

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CARL ZEISS SMT GMBH,
Petitioner,

v.

NIKON CORPORATION,
Patent Owner.

Case IPR2013-00363
Patent 7,348,575 B2

Before HOWARD B. BLANKENSHIP, SALLY C. MEDLEY, and
MATTHEW R. CLEMENTS, *Administrative Patent Judges*.

CLEMENTS, *Administrative Patent Judge*.

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

I. INTRODUCTION

Carl Zeiss SMT GmbH (“Carl Zeiss”) filed a Petition requesting *inter partes* review of claims 55–67 of U.S. Patent No. 7,348,575 B2 (Ex. 1101, “the ’575 patent”). Paper 3 (“Pet.”). The Patent Owner, Nikon Corporation (“Nikon”), did not file a Preliminary Response. On December 16, 2013, we granted an *inter partes* review for all challenged claims on certain grounds of unpatentability. Paper 7 (“Dec. to Inst.”).

After institution of trial, Nikon filed a Patent Owner Response (Paper 21, “PO Resp.”) to which Carl Zeiss filed a Reply (Paper 26, “Reply”).

Oral hearing was held on July 17, 2014.¹

The Board has jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Carl Zeiss has shown by a preponderance of the evidence that claims 55–67 of the ’575 patent are unpatentable.

A. *The ’575 Patent*

The subject matter of the ’575 patent “relates to a catadioptric projection optical system, exposure apparatus, and exposure method and, more particularly, to a high-resolution catadioptric projection optical system suitable for . . . [use] in production of semiconductor devices [and] liquid-crystal display devices . . . by photolithography.” Ex. 1101, 1:18–23. In the production of semiconductor devices, photolithography uses a projection exposure apparatus to project an “image of a mask (or a reticle) through a projection optical system onto a wafer (or a glass plate or the like) coated

¹ A transcript of the oral hearing is included in the record as Paper 33 (“Tr.”).

with a photoresist or the like.” *Id.* at 1:27–32. As the dimensions of semiconductor devices shrink, the projection optical system of the projection exposure apparatus requires greater resolving power (resolution). *Id.* at 1:32–36. In order to satisfy the requirements for the resolving power of the projection optical system, it is necessary to shorten the wavelength of illumination light (exposure light) and to increase the image-side numerical aperture of the projection optical system. *Id.* at 1:37–41. It was known to increase the numerical aperture by putting a medium with a high refractive index, like a liquid, in the optical path between the projection optical system and the image plane. *Id.* at 1:55–58. However, there were known disadvantages to this approach. *Id.* at 1:59–67.

The ’575 patent discloses systems and methods to provide a relatively compact projection optical system that is “corrected for various aberrations, such as chromatic aberration and curvature of field, and being capable of securing a large effective image-side numerical aperture while well suppressing the reflection loss on optical surfaces.” *Id.* at 2:3–9. An object of the embodiment is to achieve a large numerical aperture, without increase in the scale of optical members forming a catadioptric projection optical system. *Id.* at 2:30–32. In order to achieve that object, a projection optical system according to a third embodiment is a catadioptric projection optical system for forming an image of a first surface on a second surface, the projection optical system comprising four units. *Id.* at 3:8–27; *see also id.* at 11:48–13:22. Figure 9 of the ’575 patent is reproduced below:

Fig.9

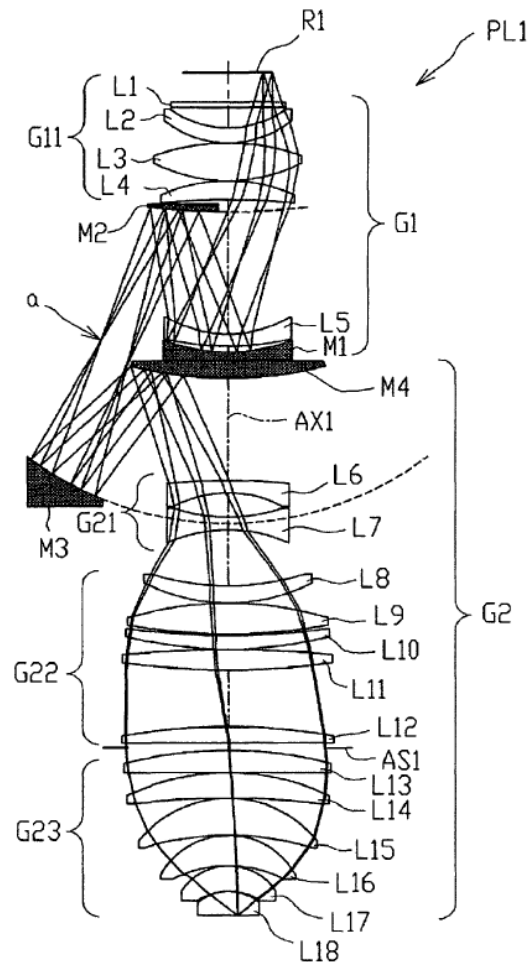


Figure 9 of the '575 patent depicts an embodiment of the catadioptric projection optical system with four lens units. *Id.* at 4:31–33, 3:8–27. The lens unit G11 constitutes the first unit. *Id.* at 29:39–41. Negative meniscus lens L5, concave reflecting mirror M1, convex reflecting mirror M2, concave reflecting mirror M3, and convex reflecting mirror M4 constitute a second unit. *Id.* at 30:28–31. Lens unit G21 constitutes the third unit. *Id.* at 29:45–46. Lens unit G22, aperture stop AS1, and lens unit G23 constitute a fourth unit. *Id.* at 30:59–60.

B. Illustrative Claim

Claim 55 is illustrative and is reproduced below:

55. A catadioptric projection optical system, which forms an image of a first surface on a second surface, comprising:

a first unit disposed in an optical path between the first surface and the second surface and having a positive refractive power;

a second unit disposed in an optical path between the first unit and the second surface and comprising at least four mirrors;

a third unit disposed in an optical path between the second unit and the second surface, comprising at least two negative lenses, and having a negative refractive power; and

a fourth unit disposed in an optical path between the third unit and the second surface, comprising at least three positive lenses, and having a positive refractive power,

wherein an intermediate image is formed in the second unit and wherein an aperture stop is provided in the fourth unit.

C. Prior Art Supporting the Instituted Challenges

Carl Zeiss relies on the following prior art references, as well as the Declaration of Richard C. Juergens (Ex. 1116):

Mann	US 2005/0036213 A1	Feb. 17, 2005	Ex. 1110
Asai	Satoru Asai et al., <i>Resolution Limit for Optical Lithography Using Polarized Light Illumination</i> , 32 JAPAN J. APPL. PHYS. 5863-5866 (1993)	Dec. 1993	Ex. 1115

D. The Instituted Challenges of Unpatentability

We instituted trial based upon the following grounds:

Reference[s]	Basis	Claim[s] challenged
Mann	§ 102	55–63 and 65–67
Mann and Asai	§ 103	64

E. Effective Filing Date

Carl Zeiss contends that the earliest possible filing date to which claims 55–67 of the ’575 patent can claim benefit under 35 U.S.C. § 119 is October 9, 2003. Pet. 17–19. The ’575 patent claims priority to three earlier-filed Japanese applications. Ex. 1101. Independent claim 55 recites “a second unit . . . comprising at least four mirrors.” Carl Zeiss contends that the earliest-filed Japanese application, JP 2003-128154, does not disclose any embodiments of a catadioptric projection optical system having “at least four mirrors,” as required by claims 55–67 of the ’575 patent. Pet. 18–19, citing Ex. 1107 (Translation of JP 2003-128154); Ex. 1116 ¶ 81. Patent Owner does not dispute this contention. Based on our review of Exhibit 1107, we agree with Carl Zeiss that claims 55–67 of the ’575 patent should not be accorded § 119 benefit of the JP 2003-128154 application. In contrast, the second-filed Japanese application, JP 2003-350647, discloses “a second unit . . . comprising at least four mirrors.” *See, e.g.*, Ex. 1108 (Translation of JP 2003-350647), claim 8, ¶¶ 22, 24, 26, 27. On this record, we determine that the earliest effective filing date to which claims 55–67 of the ’575 patent are entitled is October 9, 2003, the filing date of JP 2003-350647. Thus, based on the record before us, all of the patents and publications that Petitioner relies upon are prior art.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Also, 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).

Carl Zeiss contends that the words in the challenged claims generally should have their plain meaning. Pet. 13. However, Carl Zeiss provides its own interpretations of four terms—“unit,” “the fourth reflecting mirror of a double pass fens,” “the third reflecting mirror,” and “wherein an optical axis of every optical element with a predetermined refractive power in the catadioptric projection optical system is arranged substantially on a single straight line, and wherein a region of an image formed on the second surface by the catadioptric projection optical system is an off-axis region not including the optical axis.” Pet. 13–15. For this decision, we construe each of these claim terms in turn.

1. “unit”(claims 55–57, 60)

Carl Zeiss contends that the term “unit” should be interpreted to mean “a single, distinct part or object.” Pet. 13, citing Ex. 1121 (NEW WORLD DICTIONARY OF THE AMERICAN LANGUAGE). The ’575 patent does not define the term “unit.” Although the ’575 patent uses “unit” primarily in the

context of a “lens unit,” it also refers to “unit area” (8:21–22), “unit pulse” (8:22), “unit magnification” (17:44), and “unit time” (19:52, 55, 60, and 62–63). Accordingly, in our Decision to Institute, we construed “unit” to encompass not only “a single, distinct part or object,” but also “a determinate quantity adopted as a standard of measurement for other quantities of the same kind.” Dec. to Inst. 10. *See also, e.g.*, WEBSTER’S THIRD NEW INT’L DICTIONARY, UNABRIDGED (1993) (“**unit**. c: a determinate quantity (as of length, time, heat, value, or housing) adopted as a standard of measurement for other quantities of the same kind”).

According to Nikon, both Carl Zeiss’s proposed construction and the Board’s preliminary construction are overly broad because they do not limit “units” to optical elements. PO Resp. 14–15, 16–17. Nikon contends that “unit” should be construed as “a group of optical elements that cooperate together to perform a specific purpose or common function.” PO Resp. 1–4, 9–22. Nikon argues that “units” are limited to units of optical elements because the language of claim 55 expressly recites how each “unit” comprises optical elements, such as lenses and/or mirrors, and because the Specification (1) uses the term “units” to refer to optical elements, such as lenses or mirrors; (2) distinguishes a “unit” from a “lens unit” by describing a “unit” consisting of two lens units; and (3) describes each of the four “units” of the embodiments shown in Figures 9 and 10 as performing a function. PO Resp. 12–17. Nikon also argues that the dictionary definition cited by Carl Zeiss supports its contentions that units are “used for a specific purpose.” PO Resp. 19–20 (citing Ex. 1121) (emphasis omitted).

Carl Zeiss counters that the '575 patent does not limit a “unit” to optical elements because (1) the claim language itself prefaces the description of each claimed “unit” with the open-ended term “comprising” (Reply 4–5); and (2) the Specification uses the term “units” interchangeably with “lens units” by identifying element groups G11 and G21 as both “lens units” and as numbered “units” (*id.* at 6–7).

We are not persuaded by Nikon’s argument that “unit” is limited to optical elements. As Carl Zeiss points out, the use of “comprising” in the description of each numbered “unit” recited in claim 55 indicates that the “unit” has at least the optical elements recited (none in the case of the “first unit”), but does not exclude additional, unrecited elements. *See, e.g., Mars Inc. v. H.J. Heinz Co.*, 377 F.3d 1369, 1376 (Fed. Cir. 2004). Moreover, nothing in the Specification defines “unit” as excluding elements other than lenses and mirrors, and Nikon’s expert, Dr. Jose Sasian, conceded that optical elements could include things other than lenses and mirrors, such as aperture stops, filters, polarizers, windows, and prisms. Ex. 1136, 19:19–20:15, 23:3–11. Similarly, nothing in the Specification defines “unit” as performing a specific purpose or a common function. We recognize that the Specification describes the numbered units of the embodiments illustrated in Figures 9 and 10 as each having a function. We decline, however, to import the details of those embodiments into the recited numbered “units” of claim 55. Claim 55 explicitly recites that the “first unit . . . ha[s] a positive refractive power,” that “an intermediate image is formed in the second unit,” that the “third unit . . . ha[s] a negative refractive power,” and that the “fourth unit . . . ha[s] a positive refractive power.” Importing functions into

the construction of the term “unit” itself would render superfluous the functions explicitly attributed to each of the numbered “units” in the claim language.

Finally, Carl Zeiss also argues that our construction is overly broad and urges us to adopt its construction. Reply 3, n.1. Although the term “unit” in isolation is used in the Specification to mean both “a single, distinct part or object,” and “a determinate quantity adopted as a standard of measurement for other quantities of the same kind,” after reviewing the testimony of both Mr. Juergens (Ex. 1116) and Dr. Sasian (Ex. 2002), we are persuaded that in the context of claim 55, a person of ordinary skill in the art would not understand the term “unit” to refer to a determinate quantity.

Accordingly, we construe “unit” as “a single, distinct part or object.”

2. *“the fourth reflecting mirror of [sic] a double pass fens [sic]”*
(claim 57)

Carl Zeiss contends that “the fourth reflecting mirror of [sic] a double pass fens [sic]” includes two typographical errors, and should be interpreted as “the fourth reflecting mirror or a double pass lens.” Pet. 14. Carl Zeiss’s proposal is consistent with the Specification of the ’575 patent. Ex. 1101, 12:37–42 (“... the fourth reflecting mirror or a double pass lens”). On this record, we determine that “the fourth reflecting mirror of [sic] a double pass fens [sic]” means “the fourth reflecting mirror or a double pass lens.”

3. *“the third reflecting mirror”* (claims 58 and 59)

Carl Zeiss contends that “the third reflecting mirror” in claims 58 and 59 lacks antecedent basis, and should be interpreted as referring to the third of the “at least four mirrors” in the “second unit” recited in claim 55. Pet. 14. Claim 56 recites a “third reflecting mirror” as a component of the

“second unit” recited in claim 55. It appears that claims 58 and 59 mistakenly depend from claim 55 instead of from claim 56. On this record, we agree with Carl Zeiss that “the third reflecting mirror” in claims 58 and 59 refers to a third of “the at least four mirrors” in the “second unit” recited in claim 55.

4. *“wherein an optical axis of every optical element with a predetermined refractive power in the catadioptric projection optical system is arranged substantially on a single straight line, and wherein a region of an image formed on the second surface by the catadioptric projection optical system is an off-axis region not including the optical axis” (claim 62)*

Carl Zeiss contends that this phrase should be interpreted to mean that the region of an image formed on the second surface does not include the optical axis *of any of the optical elements* because the claims require that they are all “arranged substantially on a single straight line.” Pet. 15 (quoting claim 62). Carl Zeiss further interprets “wherein a region of an image formed on the second surface by the catadioptric projection optical system is an off-axis region not including the optical axis” to require that the portion of the reticle imaged on the wafer is offset from the single straight line. *Id.* Carl Zeiss’s proposal is consistent with the Specification of the ’575 patent. As depicted in Figure 2, “the entire effective imaging area ER of the projection optical system PL exists in the region off the optical axis AX.” Ex. 1101, Fig. 2, 20:14–16. Figure 9 depicts “[t]he optical axis AX1 of every optical element included in the catadioptric projection optical system PL1 . . . placed *substantially on [a] single straight line*, and the region of the image formed on the wafer by the catadioptric projection optical system PL1 is the off-axis region not including the optical axis

AX1.” *Id.* at Fig. 9, 31:19–25 (emphasis added). Figure 10 of the ’575 patent depicts “[t]he optical axis AX2 of every optical element included in the catadioptric projection optical system PL2 . . . placed *substantially on [a] single straight line*, and the region of the image formed on the wafer by the catadioptric projection optical system PL2 is the off-axis region not including the optical axis AX2.” *Id.* at Fig. 10, 33: 44–50 (emphasis added). On this record, we agree that “wherein an optical axis of every optical element with a predetermined refractive power in the catadioptric projection optical system is arranged substantially on a single straight line, and wherein a region of an image formed on the second surface by the catadioptric projection optical system is an off-axis region not including the optical axis” requires that the region of the image formed on the second surface be offset from the optical axis along which *every* optical element is arranged.

B. Whether Mr. Juergens is an Expert

Nikon contends that a person of ordinary skill in the art would have had at least two years of experience in the lithography optics industry and experience in the specification of projection optical systems, and that Mr. Juergens is not an expert in the relevant field because he does not have the experience required to be a person of even ordinary skill in the art. PO Resp. 25–27.

Carl Zeiss counters that Dr. Sasian invites Mr. Juergens to guest lecture Dr. Sasian’s class on lens design, and that Dr. Sasian conceded that Mr. Juergens is an expert on many aspects of optical design. Reply 9-10, n.2.

Having considered the parties’ arguments and evidence, we are not

persuaded that the level of ordinary skill in the art required at least two years of experience in the lithography optics industry and experience in the specification of projection optical systems. The claims are not limited to the field of lithography. Rather, based on the art of record, we find that the relevant field is projection optical systems. Mr. Juergens holds an M.A. in Physics and has more than 40 years of experience in the field of optical system design, including catoptric, dioptric, and catadioptric systems. Ex. 1116 ¶¶ 3–9. Accordingly, we are persuaded that Mr. Juergens is a person of at least ordinary skill in the art of projection optical systems.

C. Claims 55–63 and 65–67 – Anticipated by Mann

Carl Zeiss alleges that claims 55–63 and 65–67 are unpatentable under 35 U.S.C. § 102(e) as anticipated by Mann. Pet. 19–30.

Nikon counters that Mann’s lenses E7–E20 are not divided into the recited numbered “units,” as construed by Nikon. Nikon argues that dependent claims 56–63 and 65–67, which depend from claim 55, are patentable for the same reasons. PO Resp. 38.

Upon consideration of the parties’ contentions and supporting evidence, we determine that Carl Zeiss has demonstrated by a preponderance of the evidence that claims 55–63 and 65–67 are unpatentable as anticipated by Mann.

Mann (Ex. 1110)

Mann describes a projection objective including a plurality of mirrors with lenses ahead of mirror M3. Ex. 1110, Abstract, ¶ 1. Figure 2 of Mann is reproduced below:

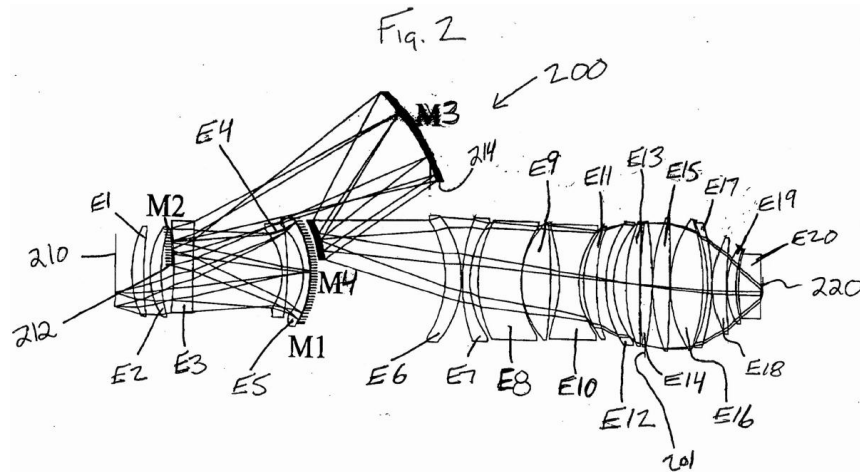


Figure 2 of Mann depicts catadioptric projection optical system 200. *Id.*

¶ 21. System 200 includes reticle 210 and wafer 220 on which a reduced image is formed based on reticle 210. *Id.* ¶ 43. System 100 has twenty lens elements, E1 to E20, and four mirrors, M1 to M4. *Id.* ¶¶ 43–50.

Carl Zeiss's contentions

Carl Zeiss contends that:

[T]he “first unit” disposed in an optical path between reticle 210 and wafer 220 is formed from lens element E1 and lens element E2. (ZEISS 1110, [0043]; ZEISS 1116, ¶¶ 53, 85, 95, 96, 102.) Mann states that “[t]he first and second lens elements E1 and E2 are positive lenses.” (ZEISS 1110, [0043].) Because the only two elements forming the first unit are positive lenses, it follows that the unit as a whole has a positive refractive power. (ZEISS 1110, [0043], Table 2; ZEISS 1116, ¶¶ 49, 52, 75-79, 96; ZEISS 1130.)

....

[T]he “second unit” disposed in an optical path between the first unit and the wafer 220 is formed from the three lens elements E3-E5 and the four mirrors M1-M4. (ZEISS 1110, [0044]–[0048], Table 2; ZEISS 1116, ¶¶ 53, 85, 97, 102.)

....

[T]he “third unit” disposed in an optical path between the second unit and wafer 220 is formed from lens elements E6-E10. (ZEISS 1110, [0050]; ZEISS 1116, ¶¶ 53, 85, 98, 102.) Mann states that of the elements E6-E10. “[l]ens element E7 is a negative lens ... lens element E10 is a negative lens element.” (ZEISS 1110, [0050].) Furthermore, based on the lens prescription for system 200, the combined refracting power of lens elements E6-E10 is negative, so the unit as a whole has a negative refracting power. (ZEISS 1110, [0050], Table 2; ZEISS 1116, ¶¶ 49, 52, 75-79, 98; ZEISS 1130.)

....

[T]he “fourth unit” an optical path between the third unit and wafer 220 is formed from lens elements E11 through E20. (ZEISS 1116, ¶¶ 53, 85, 99, 102.) The fourth unit includes at least three positive lenses. (ZEISS 1116, ¶¶ 49, 52, 99.) Specifically, Mann states that “lens element E11 is a positive lens, lens element E12 is a negative lens, lens elements E13-E16 are positive lenses, lens element E17 is a negative lens, lens elements E18-E20 are positive lenses.” (ZEISS 1110, [0050].) Furthermore, based on the lens prescription for system 200, the fourth unit as a whole has a positive refractive power. (ZEISS 1110, [0050], Table 2; ZEISS 1116, ¶¶ 75-79, ZEISS 1130.)

....

[A]n intermediate image is formed between mirrors M2 and M3. (ZEISS 1110, Table 2, see also, [0035]; ZEISS 1116, ¶¶ 34-38, 101, 102.) This means that an intermediate image is provided in the second unit. (ZEISS 1110, [0051], Table 2; ZEISS 1116, ¶¶ 34-38, 97, 101.) Furthermore, Mann states that “the aperture stop in system 200 is indicated by marker 201 in Fig. 2.” (ZEISS 1110, [0051].) This corresponds with the location of lens element E13, which means that the aperture stop is provided in the fourth unit. (ZEISS 1110, [0051]; ZEISS 1116, ¶¶ 99, 100, 102.)

Pet. 21–22. We agree with Petitioner’s contentions.

“First unit,” “second unit,” “third unit,” “fourth unit”

Nikon contends that Mann’s lenses E7–E20 are not divided into the recited numbered “units,” as that term is construed by Nikon, because Carl

Zeiss and Mr. Juergens group lenses without consideration to the function of the group. PO Resp. 27–34, 38. We decline to adopt Nikon’s proposed construction of “unit” for the reasons discussed above. Even assuming, however, that we adopted Nikon’s proposed construction, we would not be persuaded that the groups of lenses identified in Mann by Carl Zeiss are not “units” because Dr. Sasian conceded that any two adjacent lenses whose optical properties did not cancel each other out would be an example of two lenses cooperating “to perform a specific purpose,” as required by Nikon’s construction. Reply 14 (citing Ex. 1136, 23:18–26:10).

Accuracy of Mr. Juergens’ CODE V Sequence Data

Nikon contends that Mr. Juergens’ testimony should be given little weight because the CODE V Sequence data (Ex. 1130) he relied upon is inaccurate. PO Resp. 34–37.

Carl Zeiss counters, and we agree, that neither of the two discrepancies identified by Nikon constitutes an error because (1) the first was introduced by the Patent Office in the publication of the Mann application, and the CODE V Sequence data used by Mr. Juergens is identical to the data in the Mann application as-filed; and (2) the second concerns a “dummy surface” which Dr. Sasian confirmed has no effect on ray trace and is fairly modeled by the CODE V Sequence data used by Mr. Juergens. Reply 11–13.

Having considered the parties’ arguments and evidence, we are not persuaded that Mr. Juergens’ testimony should be given any less weight due to the issues in the CODE V Sequence data.

Conclusion

For the foregoing reasons, we determine that Carl Zeiss has demonstrated by a preponderance of the evidence that claims 55–63 and 65–67 are unpatentable as anticipated by Mann.

D. Claim 64 – Obvious over Mann and Asai

Carl Zeiss alleges that claim 64 is unpatentable under 35 U.S.C. § 103(a) as obvious over Mann and Asai. Pet. 54–56.

Claim 64 depends from claim 63. Claim 63 is directed to “[a]n exposure apparatus” comprising “the projection optical system according to claim 55” (emphasis removed). As discussed above, Carl Zeiss has established by a preponderance of the evidence that Mann anticipates the subject matter of claim 55.

Carl Zeiss acknowledges that Mann does not disclose expressly “illumination light which is s-polarized with respect to the second surface,” as recited in claim 64, but contends that:

[I]t would have been obvious for a POSITA at the time of the alleged invention to provide s-polarized illumination at the wafer in the lithography exposure apparatus of Mann to improve the contrast of the image at the wafer. (ZEISS 1116, ¶¶ 21-24, 72-77, 123-126, 218-224.)

Pet. 55–56. Carl Zeiss cites to paragraph 219 of Dr. Juergens’ Declaration for the following:

But s-polarized illumination was well-known long before the effective filing date of the Omura Patent. For example, back in 1993, Asai explained that: “[l]ight polarized parallel to the plane of incidence, or P polarization, gives lower contrast images than light polarized perpendicular to the plane of incidence, or S polarization, because destructive interference between diffracted waves does not occur when the electric-field

vectors are perpendicular,” and then reported demonstrating “superior resolution of S-polarized illumination” in optical lithography projection systems. (ZEISS 1115, p. 5863, abstract and intro.) Thus, it was well-known that an illumination optical system can be designed to provide polarized light in order to improve contrast of the image projected onto the wafer, especially for high numerical aperture optical systems.

Ex. 1116, ¶ 219.

Nikon counters that claim 64 is not obvious over Mann and Asai because Mann does not disclose the limitation of claim 55, from which claim 64 depends, and Asai fails to cure the deficiencies in Mann with respect to claim 55. PO Resp. 39.

Upon consideration of the parties’ contentions and supporting evidence, we determine that Carl Zeiss has demonstrated by a preponderance of the evidence that claim 64 is unpatentable as obvious over Mann and Asai. We are not persuaded by Nikon’s argument that Mann does not disclose all limitations of claim 55 for the reasons discussed above.

For the foregoing reasons, we determine that Carl Zeiss has demonstrated by a preponderance of the evidence that claim 64 is unpatentable as obvious over Mann and Asai.

III. CONCLUSION

Carl Zeiss has met its burden of proof by a preponderance of the evidence in showing that claims 55–67 of the ’575 patent are unpatentable based upon the following grounds of unpatentability:

Reference[s]	Basis	Claim[s] challenged
Mann	§ 102	55-63, 65-67
Mann and Asai	§ 103	64

IV. ORDER

Accordingly, it is

ORDERED that claims 55–67 of the '575 patent are held unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, the 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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