

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* ROBERT W. BYREN, LACY G. COOK,  
and WILLIAM S. GRIFFIN

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Appeal 2007-0203  
Application 10/139,969  
Technology Center 2800

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Decided: April 11, 2007

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Before MAHSHID D. SAADAT, ALLEN R. MACDONALD, and JOHN A. JEFFERY, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's rejection of claims 22-40.<sup>1</sup> We have jurisdiction under 35 U.S.C. § 6(b).

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<sup>1</sup> Claims 1-21 have been cancelled, and claims 41 and 42 are not on appeal (Br. 1-2; Reply Br. 2).

## STATEMENT OF THE CASE

Appellants invented a system and method for effecting low-order aberration correction of a beam of electromagnetic energy. In a preferred embodiment, the invention comprises a telescope with a fixed primary lens and a secondary lens moveable in multiple axes. The secondary lens is moved responsive to aberrations detected by a wavefront error sensor to compensate for the aberrations. *See generally* Specification 3:7-9; 10:28–11:4; *see also* Fig. 3. Claim 22 is illustrative:

22. A method for effecting low-order aberration correction of a beam of electromagnetic energy including the steps of:

receiving the beam using a telescope comprising a primary lens and a secondary lens, said secondary lens being moveable in multiple axes;

generating a signal indicative of the aberrations to be corrected; and

adjusting the position of said secondary lens in response to said signal to generate an output beam that is at least partially compensated with respect to the aberrations.

The Examiner relies on the following prior art references to show unpatentability:

Kittell	5,229,889	Jul. 20, 1993
Sorce	5,461,515	Oct. 24, 1995
Presby	2003/0001073 A1	Jan. 2, 2003 (filed Jun. 29, 2001)

The Examiner's rejections are as follows:

1. Claims 22-27, 31, and 40 are rejected under 35 U.S.C. § 103(a) as unpatentable over Presby.<sup>2</sup>
2. Claims 28-30 and 32-38 are rejected under 35 U.S.C. § 103(a) as unpatentable over Presby in view of Sorce.
3. Claims 39 is rejected under 35 U.S.C. § 103(a) as unpatentable over Presby in view of Sorce and further in view of Kittell.

Rather than repeat the arguments of Appellants or the Examiner, we refer to the Briefs and the Answer for their respective details. In this decision, we have considered only those arguments actually made by Appellants. Arguments which Appellants could have made but chose not to make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2004).

## OPINION

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the invention set forth in the claims on appeal. Accordingly, we affirm.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner must make the factual

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<sup>2</sup> Claims 22 and 23 were rejected under a new grounds of rejection based solely on the disclosure of Presby (Answer 2-4). Claims 24-27, 31, and 40 were also rejected based solely on Presby (Answer 4-6).

determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966). If that burden is met, the burden then shifts to the Appellants to overcome the *prima facie* case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

Regarding independent claims 22-24, the Examiner's rejection essentially finds that Presby teaches every claimed feature except for (1) using lenses instead of mirrors as disclosed in Presby, and (2) moving the secondary lens instead of the primary lens as in Presby. The Examiner, however, notes that Presby teaches using lenses in lieu of mirrors in ¶ 0028 of the reference. The Examiner also notes that deforming any mirror/lens, not necessarily the primary mirror/lens, achieves the same result and would have been apparent to one of ordinary skill in the art. The Examiner then concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to use lenses instead of mirrors and deform the secondary lens instead of the primary lens in Presby to utilize functionally equivalent optical elements for specific applications or environments (Answer 2-6).

Appellants argue that the movable lens element of the claimed invention is not the functional equivalent of Presby's deformable mirror. Although Appellants concede that substituting a *fixed, non-deformable* secondary lens for the *fixed* secondary mirror of Presby would constitute a case where lenses could be used as the functional equivalent of mirrors as Presby teaches, Appellants emphasize that a *movable* lens element as

claimed is simply not equivalent to Presby's *deformable* mirror (Reply Br. 7; Br. 8; emphasis added).

Specifically, Appellants note that Presby corrects distortion at discrete locations within the beam (i.e., high-order aberrations) by deforming a primary mirror at corresponding discrete locations. Appellants emphasize, however, that the claimed invention cannot correct such high-order aberrations since moving a lens can only provide a smooth, continuous correction over the entire aperture of the telescope. According to Appellants, there is no motivation to modify Presby to use a movable lens since such a modification would render Presby incapable of performing its intended purpose (i.e., correcting high-order aberrations) (Br. 8-9; Reply Br. 7-8). The Examiner argues that the proposed modification of Presby is proper since Presby's system is equally applicable for correcting low-order aberrations (Answer 12).

We will sustain the Examiner's rejection of independent claims 22-24. At the outset, we note that claims 22 and 24 broadly recite, in pertinent part, that the secondary lens is "movable in multiple axes." Similarly, claim 23 broadly recites that the primary lens is "movable in multiple axes." Significantly, the scope and breadth of the term "movable" does not preclude an element that is deformable. That is, the limitation would be fully met by a deformable lens -- "movable" optical elements that are well known in the art.<sup>3</sup>

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<sup>3</sup> See, e.g., U.S. Pat. 6,246,528 to Schachar (disclosing deformable lenses whose optical power is varied by small changes in equatorial diameter).

With this interpretation in mind, we turn to Presby. Although the primary mirror is deformed in the disclosed embodiment, Presby expressly states that “*any* mirror of the receive telescopes may be similarly deformed with identical results” (Presby, ¶ 0027; emphasis added). Presby further indicates that “[d]eforming *any* mirror in the communications system to achieve the same result...will be apparent to one skilled in the art.” (*Id.*; emphasis added). Thus, according to these teachings, the unlabeled secondary mirror (i.e., the mirror disposed to the left of beam-splitter 423 in Fig. 4) could be similarly deformed. In short, Presby suggests that the secondary mirror is deformable -- and therefore “moveable.”

Furthermore, we find that the skilled artisan confronted with the problem of removing low-order aberrations would have ample motivation on this record to substitute a moveable lens as claimed for the movable mirror in Presby. As the Examiner indicates, Presby expressly states that lenses may be used as the functional equivalents to mirrors (Presby, ¶ 0028). Appellants’ suggestion that this stated equivalency of lenses and mirrors in Presby is limited to fixed elements simply does not comport with the passage taken as a whole. Significantly, Presby states that “*any method* of using adaptive optics at the receive telescope *to compensate for distortion to the wave front* is intended to be encompassed by the present invention. *For example, lenses* may be used as the functional equivalents to mirrors.” (Presby, ¶ 0028; emphasis added). When read together, the clear import of these two sentences is that the use of lenses constitutes an exemplary method of compensating for wave front distortions in accordance with Presby’s invention.

Moreover, given the myriad of options for the respective optical elements taught by Presby, nothing in the reference precludes the skilled artisan from utilizing deformable lenses in lieu of the deformable mirrors as we noted previously.<sup>4</sup> In our view, such a system would retain the ability to correct both high- and low-order aberrations. Appellants' argument that using movable lenses would render Presby unsuitable for its intended purpose is simply not supported by any evidence on this record and, in any event, runs counter to the teachings of Presby.

For at least these reasons, we will sustain the Examiner's rejection of independent claims 22-24. Since Appellants have indicated that claims 25-40 stand or fall with independent claim 24 (Reply Br. 5), the Examiner's rejections of dependent claims 25-40 is likewise sustained. *See In re Nielson*, 816 F.2d 1567, 1572, 2 USPQ2d 1525, 1528 (Fed. Cir. 1987); *see also* 37 C.F.R. § 41.37(c)(1)(vii).

## DECISION

We have sustained the Examiner's rejections with respect to all claims on appeal. Therefore, the Examiner's decision rejecting claims 22-40 is affirmed.

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<sup>4</sup> See P. 5, *supra*, of this opinion.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2004).

AFFIRMED

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