

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

96-1184,-1221
(Interference No. 102,567)

JOHN H. BRUNING,

Appellant,

v.

RYUSHO HIROSE,

Cross-Appellant

Bruce M. Collins, Matthews, Collins, Shepherd & Gould, P.A., of Princeton, New Jersey, argued for appellant. With him on the brief were Glen E. Books and Scott N. Bernstein. Of counsel on the brief was Bruce S. Schneider, of Murray Hill, New Jersey.

John A. O'Brien, Fitzpatrick, Cella, Harper & Scinto, of New York, New York, argued for cross-appellant. With him on the brief were Joseph M. Fitzpatrick, Anthony M. Zupcic, Robert H. Fischer of New York, New York, and Anne M. Maher, of Washington, DC.

Appealed from: U.S. Patent and Trademark Office
Board of Patent Appeals and Interferences

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NONPRECEDENTIAL OPINION ISSUED: September 29, 1998
PRECEDENTIAL OPINION ISSUED: November 25, 1998

Before PLAGER, RADER, AND BRYSON, Circuit Judges.
RADER, Circuit Judge.

This appeal arises from Interference No. 102,567 between John H. Bruning (Bruning) and Ryusho Hirose (Hirose) before the Board of Patent Appeals & Interferences (the Board). See Bruning v. Hirose, Patent Interference No. 102,567 (Bd. Pat. App. & Int. Sept. 8, 1993) (Final Decision); Bruning v. Hirose, Patent Interference No. 102,567 (Bd. Pat. App. & Int. Feb. 13, 1997) (Reconsideration Decision). Junior party Bruning appeals the Board's decision that U.S. Patents Nos. 4,773,750 and 4,883,352 ("the Bruning Patents") are invalid under the best mode requirement of 35 U.S.C. § 112. Senior party Hirose cross-appeals from the Board's decision that the Bruning patents otherwise comply with 35 U.S.C. § 112, that Bruning is entitled to priority, and that Hirose cannot patent the subject matter of the interference count due to forfeiture or laches. This court affirms-in-part and reverses-in-part.

I.

The parties seek priority for an invention related to deep ultraviolet (UV) photolithography systems for defining fine features in semiconductor integrated circuits. In photolithography, a light source illuminates a circuit pattern and projects its image through a lens assembly onto a semiconductor wafer. Ultimately, the circuit pattern is etched into the wafer.

The lens assembly for this photolithographic process, according to the terms of the count, must be capable of transmitting the light from the light source. Moreover, the lens assembly must achieve sharply focused images to produce fine circuit line widths on the microchips. These requirements demand special compositions and precise design parameters.

Conventional lithography employs light sources with relatively long wavelengths, typically around the 400 nm region. These light sources typically have wide bandwidths, however, and therefore generate light containing many different wavelengths, each of which focuses at a different distance from the lens. This effect, known as chromatic aberration, reduces the sharpness of projected circuit patterns. Conventionally, this effect is corrected by fabricating the lens elements of the assembly using multiple materials. Nonetheless, traditional photolithography cannot produce extremely fine line widths.

The subject matter of the interference count overcomes this problem with light from an excimer laser which has relatively short wavelengths, typically centered at 248 nm. Because this portion of the light spectrum is known as the deep UV region, this technology takes the name deep UV photolithography. By reducing the wavelength of

transmitted light, the invention improves the resolution of the circuit pattern image and produces lines as narrow as 0.5 micron.

Excimer laser light, however, has a drawback: only a few materials can transmit its wavelengths. Thus, the chromatic aberration effect, resulting from the excimer laser having a wide range of wavelengths centered around 248 nm, cannot be corrected simply by varying the materials for the lens elements. In fact, only one material, fused silica (SiO_2), is commonly used to make the lens. Instead of varying the lens materials, therefore, the interference count counters the chromatic aberration effect by adding gratings or etalons to the laser cavity, thereby narrowing the bandwidth.

Hirose's validity challenges against Bruning's patents focus on this lens assembly. The Bruning patents disclose only one material for the lens assembly, fused silica. See '750 patent, col. 2, ll. 7-8; '352 patent, col. 2, ll. 7-8 (identical disclosure). The Bruning specification depicts the lens assembly as a biconvex, single element projection lens. See '750 patent, fig. 2; '352 patent, fig. 2. In contrast, the Hirose application discloses ten examples of multi-element lens assemblies, each made entirely of fused silica, and also supplies the prescription of each lens.

In 1981, well before filing the applications that became the '750 and '352 patents, Bruning requested that Coherent, Tropel Division (Tropel), an independent lens manufacturer, design a projection lens for the deep UV photolithography system. Tropel's "Work statement," dated October 1, 1982, detailed its design progress and identified several areas of uncertainty that could affect the lens design and price:

The final area of uncertainty involves the likelihood that we would have to readjust the lens after it has been fully evaluated [by another laboratory] in

order to correct for any image defects that were not detectable by our necessarily limited testing procedures. We anticipate that we will have to go through one iteration of this part. If it is necessary to perform more than one, it may be necessary to ask for additional funds.

Sometime before April 1984, Bruning approved Tropel's blueprint for a lens design that included a fifteen element projection lens comprising an aspheric element. In fact, the October 1982 work statement had identified the surface of the aspheric lens element as a source for another "area of uncertainty."

The Bruning '750 and '352 patents, containing identical disclosures, issued September 27, 1988 and November 28, 1989, respectively, and both claim the benefit of several prior U.S. applications, the earliest of which was filed June 21, 1984. Hirose, however, claims the benefit of his Japanese filing date, December 28, 1983. Hirose filed his original U.S. application, Serial No. 06/682,232, on December 17, 1984.

Under 35 U.S.C. § 120, Hirose filed three continuation applications: Serial Nos. 07/048,508 on May 11, 1987; 07/139,137 on December 23, 1987; and 07/212,081 on June 24, 1988. Notwithstanding his numerous refilings, Hirose did not amend either his specification or claims nor did he cite new art or submit any affidavits or amendments. Furthermore, each continuation was filed and its parent application abandoned after Hirose received a notice of allowance in the previous application. On September 26, 1989, after Bruning's '750 patent issued, Hirose filed yet another continuation application, Serial No. 07/412,527, this time copying claims from the '750 patent. Thereafter, the Patent & Trademark Office (PTO) declared an interference.

The interference involves claims 28-30 of Bruning's '750 patent, claims 1-2 of Bruning's '352 patent, and claims 7-10 of Hirose's Application No. 07/412,527. The interference count, which is identical to claim 29 of the '750 patent, recites:

In combination,

means for providing laser radiation that inherently is characterized by a relatively wide bandwidth,

a lens assembly made of a single optical material disposed in the path of said radiation and exhibiting unacceptably large chromatic aberrations in response to the wide-bandwidth radiation inherently supplied by said providing means,

and means for sufficiently narrowing the bandwidth of said radiation to cause said assembly to exhibit substantially no chromatic aberrations.

In its final decision, the Board ruled in favor of Bruning on the issue of priority. Specifically, the Board found that the junior party had shown its conception before Hirose's December 28, 1983 effective date and diligence from just before that date to Bruning's constructive reduction to practice on June 21, 1984. The Board denied, among others, Hirose's motions for judgment against the Bruning patents on the grounds of nonenablement and lack of descriptive support. The Board, however, granted Hirose's deferred preliminary motion for judgment of invalidity on the ground of

best mode violations and held claims 28-30 of the '750 patent and claims 1-2 of the '352 patent unpatentable to Bruning on the grounds of failure to disclose his best mode. Finally, the Board entered judgment against Hirose on the grounds of priority of invention and inequitable conduct due to delay in prosecution. The Board, upon reconsideration, revised its final decision to indicate that judgment was entered against Hirose on the ground of unpatentability for forfeiture and/or laches (rather than inequitable conduct) as well as priority of invention. Bruning and Hirose each appealed.

II.

In this interference between an issued patent and a pending application, the threshold question concerns the appropriate burden of proof required to substantiate a validity challenge to the patent. Following its own pronouncement that the presumption of validity is inapplicable in interferences, see Lamont v. Berquer, 7 USPQ2d 1580, 1582 (Bd. Pat. App. & Int. 1988), the Board applied the preponderance of the evidence standard when considering Hirose's motions that the Bruning patents were invalid for lack of enablement, failure to disclose best mode, and failure to comply with the written description requirement. Bruning asserts that an interference, unlike reissue or reexamination proceedings, does not divest a patent of the presumption of validity. Therefore, Bruning argues, the Board should have required clear and convincing evidence to sustain any challenge to the validity of the interfering patent.

Because the issue of the appropriate burden of proof relates to statutory interpretation, this court reviews without deference the Board's decision to apply the preponderance of the evidence standard. See Arrhythmia Research Tech. v. Corazonix Corp., 958 F.2d 1053, 1055, 22 USPQ2d 1033, 1035 (Fed. Cir. 1992). This court finds

guidance for this question of first impression in Price v. Symsek, 988 F.2d 1187, 26 USPQ2d 1031 (Fed. Cir. 1993), and its companion case, Bosies v. Benedict, 27 F.3d 539, 30 USPQ2d 1862 (Fed. Cir. 1995). Both Price and Bosies addressed the standard of proof required to sustain a priority challenge against a patent during an interference proceeding. In Price, this court stated: “An interference involving an already issued patent embraces the societal interests derived from the statutory presumption that an issued patent is valid. These interests require a standard of proof higher than a mere, or dubious, preponderance of the evidence.” 988 F.2d at 1193. At issue in the interference were the questions of priority and derivation between an issued patent and an application filed after the patent had issued. See id. at 1189. Accordingly, the court applied the clear and convincing evidence standard. See id. at 1194.

Bosies clarified, however, that simply because an interference involves an issued patent, priority challenges to the patent do not automatically require the clear and convincing evidence standard. Specifically, Bosies stated: “It is well settled that where an interference is between a patent that issued on an application that was copending with an interfering application, the applicable standard of proof is preponderance of the evidence.” 27 F.3d at 541-42 (citing Peeler v. Miller, 535 F.2d 647, 651 n.5, 190 USPQ 117, 120 n.5 (CCPA 1976)) (additional citations and footnote omitted). Thus, reliance on Price to supply the appropriate burden of proof is misplaced unless the interference involves an application that was not filed until after the interfering patent issued. See id. at 542. Therefore, for priority issues, the linchpin for deciding which standard to apply, either the preponderance or clear and convincing evidence standard, is whether or not

the patent's application was copending with the interfering application. Copending applications invoke the preponderance of the evidence standard.

The applicability of this approach for priority disputes is not disputed by the parties. Bruning does not challenge the application of the preponderance of the evidence standard to priority challenges against his patents. Rather, he reasons, validity challenges to issued patents during an interference are distinct from priority disputes. As a basis for this argument, Bruning points to the fact that an accused infringer asserting validity challenges as defenses to an infringement action would be required to meet the clear and convincing evidence standard. See, e.g., Monarch Knitting Mach. v. Sulzer Morat GMBH, 139 F.3d 877, 881, 45 USPQ2d 1977, 1981 (Fed. Cir. 1998) (“[T]his court remains cognizant of the statutory presumption of validity, see 35 U.S.C. § 282 (1994), and of the movant's burden to show invalidity of an issued patent by clear and convincing evidence.”).

Despite Bruning's analogy, however, there are other situations in which the statutory presumption of validity does not apply to issued patents. For example, the statutory presumption of validity does not apply to patents involved in reissue proceedings before the Board. See 35 U.S.C. § 251, ¶ 3 (1994) (“The provisions . . . relating to applications for patent [which provide no presumption of validity] shall be applicable to applications for reissue.”); see also In re Sneed, 710 F.2d 1544, 1550 n.4, 218 USPQ 385, 388 n.4 (Fed. Cir. 1983). Reissue proceedings are initiated “[w]hensoever [a] patent is, through error without any deceptive intention, deemed wholly or partly inoperative or invalid.” 35 U.S.C. § 251, ¶ 1 (1994). Neither do patents retain the presumption of validity during reexamination proceedings. See 35 U.S.C. § 305

(1994) (“[R]examination will be conducted according to the procedures established for initial examination.”); see also In re Etter, 756 F.2d 852, 858, 225 USPQ 1, 5 (Fed. Cir. 1985). Reexaminations arise when a patent or printed publication raises a “substantial new question of patentability” regarding an issued patent. 35 U.S.C. § 304 (1994).

Interferences differ from reissue and reexamination proceedings in at least two ways. First, an interference is an inter partes, not an ex parte, proceeding. Second, an interference arises from a priority dispute, rather than from a patentability issue or patent defect. Accordingly, these differences suggest that the Board’s blanket presumption of validity may not apply. Notwithstanding these differences, this court finds the analogy to reissue and reexamination proceedings relevant on one point. While reissue, reexamination, and interference proceedings can only be initiated by some showing of error, defect or problem with a patent, an infringement action carries no such stigma or uncertainty regarding entitlement to the patent. Thus, treating an issued patent differently in an interference proceeding as compared to an infringement action, with respect to patentability issues, is not necessarily illogical or incongruous.

However, this court must acknowledge as well the unique premise of the U.S. patent system -- the system rewards the first to invent, not the first to file. When two applications are copending, which application will issue first as a patent may be as much a function of the PTO’s own delay as the applicant’s tactics. The rule of Price and Bosies, that the burden of proof required for priority challenges depends upon the issue of copendency, recognizes the inherent unfairness in penalizing an applicant for uncontrollable delay during prosecution.

Some cases, such as this one, may not fit within this rationale, however. The delay in the Hirose application appears to be solely the result of actions of the applicant, not unavoidable PTO delay. Notwithstanding these departures from the rationale behind the rule, this court's predecessor recognized the benefits of applying a bright line rule based on copendency of applications even in cases where the facts did not necessarily support the underlying rationale. See Linkow v. Linkow, 517 F.2d 1370, 1373 n.3, 186 USPQ 223, 225 n.3 (C.C.P.A. 1975) (applying the preponderance of the evidence standard to issues of joint inventorship in an interference proceeding between a patent and a junior copending application). Accordingly, this court holds that, during an interference involving a patent issued from an application that was copending with the interfering application, the appropriate standard of proof for validity challenges is the preponderance of the evidence standard.

III.

This court proceeds to review the Board's substantive determinations on the validity of the Bruning patents under 35 U.S.C. § 112, ¶ 1. Denying Hirose's motions, the Board held that claims 28-30 of the '750 patent were enabled and that the '352 patent complied with the written description requirement. Nonetheless, the Board determined that these claims were still unpatentable to Bruning for failure to disclose the best mode for practicing the invention.

While enablement is ultimately a question of law subject to de novo review, it is based on underlying factual findings that are reviewed for clear error. See PPG Indus., Inc. v. Guardian Indus. Corp., 75 F.3d 1558, 1564, 37 USPQ2d 1618, 1623 (Fed. Cir. 1996). "To be enabling, the specification of a patent must teach those skilled in the art

how to make and use the full scope of the claimed invention without undue experimentation.” Genentech, Inc. v. Novo Nordisk A/S, 108 F.3d 1361, 1365, 42 USPQ2d 1001, 1004 (Fed. Cir. 1997). Nonetheless, enablement “is not precluded even if some experimentation is necessary, although the amount of experimentation needed must not be unduly excessive.” Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986).

The '750 patent discloses a lens assembly of fused silica, which is transmissible to deep UV with a target wavelength of 248 nm. According to Hirose, these disclosures are insufficient to permit one of ordinary skill in the art to design the lens assembly claimed in the '750 patent without undue experimentation.

The Board based its enablement decision primarily upon design tests conducted during the interference proceeding to demonstrate the relative ease of developing a suitable lens assembly. Specifically, the Board pointed to tests by Bruning's expert witness Phillips to support its conclusion that disclosure of the '750 patent was enabling. According to the Board, the Phillips tests demonstrated that a “very good” fused silica lens, exemplifying the projection lens of the Bruning application, could be developed using “a known Tropel lens of multiple materials” as a starting point and “an in-house version of a commercially available lens design computer program” in less than 8 hours. The Board concluded that this experiment “show[ed] no undue experimentation would have been required in the design of a lens exemplary of [the Bruning lens].”

Hirose presented little, if any, record evidence to support its argument that Phillips was extraordinarily skilled in the art and that his computer program had been

modified. Conclusory and speculative testimony by Hirose's expert witnesses will not suffice. This court honors the Board's assessment of this form of evidence.

Consequently, the factual conclusions of the Board regarding enablement of the '750 patent are not clearly erroneous. Furthermore, the Board's ultimate conclusion of enablement rested on a correct interpretation and application of legal principles.

Therefore, this court affirms the Board's decision that the '750 patent contains an enabling disclosure.

The Board did err, however, in its conclusion that, with regard to claims 28 through 30 of the '750 patent and claims 1 and 2 of the '352 patent, Bruning did not satisfy the best mode requirement of § 112, ¶ 1. Satisfaction of the best mode requirement requires that the inventor disclose the best mode of carrying out the invention known to him at the time of filing. See 35 U.S.C. § 112, ¶ 1. This subjective inquiry examines what was known to the inventor at the time of the filing of the application. See Chemcast Corp. v. Arco Indus. Corp., 913 F.2d 923, 927-28, 16 USPQ2d 1033, 1036 (Fed. Cir. 1990). The Board found a best mode violation because Bruning knew many of the details of the Tropel lens and did not disclose those details in the patent application.

The evidence suggests, however, and the Board's opinion itself reflects, that at the time of filing the application Bruning had no subjective awareness of a best mode for practicing the claimed invention. Specifically, although the Board stated that Bruning knew many of the details of the lens at the time the application was filed, it also noted that he had expressed concern in his notebooks over certain characteristics of the elements. Significantly, after filing the application, the lens assembly required

additional testing and modifications before it would work for its intended purpose. The record does not show that at the time the application was filed, the inventor subjectively believed one embodiment to be a superior mode to carry out the invention.

Furthermore, the record does not show evidence of concealment or of intent to withhold or suppress a known best mode for carrying out the invention. Although satisfaction of the best mode requirement is a question of fact subject to the clearly erroneous standard, the absence of evidence to support the basic tenets of a best mode violation satisfy that standard. The Board's findings on the best mode requirement are therefore reversed.

Finally, this court reviews the Board's finding that claims 1-2 of Bruning's '352 patent complied with the written description requirement. Compliance with the written description requirement of 35 U.S.C. § 112, ¶ 1 is a question of fact and thus the Board's decision is reviewed under the clearly erroneous standard. See Utter v. Hiraga, 845 F.2d 993, 998, 6 USPQ2d 1709, 1714 (Fed. Cir. 1988). The Board's decision on this issue was not clearly erroneous given Hirose's failure to adequately challenge the Board's finding.

IV.

This court next turns to what is typically the central issue in an interference, priority of invention. Hirose's challenge to Bruning's priority is predicated upon his assertion that the Bruning applications were defective under 35 U.S.C. § 112, ¶ 1 and therefore could not serve as constructive reductions to practice. Bruning counters that this argument is improper because it was not presented to the Board. Notwithstanding the timeliness issue, this court's decision that the Bruning patents are in compliance

with the requirements of 35 U.S.C. § 112, ¶ 1 also forecloses Hirose's priority challenge. In turn, resolution of the priority and validity issues in favor of Bruning renders the Board's judgment against Hirose on the grounds of forfeiture or laches irrelevant.

In summary, this court holds that, during an interference involving a patent issued on an application that was copending with the interfering application, the quantum of proof required to sustain a validity challenge is a preponderance of the evidence. Because the Bruning and Hirose applications were copending, the Board correctly applied the preponderance of the evidence standard to Hirose's challenges to the validity of Bruning's patents under 35 U.S.C. § 112, ¶ 1. Nonetheless, this court reverses the Board's finding that Bruning failed to disclose his best mode when the purported best mode was not subjectively appreciated by the inventor and was not concealed. Finally, this court affirms the Board's judgment in favor of Bruning on priority, while declining to reach the issue of forfeiture or laches. In view of the foregoing, this court affirms the priority judgment against Hirose and reverses the judgment that Bruning is not entitled to the subject matter of the interference count, which corresponds to claims 28-30 of the '750 patent and claims 1-2 of the '352 patent.

COSTS

Each party shall bear its own costs.

AFFIRMED-IN-PART and REVERSED-IN-PART