

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOSHIBA CORPORATION,

Petitioner,¹

v.

OPTICAL DEVICES, LLC,
Patent Owner.

Case IPR2014-01444
Patent RE40,927 E

Before ERICA A. FRANKLIN, GLENN J. PERRY, and JAMES B. ARPIN,
Administrative Patent Judges.

FRANKLIN, *Administrative Patent Judge.*

DECISION
Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.108

¹ The Notice of Filing Date Accorded, Paper 3, mistakenly included Toshiba America Information Systems, Inc. as a Petitioner.

I. INTRODUCTION

A. *Background*

Toshiba Corporation (“Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 37, 48, 49, 51, 55, 58, 60, 61, 63, 64, 67, 69, and 71 of Patent No. US RE40,927 E (Ex. 1001; “the ’927 patent”). Optical Devices, LLC (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”).

We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Upon considering the Petition and Preliminary Response, we are persuaded that Petitioner has not shown a reasonable likelihood that it would prevail in showing the unpatentability of any challenged claim. Accordingly, the Petition is *denied*.

B. *The Cited Reference and Declaration*

Petitioner relies upon the following reference and declaration in support of its ground challenging the identified claims of the ’927 patent:

Exhibits	References and Declaration
1007	Patent No. US 3,016,464 to Bailey (“Bailey”)
1008	Declaration of Lambertus Hesselink, Ph.D.

C. *The Asserted Ground of Unpatentability*

Petitioner asserts that the challenged claims are anticipated by Bailey under 35 U.S.C § 102(b)(pre-AIA). Pet. 12.

D. Related Proceedings

The parties indicate that the '927 patent is the subject of *Optical Devices, LLC v. Toshiba Corp. a*, Case No. 1:13-cv-10530 (D. Del. 2013). Pet. 1; Paper 5, 2 (also identifying other related cases). In addition, the patent currently is the subject of an investigation before the U.S.

International Trade Commission: *In the Matter of Certain Optical Disc Drives, Components Thereof, and Products Containing the Same*, Inv. No. 337-TA-897. Pet. 1; Paper 5, 1. Further, Petitioner has filed another petition for *inter partes* review of the '927 patent (IPR2014-01443) as well as for related patents US RE42,913 E ("the '913 patent") (IPR2014-01439 and IPR2014-1440) and US RE43,681 E (IPR2014-01441 and IPR2014-01442). Pet. 2; Paper 5, 1.

The '927 patent is also the subject of IPR2014-00303, filed by a different petitioner (*inter partes* review terminated). The '913 patent was the subject of IPR2014-00302, filed by a different petitioner (request for *inter parties* review denied).

E. The '927 Patent

The '927 patent describes a retroreflective optical system consisting of a focusing lens and a reflective surface exhibiting some degree of reflectivity positioned near the focal place of the lens, whereby any radiant energy from a radiant energy source directed at the system is reflected back towards the source in a substantially collimated narrow beam. Ex. 1001, Abstract, 1:33–39. The claims at issue are directed to an apparatus for measuring the retroreflective characteristics of such an optical system, as well as a method and apparatus for detecting characteristics or properties of such a system. See, e.g., *id.* at Claims 38, 48, and 61.

Figure 1 of the '927 patent is reproduced below:

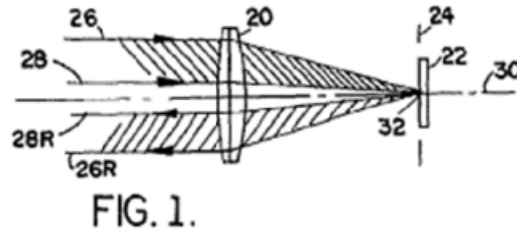


Figure 1 of the '927 patent depicts an optical system including lens 20 and reflective surface 22 (e.g., a mirror) positioned in focal plane 24 of lens 20. Ex. 1001, 2:59–62. Radiation rays 26 and 28 are directed towards lens 20 of the optical system from a radiation (e.g., light) source (not shown). *Id.* at 2:62–65. For purposes of clarity, the '927 patent shows the *incident* rays at the top of lens 20 and the *reflected* rays at the bottom of lens 20. *Id.* at 2:66–3:2. Incident rays 26 and 28 are refracted by lens 20 and focused at focal point 32 on mirror 22. *Id.* at 3:2–4. The rays are reflected, such that the angle of reflection equals the angle of incidence, and the reflected rays are refracted again by lens 20 and emerge therefrom as retroreflected rays 26R and 28R. *Id.* at 3:4–8.

Figure 3 of the '927 patent is reproduced below:

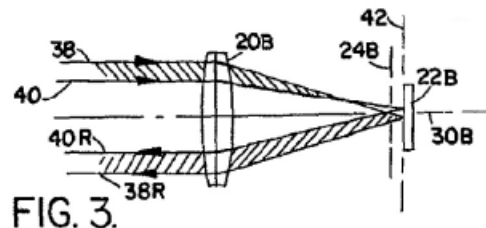


Figure 3 of the '927 patent shows that the radiant flux density at surface 22B may vary based on characteristics of the components of the optical system, such as placement of or imperfections in lens 20B. *Id.* at 3:28–44; 3:66–

4:59; see Prelim. Resp. 3. For example, in Figure 3, reflective surface 22B is positioned substantially, but not entirely, in focal plane 24B. *Id.* at 3:28–44.

According to the '927 patent,

[i]n the system depicted in FIG. 3 . . . the lens 20B is assumed to be imperfect; i.e., it has aberrations. In this case the rays 38 and 40 are parallel to the optical axis 30B but are not focused at a single point on the focal plane 24B, and instead form an image on the mirror 22B, which image is referred to as the circle of confusion. In most practical optical systems there are circles of confusion and the mirror is normally positioned at the plane of least circle of confusion, herein depicted by the reference numeral 42. The image formed on the mirror by means of the rays 38 and 40 can be considered to be a radiant source, and the retroreflected rays 38R and 40R exit from the lens 20B substantially parallel to each other.

Ex. 1001, 3:28–41. The difference in radiant flux density between the smaller circle of confusion of Figure 1, i.e., where surface 22 lies in the focal plane, and that of Figure 3, i.e., where surface 22B lies substantially, but not entirely, in focal plane 24B, is referred to as the optical gain. *See id.* at col. 3:28–65. In Figures 1 and 3, the rays retroreflected by the optical system are in the form of a narrow, substantially collimated beam having a high radiant flux density. *Id.* at 3:59–61. “[T]here is an increase in the radiant flux density of the retroreflected beam due to the narrowing thereof. This increase in radiant flux density is herein termed optical gain.” *Id.* at 3:62–65.

F. Illustrative Claims

Independent claims 37, 48, and 61 are illustrative and are reproduced below, with emphasis added:

37. Apparatus for measuring the retroreflective characteristics of an optical system consisting of at least a focusing means and a *surface exhibiting some degree of reflectivity disposed substantially in the focal plane of said focusing means*, said apparatus comprising

a radiant energy source,
detection means,
measuring means connected to said detection means, and
means for directing said radiant energy produced by said source at said optical system,
whereby said radiant energy is retroreflected *with an optical gain* by said optical system and detected by said detecting means and the output thereof is coupled to said measuring means.

48. A method of detecting characteristics or properties of an optical system based on a retroreflected beam, comprising:
transmitting radiant energy at an optical system having retroreflective characteristics;
receiving reflected radiant energy after retroreflection of the radiant energy;
detecting the reflected radiant energy after retroreflection *to determine at least one characteristic or property* of the optical system.

61. An apparatus for detecting characteristics or properties of an optical system based on a retroreflected beam, comprising:
transmitting radiant energy at an optical system having a source of radiant energy;
a detector; and
an optical system that directs radiant energy from the source toward a retroreflective surface and returns reflected radiant energy to the detector;
wherein the detector *determines at least one characteristic or property* of the optical system.

Ex. 1001, 12:55–13:2; 15:9–19, 40–42, 53–63 (emphasis added). Disputed limitations are emphasized.

G. Claim Construction

Consistent with the statute and the legislative history of the Leahy-Smith America Invents Act,² we interpret claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent. 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). There is a presumption that 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).

At least one of the parties proposes a specific construction for each of the following terms:

1. “*Focal Plane*”

Patent Owner proposes to construe “focal plane” as “a plane through the focus perpendicular to the axis of an optical element.” Prelim. Resp. 11. Petitioner does not object to this construction. Pet. 13. We are persuaded, for purposes of this decision, that this proposed construction is the broadest reasonable construction consistent with the Specification of the ’927 patent.

² Pub. L. No. 112-29 (2011).

2. *“Retroreflected”*

Patent Owner proposes to construe “retroreflected” as “having undergone reflection of an incident ray in a manner such that the reflected ray is parallel to the incident ray of any angle of incidence.” Prelim. Resp. 12. Petitioner does not object to this construction, wherein any angle of incidence is “within the field-of-view” of the retroreflector. Pet. 14. We are persuaded, for purposes of this decision, that this proposed construction is the broadest reasonable construction consistent with the Specification of the ’927 patent.

3. *“Retroreflection”*

Patent Owner proposes to construe “retroreflection” as “reflection of an incident ray in a manner such that the reflected ray is parallel to the incident ray for any angle of incidence.” Prelim. Resp. 13. Petitioner does not object to this construction, wherein any angle of incidence is “within the field-of-view” of the retroreflector. Pet. 14–15. We are persuaded, for purposes of this decision, that this proposed construction is the broadest reasonable construction consistent with the Specification of the ’927 patent.

4. *“Optical System”*

Patent Owner proposes to construe “optical system” as “a collection of optical elements including at least a lens and a reflective surface.” Prelim. Resp. 13–14. Petitioner does not object to this construction. Pet. 15. We are persuaded, for purposes of this decision, that this proposed construction is the broadest reasonable construction consistent with the Specification of the ’927 patent.

5. “*Substantially Concentric*”

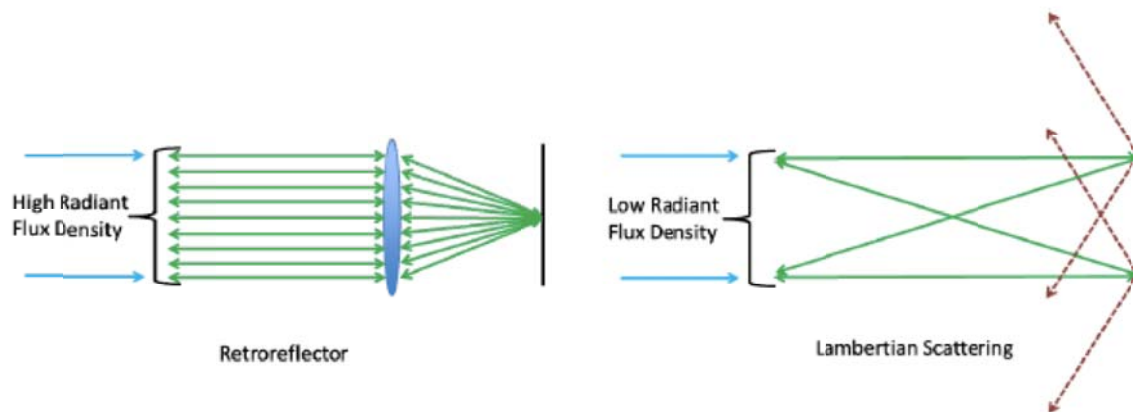
Patent Owner proposes to construe “substantially concentric” as “having an axis, or axes, aligned coaxially or nearly coaxially therewith.” Prelim. Resp. 14. Petitioner does not object to this construction. Pet. 15. We are persuaded, for purposes of this decision, that this proposed construction is the broadest reasonable construction consistent with the Specification of the ’927 patent.

6. “*Optical Gain*”

Patent Owner proposes to construe “optical gain” as “a change in radiant flux density of reflected radiant energy.” Prelim. Resp. 14. According to the Patent Owner, “the retroreflected radiant energy does not necessarily or inherently exhibit optical gain.” *Id.* at 17.

Petitioner argues that “in the case of a retroreflector with a reflective surface in the focal plane of a lens and incoming light that is collimated (assuming no significant vignetting) . . . ‘optical gain’ is an inherent property of such a retroreflector.” Pet. 19–20. According to Petitioner, “relative to a Lambertian surface without a lense, any retroreflector must necessarily reflect radiant energy with ‘an actual increase in [] radiant flux density due to a narrowing thereof.’” *Id.* at 22. In other words, retroreflected light necessarily has the attribute of optical gain because the lens concentrates rays that otherwise would be reflected into a larger solid angle into a smaller one. Pet. 19–21.

Petitioner provides the following comparison figure at Petition page 21 and at Ex. 1008 ¶¶ 26, 47:



According to Petitioner, this comparison figure demonstrates that light that would otherwise be scattered into a wide angle (right side) is gathered into a smaller angle and collimated (left side) thereby increasing flux density of the reflected light. Pet. 20.

Based on the record thus far, we accept that optical gain, in this context, is an inherent property of retroreflected light.

The description of embodiments in the '927 patent relies on retroreflected optical gain in order to identify targets by comparing retroreflected light to light transmitted toward a potential target. The optical gain caused by the retroreflection provides a discernable distinction.

We are persuaded, for purposes of this decision, that Petitioner's proposed construction is the broadest reasonable construction consistent with the Specification of the '927 patent.

For purposes of this decision and on this record, no other claim terms require express construction.³

³ In particular, for purposes of this decision, we do not construe expressly the terms: "an optical system having retroreflective characteristics," "focusing means," "detection/detecting means," "measuring means," "means for directing," and "means . . . for transmitting." See Pet. 23–26; Prelim. Resp. 23.

II. ANALYSIS

Petitioner contends that claims 37, 48, 49, 51, 55, 58, 60, 61, 63, 64, 67, 69, and 71 of the '927 patent are anticipated by Bailey. Pet. 27. Patent Owner disagrees. Prelim. Resp. 29–32. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

A. Bailey

Bailey describes an apparatus for determining the location and thickness of a reflecting object. Ex. 1007, Title. Bailey's Figure 2 is reproduced below.

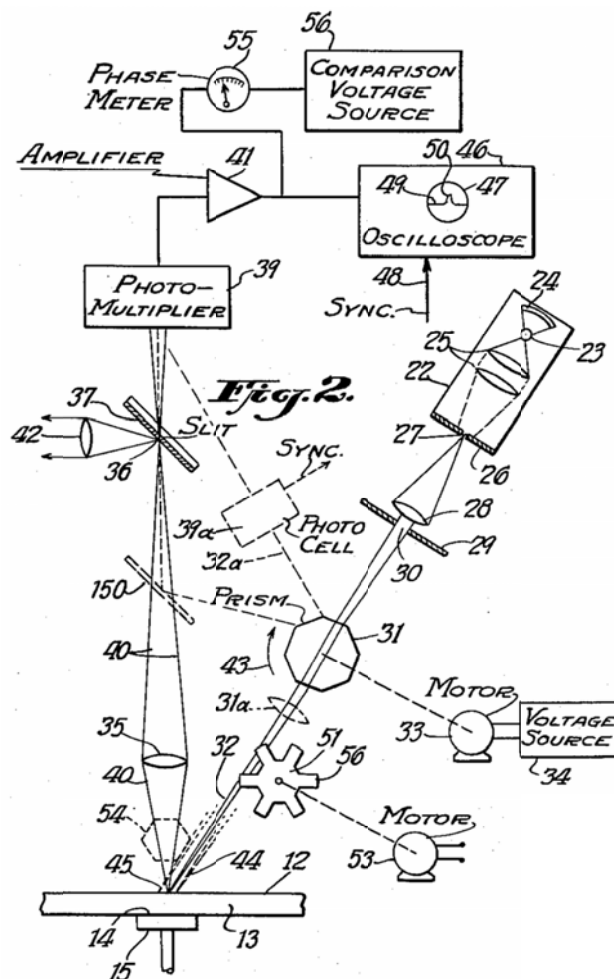


Figure 2 is a combined schematic and block diagram which illustrates the preferred embodiment of Bailey's Specification. *Id.* at 2:40–42. Light from source 22, 23 is focused onto surface 12 by lens 28. *Id.* at 5:39–46. Surface 12 reflects some of the light impinging upon it. *See id.* at 6:38–39.

B. Anticipation Challenge Based on Bailey

Petitioner provides a detailed reading of the challenged claims on Bailey in its claim charts. Pet. 31–45. In particular, regarding independent claims 37, 48, and 61, Petitioner refers to Bailey's Figure 3 and argues that "Bailey discloses radiant energy retroreflected by the optical system that includes lens 57 and surface 12." *Id.* at 35, 37, 42. Bailey's Figure 3 is reproduced below.

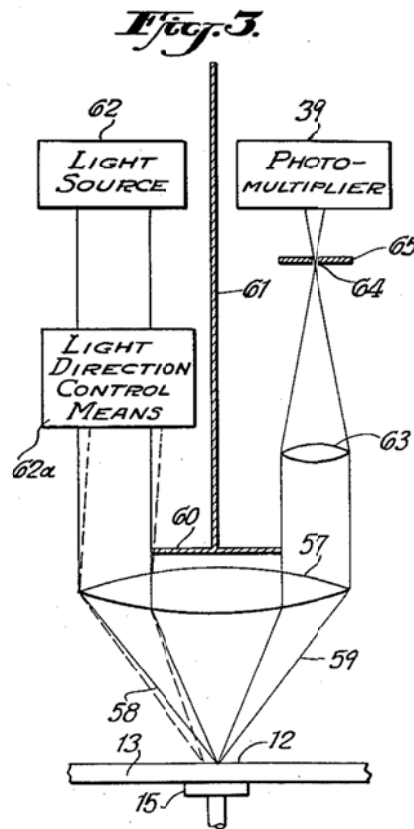
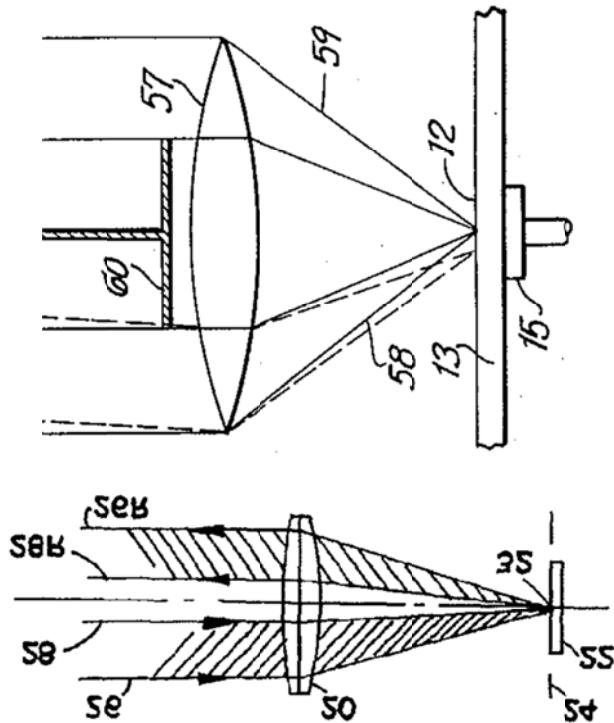


Figure 3 is a combined schematic and block diagram which illustrates a modified form of the embodiment illustrated in Figure 2. Ex. 1007, 2:40–

43. Petitioner asserts that this embodiment exhibits retroreflection because the same lens is used to irradiate the surface of object 12 and to capture light reflected from its surface. Pet. 35. Specifically, according to Petitioner, Figure 3 depicts the reflected rays (rays exiting lens 57 after reflection off of object 12) are parallel to the rays entering lens 57 from light source 62, and that this is true for any angle of incidence within the field of view. *Id.* at 30–31. Petitioner provides the following juxtaposed figures (Pet. 30) to demonstrate asserted similarities between Bailey and the '927 patent:



The upper figure depicts a portion of Bailey's Figure 3 rotated 90 degrees, and the lower figure depicts Figure 1 of the '927 patent. Thus, the juxtaposed figures both show incident light rays moving left to right, focusing on a target surface and then being reflected right to left. According to Petitioner, "[b]oth figures show incoming collimated light being focused onto a surface in the focal plane of the lens, whereby the reflected light is

collimated by the lens so that the outbound reflected light rays are parallel to the incoming light rays.” Pet. 30–31. Petitioner notes that the ’927 patent states that “[a]ny optical instrument which includes a focusing lens and a surface having some degree of reflectivity, no matter how small, positioned near the focal point of the lens, act as a retroreflector.” *Id.* at 35.

Patent Owner argues that Bailey does not anticipate any of the challenged claims. Prelim. Resp. 1. In particular, Patent Owner argues that Bailey doesn’t disclose radiant energy retroreflected by an optical system. *Id.* at 31. According to Patent Owner, Petitioner relies only on Bailey’s Figure 3 as demonstrating that “the light from light source 62 is collimated, that the collimated light is focused to a point by lens 57, and that the surface 12 is placed at the focus point of the light.” *Id.* (quoting Pet. 29). Patent Owner asserts that Bailey, however, does not state or otherwise describe that Figure 3 exhibits retroreflection, or even that object 12 is located at a focal point of Bailey’s lens 57. *Id.* at 31–32.

Based on our review of Bailey’s Specification, and our construction of the claim terms “retroreflected” and “retroreflection,” we agree with Patent Owner. Contrary to Petitioner’s arguments, Bailey does not describe Figure 3 as exhibiting retroreflected radiant energy or retroreflection. Nor does Bailey explain that object 12 is at the focal point of lens 57, or that the reflection of an incident ray is in a manner such that the reflected ray is parallel to the incident ray for any angle of incidence. Further, we agree with Patent Owner that Petitioner has not identified in Bailey a description that its Figure 2 embodiment generates a collimated beam of light. See Prelim. Resp. 32. Moreover, although we recognize the apparent expertise of Dr. Hesselink (see Ex. 1008 ¶¶ 2–4), we note that his testimony regarding

retroreflection relies only upon assumptions made with respect to Bailey's Figure 3 (*see id.* ¶ 33). As Patent Owner correctly notes, it is insufficient to rely on a schematic diagram alone to define precise proportions of elements shown in such a diagram. *Id.* ¶¶ 32–33 (citing *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956 (Fed. Cir. 2000)). For these reasons, we are persuaded that Petitioner has not established that radiant energy is retroreflected in Bailey.

Patent Owner argues additionally that Bailey doesn't receive retroreflected light with an optical gain. Prelim. Resp. 33–35. Because we are not persuaded that retroreflection is taking place in Bailey, we likewise are not persuaded that light reflected from the surface of object 12 is received with an optical gain.

Consequently, based on the information presented, Petitioner has not established sufficiently that Bailey discloses each and every element of independent claims 37, 48, and 61. Therefore, on this record, we are persuaded that Petitioner has not set forth a reasonable likelihood of prevailing in establishing that independent claims 37, 48, and 61, or their respective dependent claims 49, 51, 55, 58, 60, 63, 64, 67, 69, and 71 are anticipated by Bailey.

III. CONCLUSION

For the foregoing reasons, we conclude that, based on the information presented in the Petition, Petitioner has not established a reasonable likelihood of prevailing in showing that any claim of the '927 patent is unpatentable based upon the asserted anticipation ground.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied* as to claims 37, 48, 49, 51, 55, 58, 60, 61, 63, 64, 67, 69, and 71 of the '927 patent under 35 U.S.C.

§ 102(b)(pre-AIA) as anticipated by Bailey; and

FURTHER ORDERED that no *inter partes* review is instituted.

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