

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

COREPHOTONICS, LTD.,
Patent Owner.

Case IPR2018-01133
Patent 9,538,152 B2

Before MARC S. HOFF, BRYAN F. MOORE, and MONICA S.
ULLAGADDI, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

DECISION
Instituting *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Apple Inc. (“Petitioner”) requests *inter partes* review of claims 1–4 of U.S. Patent No. 9,538,152 B2 (“the ’152 patent,” Ex. 1001) pursuant to 35

U.S.C. §§ 311 *et seq.* Paper 2 (“Pet.”). Petitioner relies on the testimony of Dr. Oliver Cossairt. Ex. 1004. Institution of an *inter partes* review is authorized by statute when “the information presented in the petition . . . and any response . . . shows that 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); *see* 37 C.F.R. § 42.108. Upon consideration of the Petition and Preliminary Response, we conclude the information presented shows there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of claims 1–4 of the ’152 patent.

A. Related Matters

A decision in this proceeding could affect or be affected by the following case pending in the United States District Court for the Northern District of California and involving the ’152 patent: *Corephotonics, Ltd. v. Apple Inc.*, Case No. 5-17-cv-06457 (N.D. Cal.). Pet. 2; Paper 4, 2 (Patent Owner also asserts *Corephotonics, Ltd. v. Apple Inc.*, Case No. 5:18-cv-02555 (N.D. Cal.) may affect, or be affected by, a decision in this proceeding).

B. The ’152 patent

The ’152 patent is directed to “multi-aperture imaging (‘MAI’) systems with high color resolution and/or optical zoom.” Ex. 1001, 1:15–18. The ’152 patent states that while mechanical zoom solutions are common in digital still cameras, they are “typically too thick for most camera phones” and may result in “resolution compromise.” *Id.* at 1:35–43. In its background, the ’152 patent states that one of the known approaches is using a multi-aperture imaging (‘MAI’) system, for example, a dual-aperture

imaging system (“DAI”) including “two optical apertures which may be formed by one or two optical modules, and one or two image sensors” for “implementing zoom, as well as increasing the output resolution.” *Id.* at 1:52–59.

The Specification states that those known multi-aperture imaging systems “often trade-off functionalities and properties, for example zoom and color resolution, or image resolution and quality for camera module height,” and therefore, there was a need to have thin multi-aperture imaging systems that “produce an image with high resolution (and specifically high color resolution) together with zoom functionality.” *Id.* at 1:63–66, 1:67–2:3.

As a solution to this problem, the ’152 patent describes a dual aperture imaging system including a Wide sensor and a Tele sensor capturing a Wide image and a Tele image from two apertures, where color filter arrays may be used in the Wide sensor and Tele sensor. *Id.* at 2:34–65. The Wide image and Tele image may be fused to “output one fused (combined) output zoom image processed according to a user [zoom factor] ZF input request.” *Id.* at 3:17–20.

The ’152 patent describes a dual-aperture zoom imaging system 100 including a Wide subset 104 and a Tele subset 106 each having a respective sensor. *Id.* at Figs. 1A, 1B. The ’152 patent explains that a processor 108 “fuses . . . a Wide image obtained with the Wide subset and a Tele image obtained with the Tele subset, into a single fused output image according to a user-defined ‘applied’ ZF input or request.” *Id.* at 5:60–6:2. The ’152 patent explains that an overlap area 110 of the Wide image and Tele image is illustrated on the Wide image in the figure. *Id.* at 4:62–64, 6:2–9.

To obtain the output image, the '152 patent teaches a registration process, which “chooses either the Wide image or the Tele image to be a primary image . . . based on the ZF chosen for the output image.” *Id.* at 9:20–21, 31–33. The registration process “considers the primary image as the baseline image and registers the overlap area in an auxiliary image to it,” and the “output image point of view is determined according to the primary image point of view (camera angle).” *Id.* at 9:20–28.

C. Illustrative Claim

Independent claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A multi-aperture imaging system comprising:

a first camera that provides a first image, the first camera having a first field of view (FOV_1) and a first sensor with a first plurality of sensor pixels covered at least in part with a standard color filter array (CFA);

a second camera that provides a second image, the second camera having a second field of view (FOV_2) such that $FOV_2 < FOV_1$ and a second sensor with a second plurality of sensor pixels being either Clear or covered with a standard CFA, the second image having an overlap area with the first image; and

a processor configured to provide an output image from a point of view of the first camera based on a zoom factor (ZF) input that defines a respective field of view (FOV_{ZF}), the first image being a primary image and the second image being a non-primary image, wherein if $FOV_2 < FOV_{ZF} < FOV_1$ then the point of view of the output image is that of the first camera, the processor further configured to register the overlap area of the second image as a non-primary image to the first image as primary image to obtain the output image.

Ex. 1001, 12:60–13:13.

D. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–4 are unpatentable based on the following grounds:

Reference(s)	Basis	Claims challenged
Border ¹ and Parulski ²	§ 103	1–4

Pet. 12.

II. DISCUSSION

A. *Relevant Law*

1. *Obviousness*

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs,

¹ US Patent Application Pub. No. 2008/0030592 A1, filed Aug. 1, 2006, published Feb. 7, 2008. (“Border,” Ex. 1006).

² US Patent No. 7,859,588 B2, filed Mar. 9, 2007, issued Dec. 28, 2010. (“Parulski,” Ex. 1007).

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