UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte KEVIN BERNARD KENNY and ALEX DAVID CORWIN

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Appeal 2017-003911
Application 13/846,490
Technology Center 2400

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Before JOHN A. EVANS, ALEX S. YAP, and JASON M. REPKO,
Administrative Patent Judges.

REPKO, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants[1] appeal under 35 U.S.C. § 134(a) from the Examiner's
rejection of claims 1–20, which constitute all the claims pending in this
application. App. Br. 2.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

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[1] Appellants identify the real party in interest as General Electric Company.
App. Br. 2.

[2] Throughout this opinion, we refer to the Final Rejection ("Final Act.")
mailed September 21, 2015, the Appeal Brief ("App. Br.") filed April 29,
2016, the Examiner's Answer ("Ans.") mailed November 8, 2016, and the
Reply Brief ("Reply Br.") filed January 6, 2017.

THE INVENTION

Appellants' invention registers slide images to create a composite image and to allow simultaneous display of multiple biomarkers of the same cells. Spec. ¶¶ 17, 21. The system acquires multiples sets of images of a sample on a slide. *Id.* ¶ 17. The system generates a stitched or composite image from the image set. *Id.* ¶ 20. Over multiple rounds of imaging the slide, the sample can be stained with a different agent and returned to the stage for re-imaging. *Id.* ¶ 18. Appellants' process produces set of pixels in a common datum plane that can be subtracted for autofluorescence removal, combined in a false-color image, superposed for a reviewer to compare, or analyzed in other ways. *Id.*

Claim 9 is reproduced below with our emphasis:

9. An image analysis system, comprising:

a memory storing one or more routines; and

a processing component configured to execute the one or more routines stored in the memory, wherein the one or more routines, when executed by the processing component, cause acts to be performed comprising:

performing an alignment operation between a limited set of images acquired of a sample and a previously acquired full set of images of the sample wherein the limited set of images comprise fewer images than the full set of images, wherein *the alignment operation generates at least a rotation relating the limited set of images to corresponding images of the full set of images;*

rotating a subsequently acquired full set of images by the rotation; and

translating the rotated images of the subsequently acquired full set of images to register the rotated images with corresponding images of the previously acquired full set of images.

THE REJECTIONS

The Examiner relies on the following as evidence:

Grindstaff et al.	US 2006/0028549 A1	Feb. 9, 2006
Micheva et al.	US 2008/0152207 A1	June 26, 2008
Can et al.	US 2009/0245610 A1	Oct. 1, 2009
Hardy et al.	US 7,853,098 B2	Dec. 14, 2010
Henderson et al.	US 2011/0249910 A1	Oct. 13, 2011

Claims 9, 10, and 12–14 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Henderson, Grindstaff, and Can. Final Act. 4–8; Ans. 2–6.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Henderson, Grindstaff, and Hardy. Final Act. 8–9; Ans. 6–7.

Claims 15–18 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Henderson, Grindstaff, and Micheva. Final Act. 9–13; Ans. 7–11.

Claim 20 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Henderson, Grindstaff, Micheva, and Hardy. Final Act. 13–14; Ans. 11–12.

Claims 1–6, 8, and 19 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Henderson, Grindstaff, Micheva, and Can. Final Act. 14–18; Ans. 12–16.

Claim 7 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Henderson, Grindstaff, Micheva, Can, and Hardy. Final Act. 18–19; Ans. 16–17.

3

THE OBVIOUSNESS REJECTION OVER HENDERSON, GRINDSTAFF, AND CAN

The Examiner finds that Henderson teaches every limitation recited in independent claim 9 except for the recited image alignment and registration operations. Ans. 2–5. In concluding that claim 9 would have been obvious, the Examiner cites Grindstaff and Can as teaching these features. *Id.* at 3–5. In particular, the Examiner finds that Grindstaff translates and rotates the images to register the images with previously acquired images. *Id.* at 3–4. According to the Examiner, it would have been obvious to use Grindstaff's alignment operation in Henderson to significantly enhance image processing, facilitate image alignment, compensate for misalignment, and provide accurate observation techniques. *Id.* at 4 (citing Henderson ¶¶ 2–3, 5; Grindstaff ¶¶ 2, 4, 17).

Appellants argue that the combination of references does not teach generating a rotation from an alignment of two different images sets. App. Br. 12. According to Appellants, Henderson does re-acquire a set of images to improve quality, but there is no benefit to comparing the re-acquired images to the previous sets. *Id.* at 10. We agree.

In particular, claim 9 requires, in part, "the alignment operation *generates at least a rotation* relating the limited set of images to corresponding images of the full set of images" and "rotating a subsequently acquired full set of images *by the rotation*" (emphasis added). That is, there are three sets of images recited in claim 9: (1) "the limited set of images," (2) "a previously acquired full set of images," and (3) "a subsequently acquired full set of images." The claimed alignment relates (1) the limited set of images to (2) the full set of previously acquired images to generate a rotation for (3) the subsequently acquired full set of images.

4

The Examiner relies on Henderson for teaching acquiring two full sets of images. Ans. 3. Henderson assesses the quality of a digital image that is a composite of tiles of image segments. Henderson, Abstract. For example, Henderson is especially concerned with focus accuracy for a microscopic pathology sample. *Id.* Henderson's system repeatedly images a slide over adjacent areas and merges the images to form a composite image. *Id.* ¶ 84, *cited in* Ans. 7. Instead of compositing images segments that have different quality, Henderson's system can re-acquire the images of the worst quality. Henderson ¶¶ 58, 135, Fig. 9. For example, Henderson may re-image the whole slide. *Id.* ¶ 105. Therefore, in this example, Henderson does acquire at least two full sets of images—a poor quality set and a re-acquired set. *See id.*

The Examiner has not shown that Henderson uses a rotation generated from the poor quality images for the re-acquired images. Ans. 3 (citing Henderson ¶ 58, Fig. 9); *see also* Ans. 22 (discussing Henderson's re-imaging). Nor has the Examiner shown it would have been obvious to modify Henderson with Grindstaff to do so. *Accord* App. Br. at 9–10.

To be sure, Henderson does align images. *See, e.g.*, Henderson ¶ 25. But Henderson aligns adjacent images of the same set. *Id.* That is, adjacent images in the set overlap. *Id.* When creating the composite image, Henderson knits or stiches the adjacent images together to merge over the adjacent-tile transitions. *Id.* Notably, Henderson counsels against using images of differing quality to create a composite image. *Id.* ¶ 135.

Even assuming that Grindstaff's rotation could be used for creating Henderson's composite image from one image set (e.g., the re-imaged set), we agree that the Examiner has not shown how the combination uses two

5

full images sets in the manner claimed. *See* App. Br. 12. Furthermore, we agree that the Examiner has not adequately explained why aligning Henderson's two full image sets would significantly enhance image processing, facilitate image alignment, compensate for misalignment, and provide accurate observation techniques. *See Id.* at 9–10. Rather, the cited teachings merely show that Henderson re-images the slide to obtain a better quality set and aligns adjacent images within that set. Henderson ¶¶ 58, 135, Figs. 2, 9, *cited in* Ans. 3.

Because we find this issue dispositive, we need not reach Appellants' additional arguments.

On this record, we do not sustain the Examiner's rejection of independent claim 9 and dependent claims 10 and 12–14, for similar reasons.

<p style="text-align:center">THE REMAINING OBVIOUSNESS REJECTIONS</p>

The Examiner rejects claims 1–8, 11, and 15–20 as being obvious over Henderson and Grindstaff, and various combinations of Hardy, Micheva, and Can. Final Act. 8–19. Independent claims 1 and 15 recite a step similar to the rotating step recited in claim 9. In particular, claims 1 and 15 require registering a first and second set of images using a rotation. In addressing this limitation in claims 1 and 15, the Examiner provides a similar rationale to the one presented in the rejection of claim 9. *Compare* Final Act. 5 (rejecting claim 9) *with* Final Act. 10 (rejecting claim 15), Final Act. 15 (rejecting claim 1). Appellants present arguments for the patentability of the claims 1 and 15 that are similar to those presented for claim 9. *See* App. Br. 13, 15. Claims 2–8, 11, and 16–20 depend from one of independent claims 1, 9, or 15.

Because the additional references are not relied upon to teach the limitation missing from Henderson and Grindstaff, the additional references do not cure the deficiency discussed above. Final Act. 8–19. Accordingly, we do not sustain the Examiner's rejections of claims 1–8, 11, and 15–20 for the same reasons discussed above in connection with claim 9.

DECISION

We reverse the Examiner's rejection of claims 1–20.

REVERSED