated by governing case law.

We are not persuaded by Patent Owner that the one statement in the ’953 patent Specification describing “desirable filter performance properties” for “high performance filters” should be read to limit all thin-film filters.

b. Claim Differentiation

Petitioner argues that the doctrine of claim differentiation reinforces the conclusion that the term “thin-film filter” should not be narrowed as proposed by Patent Owner. Pet. Reply 7. Specifically, Petitioner argues that dependent claim 50, which depends from challenged independent claim 30, further limits the term “thin-film filter” by reciting that “said thin film is comprised of material having packing density exceeding 99%.” Pet. Reply 7 (quoting Ex. 1001, 14:22–23). Accordingly, Petitioner argues that the term “thin-film filter” recited in independent claim 30 does not require such a high packing density as proposed by Patent Owner. Pet. Reply 7.

Under the doctrine of claim differentiation, when a dependent claim adds a limitation relative to the independent claim on which it depends, there is a rebuttable presumption that the independent claim does not require that limitation. *Bancorp Servs. L.L.C. v. Sun Life Assur. Co. of Can.*, 687 F.3d 1266, 1275 (Fed. Cir. 2012); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005). Furthermore, as the Federal Circuit stated in *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898 (Fed. Cir. 2004), the “doctrine of claim differentiation is at its strongest” where “the limitation that is sought to be ‘read into’ an independent claim already appears in a dependent claim.” *Id.* at 910. Here, a similar limitation to the one regarding minimum packing density that Patent Owner attempts to read into independent claim 30 appears in dependent claim 50. Accordingly, we are not persuaded that Patent Owner has overcome the rebuttable presumption that independent claim 30 does not require the further limitation of a minimum packing density “exceeding 99%” (or approaching 100%), as recited in claim 50.

c. Ambiguity of the Proposed Claim Construction

Petitioner argues Patent Owner’s proposed construction for “thin-film filter” would introduce ambiguity into the claim by purportedly covering only thin film filters that have layers that “approach that of a bulk solid” and have packing factors that “approach 100%”. Pet. Reply 9. Specifically, Petitioner’s declarant Dr. Tomlinson states that a person of ordinary skill in the art, reading the Specification and the claims, would not be able to determine with any reasonable degree of certainty whether the proposed construction requires a packing density that is substantially greater than 99%, greater than 99%, at least 95%, or some other scope. *Id.* (citing Ex.

1018 ¶ 15). Petitioner further argues that the Specification of the '953 patent does not clearly define the scope of “approaching 100%.” *Id.*

We note that the '953 patent Specification fails to provide complete clarity regarding what it means for the “material characteristics of the layers [to] approach that of a bulk solid and the packing factors of the layers [to] approach 100%,” as set forth in Patent Owner’s proposed claim construction. PO Resp. 1–2. For example, the Specification states that:

The preferred thin-film deposition processes impart sufficient energy to the depositing molecules so that the forming structure is essentially fully packed (*100% comprised of the desired molecules*, essentially nonporous, and free of voids and pinholes). For best performance, the structure should *approach or equal 100% (greater than 99%)* packing density, but at least 95%.

Ex. 1001, 5:21–27 (emphasis added). The quoted statement seems to indicate that the phrase “approach or equal 100%” means to be “greater than 99%.” *See id.* In the same paragraph of the Specification, however, it describes “a filter with high packing density *greater than 99%, preferably approaching or equaling 100%, but at least 95%.*” Ex. 1001, 5:44–46 (emphasis added).⁴ Accordingly, the '953 patent Specification appears to provide somewhat differing uses of the phrase “approaching or equaling 100%.” Thus, we are not persuaded that the Patent Owner clearly set forth a definition in the Specification of the phrase “material characteristics of the

⁴ With respect to this statement, Patent Owner argued at the oral hearing that “this is probably an appropriate case to look for the broadest reasonable interpretation of what ‘approaching 100 percent’ means.” Tr. 31.

layers approach that of a bulk solid and the packing factors of the layers approach 100%,” as set forth in Patent Owner’s proposed claim construction.

For the first time during oral argument, Patent Owner cited the Federal Circuit’s decision in *In re Abbott Diabetes Care Inc.*, 696 F.3d 1142, 1150 (Fed. Cir. 2012) as the closest case on this claim construction issue. Tr. 29. Specifically, Patent Owner cited *In re Abbott Diabetes Care Inc.*, as an example of the Federal Circuit reading limitations recited in the Specification into the construction of a claim term. *In re Abbott*, 696 F.3d at 1150 (construing the claimed “electrochemical sensor” as a “discrete electrochemical sensor devoid of external connection cables or wires.”). In that case, however, the Federal Circuit determined that “Abbott’s patents ‘repeatedly, consistently, and exclusively’ depict an electrochemical sensor without external cables or wires while simultaneously disparaging sensors with external cables or wires. *Id.* (quoting *Irdeto Access, Inc. v. Echostar Satellite Corp.*, 383 F.3d 1295, 1300 (Fed. Cir. 2004)). Unlike Abbott’s patent, the Specification of Patent Owner’s ’953 patent does not repeatedly, consistently, and exclusively describe a “thin-film filter” to require the following:

a filter comprised of stacked layers for filtering light, where the layers are free from defects and voids such that the material characteristics of the layers approach that of a bulk solid and the packing factors of the layers approach 100%.

PO Resp. 1–2. Furthermore, unlike the disparaging statements found in Abbott’s patent, Patent Owner fails to identify any statements in the

Specification disparaging thin-film filters that fail to provide each of the limitations set forth in Patent Owner's proposed narrowed construction of "thin-film filter." Therefore, we determine *In re Abbott Diabetes Care Inc.* to be distinguishable from the facts of this *inter partes* review proceeding.

d. Conclusion

A "heavy presumption" exists in favor of the ordinary meaning of claim language. *Bell Atl. Network Servs., Inc. v. Covad Comm. Grp., Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001). To overcome this presumption, the patentee must "clearly set forth" and "clearly redefine" a claim term away from its ordinary meaning. *Id.* The disavowal must be "unmistakable" and "unambiguous." *Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1322 (Fed. Cir. 2012). This standard is "exacting." *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1366 (Fed. Cir. 2012).

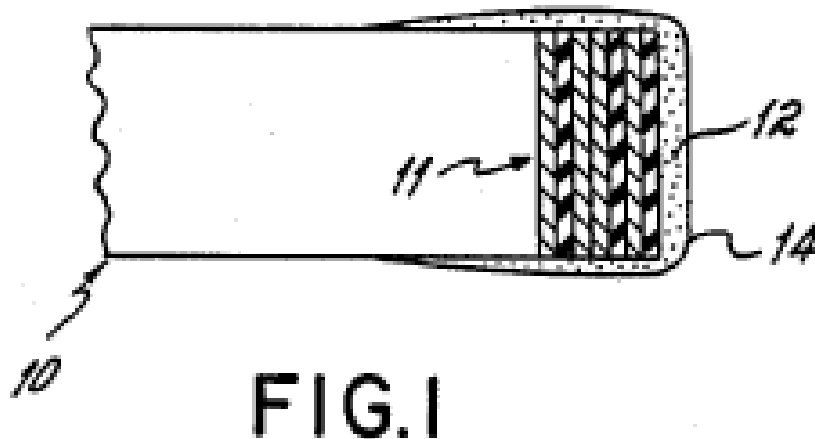
We do not find that Patent Owner has met this exacting standard, and, in the absence of an express definition for the term "thin-film filter," we decline to incorporate Patent Owner's lengthy recitation as the broadest reasonable interpretation of the term "thin-film filter." In view of the plain and ordinary meaning of the term "thin-film filter" and the disclosure in the '953 patent Specification, we construe the term "thin-film filter" to mean "a filter comprised of stacked layers for filtering light."

B. PROPOSED GROUND OF ANTICIPATION BY NICHOLSON

1. Overview of Nicholson (Ex. 1005)

Nicholson is titled "Temperature and Pressure Monitors Utilizing Interference Filters," and describes an interference edge filter mounted to the end of an optical fiber to provide a sensor for pressure or temperature.

Ex. 1005, Abstract. Nicholson discloses that the “interference filter is a known device consisting of alternating metal-dielectric-metal layers,” and that two basic types of interference filters exist, specifically (1) bandpass filters and (2) edge filters. Ex. 1005, 2:5–15. Figure 1 of Nicholson is reproduced below.



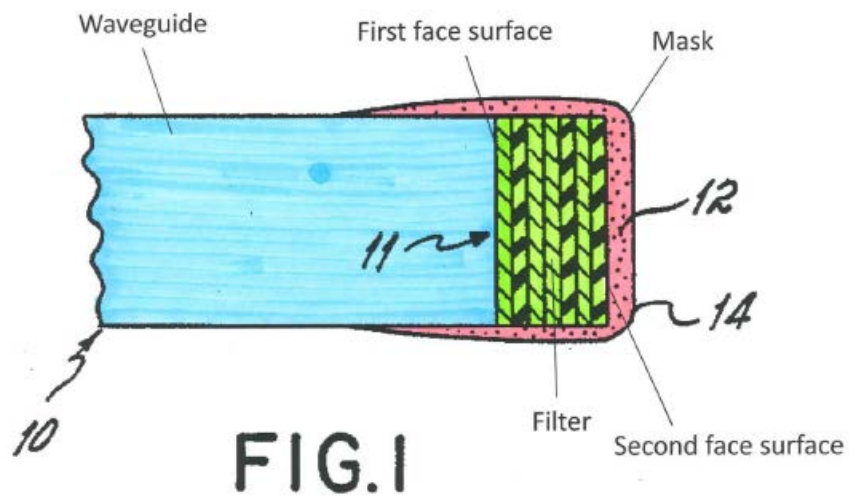
As shown above in Figure 1, Nicholson discloses optical fiber 10 with edge filter 11 formed on it. *Id.* at 3:11–12. Nicholson discloses that the “edge filter consists of alternating layers of dielectric and metal or metal coatings.” *Id.* at 3:12–13. Additionally, as shown in Figure 1 above, Nicholson discloses that the “filter is preferably surrounded by an absorbance layer 12 formed of highly optically absorbent material such as carbon black.” *Id.* at 3:23–25.

2. *Analysis of Proposed Ground of Anticipation by Nicholson*

The apparatus set forth in claim 30 requires a “waveguide having at least one end face.” Concerning this claim limitation, Petitioner contends that Nicholson discloses an optical assembly, and more particularly that

“[a]n interference filter is mounted on the end of an optical fiber to provide a sensor for pressure or temperature” and that the “edge filter at the end of an optical fiber is subjected to a polychromatic light.” Pet. 28–29 (quoting Ex. 1005, Abstract, 2:33–36). Accordingly, we are persuaded Petitioner sufficiently demonstrates that Nicholson discloses the claimed waveguide limitation.

With respect to the claimed “thin-film filter” limitation, Petitioner contends that Nicholson discloses an edge filter consisting of alternating layers of dielectric and metal or metal coatings. Pet. 30 (citing Ex. 1005, 3:11–12). Petitioner’s annotated version of Figure 1 of Nicholson is reproduced below.



As illustrated in annotated Figure 1 of Nicholson above, Petitioner alleges that Nicholson’s edge filter 11 has opposing face surfaces with a first face surface being optically closer to the fiber end face and the second face

surface being the opposing surface of edge filter 11. Pet. 31 (citing Ex. 1003 ¶ 93).

As discussed above, we construe “thin-film filter,” to mean “a filter comprised of stacked layers for filtering light.” As cited by Petitioner, edge filter 11 from Nicholson is disclosed as consisting of alternating layers of dielectric and metal or metal coatings. Pet. 30 (citing Ex. 1005, 3:11–12). Furthermore, Petitioner cites the disclosure in Nicholson that edge filter 11 can transmit only above or below a certain “cut on” or “cut off” wavelength. Pet. 30 (citing Ex. 1005, 2:5–16). Accordingly, we are persuaded Petitioner sufficiently demonstrates that Nicholson discloses the claimed “thin-film filter” limitation.

Claim 30 further requires “a mask in intimate contact with at least one of said filter surfaces, said mask substantially opaque in at least some spectral region.” For this claim limitation, Petitioner relies upon Nicholson’s disclosure of absorbance layer 12, shown in the annotated Figure 1 above. Pet. 31 (citing Ex. 1005, 3:23–25). Nicholson states that the “absorbance layer 12 [is] formed of highly optical absorbent material such as carbon black.” Ex. 1005, 3:24–25. Petitioner argues that this highly absorbent material, such as carbon black, would be substantially opaque in at least some spectral region. Pet. 31–32 (citing Ex. 1003 ¶ 94). As discussed above, we construe a mask as “a material that blocks the passage of at least selected photons.” We are persuaded that Petitioner sufficiently demonstrates that absorbance layer 12 in Nicholson provides a material that blocks the passage of at least selected photons.

In its Response, Patent Owner argues that Nicholson does not

anticipate because it fails to teach a thin-film filter with layers having packing factors approaching 100%. PO Resp. 6–7. As we do not adopt Patent Owner’s proposed construction of “thin-film filter” requiring these limitations, Patent Owner’s arguments are moot. In fact, during the oral argument, Patent Owner conceded that, if the Board were to adopt the same construction for “thin-film filter” as set forth in the decision to institute, Nicholson would anticipate claim 30. Tr. 38.⁵ As discussed above, we maintain the same construction for “thin-film filter” as in the decision to institute. Dec. on Inst. 6. For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 30 is anticipated by Nicholson.

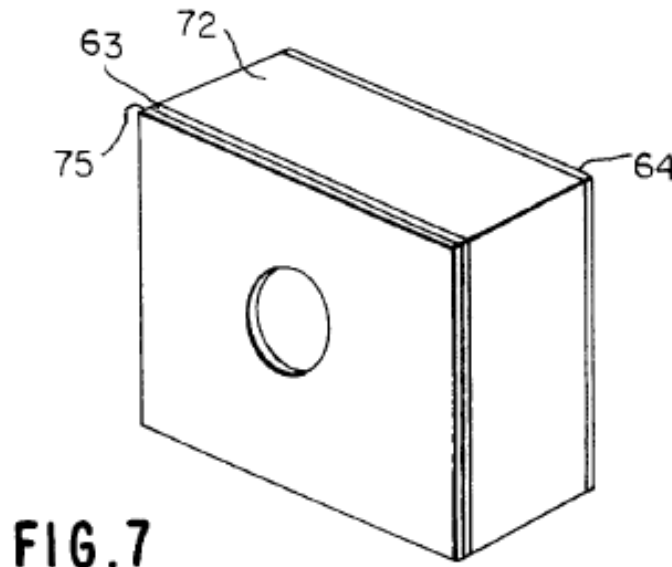
C. PROPOSED GROUND OF ANTICIPATION BY YOKOYAMA

1. *Overview of Yokoyama (Ex. 1007)*

Yokoyama is titled “Optical Waveguide Multiplexer for Optical Fiber Amplifiers,” and describes an optical waveguide multiplexer for use in optical fiber amplifiers. Ex. 1007, Abstract. Specifically, Yokoyama discloses optical waveguide multiplexer 61 having substrate 62 and on “one face of the substrate 62 on which a first light of wavelength λ_1 (an optical signal 12) is to come incident, a branching film 63 is vapor-deposited.” Ex. 1007, 5:67–6:2. Figure 7 of Yokoyama is reproduced below.

⁵ “JUDGE WARD: With respect to anticipation by Nicholson, does the Patent Owner concede that if we were to adopt our construction set forth in the decision to institute, that Nicholson does anticipate?

MR. FAHMI: Under your original construction, yes.” Tr. 38.



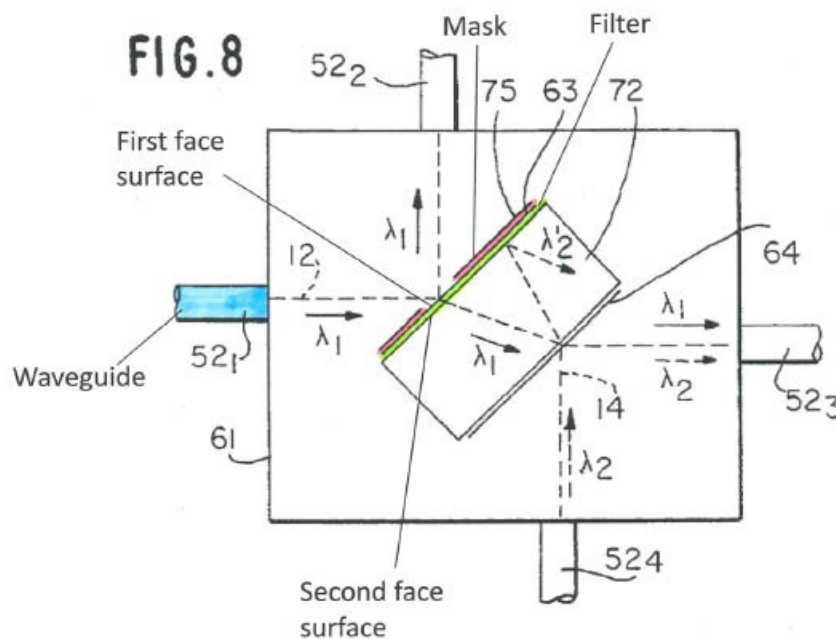
As shown above in Figure 7, Yokoyama discloses substrate 72, similar to substrate 62, having optical branching film 63 formed on its face and receiving light radiated from first optical I/O terminal 5₂₁. *Id.* at 9:1–6. Yokoyama further discloses that in addition to optical branching film 63, substrate 72 has aperture film 75 consisting of a metal film near the center of which is a hole. *Id.* at 9:6–8.

2. *Analysis of Proposed Ground of Anticipation by Yokoyama*

The apparatus set forth in claim 30 requires a “waveguide having at least one end face.” Concerning this claim limitation, Petitioner contends that Yokoyama discloses “[a]n optical waveguide multiplexer for use in optical fiber amplifiers” and that for the multiplexer, “[e]ach of the first to fourth optical I/O terminals 5₂₁ to 5₂₄ is provided, at the tip of an optical fiber.” Pet. 34 (quoting Ex. 1007, Abstract, 1:7–9, 6:46–47). Accordingly,

we are persuaded Petitioner sufficiently demonstrates that Yokoyama discloses the claimed waveguide limitation.

With respect to the “thin-film filter” limitation, Petitioner contends that Yokoyama discloses optical branching film 63, consisting of a multi-layer film of TiO_2 and SiO_2 , deposited over a substrate. Pet. 34 (citing Ex. 1007, 6:6–9). Petitioner’s annotated version of Figure 8 of Yokoyama is reproduced below.



As illustrated in annotated Figure 8 of Yokoyama above, Petitioner alleges that Yokoyama’s substrate 72 is arranged so as to receive incident light from first I/O terminal 521. Pet. 35 (citing Ex. 1007, 5:64–6:2). Accordingly, Petitioner alleges that optical branching film 63, deposited on substrate 72, has a first face surface optically closer to the fiber end face and second face in contact with the substrate that is opposed to the first face surface. Pet. 35 (citing Ex. 1003 ¶ 106).

As discussed above, we construe “thin-film filter” to mean “a filter comprised of stacked layers for filtering light.” As cited by Petitioner, optical branching film 63 from Yokoyama is disclosed as consisting of multiple layers of TiO_2 and SiO_2 . Pet. 34 (citing Ex. 1007, 6:6–9; Ex. 1003 ¶ 104). Furthermore, Petitioner cites the disclosure in Yokoyama that optical branching film 63 has a characteristic to transmit about 90% of the incident light and to reflect the remaining 10%. Pet. 34 (citing Ex. 1007, 6:6–9). Accordingly, we are persuaded Petitioner sufficiently demonstrates that Yokoyama discloses the claimed thin-film filter limitation.

Claim 30 further requires “a mask in intimate contact with at least one of said filter surfaces, said mask substantially opaque in at least some spectral region.” For this claim limitation, Petitioner relies upon Yokoyama’s disclosure of aperture film 75, shown in Figure 7 above. Pet. 35 (citing Ex. 1007, 9:2–8, 30–34). Yokoyama states that “aperture film 75 need not be made of metal, but of anything that intercepts light.” Ex. 1007, 9:35–36; *see also* Ex. 1003 ¶¶ 108–109 (“aperture film 75 is opaque in at least some spectral region”). As discussed above, we construe a mask as “a material that blocks the passage of at least selected photons.” We are persuaded that Petitioner has demonstrated that aperture film 75 in Yokoyama provides a material that blocks the passage of at least selected photons.

In its Response, Patent Owner argues that Yokoyama does not anticipate because it fails to teach a thin-film filter with layers having packing factors approaching 100%. PO Resp. 8–9. As we do not adopt Patent Owner’s proposed construction of “thin-film filter” requiring these

limitations, Patent Owner's arguments are moot. In fact, during the oral argument, Patent Owner conceded that, if the Board were to adopt the same construction for "thin-film filter" as set forth in the decision to institute, Yokoyama anticipates claim 30. Tr. 38.⁶ As discussed above, we maintain the same construction for "thin-film filter" as in the decision to institute. Dec. on Inst. 6. For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 30 is anticipated by Yokoyama.

D. PROPOSED GROUND OF OBVIOUSNESS OVER SHIH

1. *Overview of Shih (Ex. 1004)*

Shih is titled "Optical Fiber End for Application in an Optical Isolator and a Method of Manufacture Thereof," and describes an improved end of an optical fiber such that light transmission into the end is substantially reduced. Ex. 1004, 2:22–31. Figure 4G of Shih is reproduced below.

⁶ "JUDGE WARD: With respect to anticipation by Nicholson, does the Patent Owner concede that if we were to adopt our construction set forth in the decision to institute, that Nicholson does anticipate?"

MR. FAHMI: Under your original construction, yes.

JUDGE WARD: Is the same true for Yokoyama?

MR. FAHMI: It is." Tr. 38.

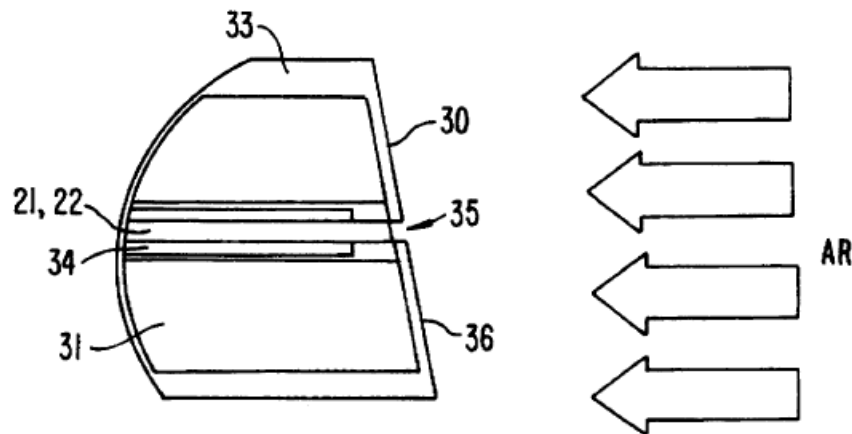


FIG. 4G.

As shown above in Figure 4G, Shih discloses input fiber 20 having core 21 and cladding 22. *Id.* at 3:10–13. Furthermore, Shih discloses placing an optical barrier 30 over cladding 22 of end surface 24 of input fiber 20, such that optical barrier 30 has opening 35 that exposes some portion of cladding 22 around core 21 to allow light to be transmitted from core 21. *Id.* at 3:15–19. Shih further discloses that the surface of optical barrier 30 and the end surface of input fiber 20 in opening 35 are covered with antireflection coatings. *Id.* at 4:39–41. Shih states that these “[t]he antireflection coatings enhance the transmission of light in the forward direction through the input fiber 20.” *Id.* at 4:46–48.

2. *Analysis of Proposed Ground of Obviousness Over Shih*

The apparatus set forth in claim 30 requires a “waveguide having at least one end face.” Concerning this claim limitation, Petitioner contends that Shih discloses an optical fiber providing a waveguide. Pet. 20 (citing Ex. 1004, 2:23–28). Specifically, Shih discloses that “[t]he present invention provides for an improved end of an optical fiber” having “a flat

end surface substantially perpendicular to the longitudinal axis.” Ex. 1004, 2:22–26. Accordingly, we are persuaded Petitioner sufficiently demonstrates that Shih discloses the claimed waveguide limitation.

Claim 30 further requires “a mask in intimate contact with at least one of said filter surfaces, said mask substantially opaque in at least some spectral region.” For this claim limitation, Petitioner relies upon Shih’s disclosure of optical barrier 30, shown in Figure 4G above. Pet. 26–27 (citing Ex. 1004, 3:12–22). Shih states that optical barrier 30 serves to prevent any light from entering cladding 22. Ex. 1004, 3:12–13. Furthermore, optical barrier 30 provides opening 35 to allow light to be transmitted from core 21 in the forward direction. *Id.* at 3:18–19. As discussed above, we construe a mask as “a material that blocks the passage of at least selected photons.” We are persuaded that Petitioner sufficiently demonstrates that optical barrier 30 in Shih provides a material that blocks the passage of at least selected photons.

With respect to the claimed “thin-film filter” limitation, Petitioner contends that Shih discloses the application of an antireflection coating, such as layers of TiO_2 and SiO_2 or ZrO_2 and SiO_2 , to optical barrier 30 and end surface 34 of input fiber 20, as shown in Figure 4G above. Pet. 23–24 (citing Ex. 1004, 4:40–50). Petitioner argues that a person of ordinary skill in the art would understand that an antireflection coating, such as layers of titania and silica, is a thin-film filter. Pet. 25 (citing Ex. 1003 ¶ 76). To support its contention, Petitioner relies upon testimony from Dr. Tomlinson that “[i]t is my opinion that a person of ordinary skill in the relevant art

would understand that the antireflection (AR) coating, as described and illustrated in Shih, is a multilayer thin film filter.” Ex. 1003 ¶ 77.

Patent Owner offers only attorney argument, not evidence, in rebuttal to Dr. Tomlinson’s Declaration testimony that one of ordinary skill would understand Shih’s antireflection coating to be a “thin-film filter.” PO Resp. 3–6. Patent Owner argues that Dr. Tomlinson’s statement is entitled to little or no weight because it does not explain the “how,” “what,” and “why” of Dr. Tomlinson’s opinion and does not explain how a person of ordinary skill in the art would recognize that Shih would suggest the subject claim. PO Resp. 3–4. Contrary to Patent Owner’s argument, Dr. Tomlinson provides, as the basis for his opinion, certain statements recited in Shih. *See* Ex. 1003 ¶¶ 76–77. As noted by Dr. Tomlinson, the cited portions of Shih state that “[t]hese antireflection coatings and the techniques for applying them *have long been practiced in the optics field.*” Ex. 1003 ¶ 76 (quoting Ex. 1004, 4:44–46 (emphasis added)). Furthermore, Dr. Tomlinson relies upon the statement in Shih that the “antireflection coatings enhance the transmission of light in the forward direction through the input fiber 20.” *Id.* (quoting Ex. 1004, 4:45–46). Accordingly, Dr. Tomlinson concludes that a person of ordinary skill in the art would understand that the antireflection coating described in Shih is a “thin-film filter.” *Id.* at ¶ 77.

“To determine whether there was an apparent reason to combine the known elements in the way a patent claims, it will often be necessary to look . . . [at] the background knowledge possessed by a person having ordinary skill in the art.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 401 (2007). Petitioner argues that thin-film filters were well known in the art.

Pet. 25 (citing Ex. 1003 ¶ 45). As discussed above, we construe “thin-film filter,” to mean “a filter comprised of stacked layers for filtering light.” Shih discloses that antireflection coatings are comprised of “layers of TiO_2 and SiO_2 ” and that “[t]he antireflection coatings enhance the transmission of light in the forward direction through the input fiber 20.” Ex. 1004, 4:42–48. Thus, we are persuaded that Petitioner has presented sufficiently an “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)) (internal quotation marks omitted).

For the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 30 would have been obvious in view of Shih.

III. CONCLUSION

Petitioner has shown by a preponderance of the evidence that: (1) claim 30 of the '953 patent is anticipated by Nicholson, (2) claim 30 of the '953 patent is anticipated by Yokoyama, and (3) claim 30 of the '953 patent would have been obvious in view of Shih.

IV. ORDER

For the reasons given, it is

ORDERED that, based on Petitioner's showing by a preponderance of the evidence, claim 30 of the of the '953 patent is unpatentable; and

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FURTHER ORDERED that this is a final written decision and that parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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