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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YONG HE, ERIC B. LUM, ERIC ENDERTON, HENRY PACKARD MORETON, and KAYVON FATAHALIAN

Appeal 2019-003244
Application 15/411,918
Technology Center 2600

Before JENNIFER L. MCKEOWN, LINZY T. MCCARTNEY, AND MICHAEL T. CYGAN, *Administrative Patent Judges.*

MCKEOWN, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–25. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as NVIDIA Corporation. Appeal Br. 3.

CLAIMED SUBJECT MATTER

The claimed invention generally relates "to graphics processing and, more specifically, to adaptive shading in a graphics processing pipeline." Spec. ¶ 2.

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

> A computer-implemented method, comprising:
>
> selecting a first pixel from a plurality of pixels based on which pixels included in the plurality of pixels are covered by a graphics primitive;
>
> performing a first pixel shading operation on the first pixel to compute a first coarse shading value;
>
> performing a second pixel shading operation on the first pixel to compute a first fine shading value; and
>
> computing a first composite shading value for the first pixel based on the first coarse shading value and the first fine shading value.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Nichols	Nichols et al., *Interactive, Multiresolution image-space rendering for dynamic area lighting*. Computer Graphics Forum, 29(4), 1279-1288.	2010
Yang	Yang et al., *Geometry-aware Framebuffer level of detail*. Computer Graphics Forum, 27(4), 1183-1188.	2008

REJECTIONS

The Examiner rejected claims 1–25 under 35 U.S.C. § 103 as unpatentable over Yang and Nichols. Final Act. 2–7.

The Examiner rejected claims 1–25 on the ground of nonstatutory double patenting as being unpatentable over claims 1–21 of U.S. Patent No. 9,552,667. Final Act. 7–9.

THE OBVIOUSNESS REJECTION BASED ON NICHOLS AND YANG

Claims 1–25

The Examiner finds that Yang teaches the limitations of claim 1, except Yang fails to explicitly teach "computing a first composite shading value for the first pixel based on the first coarse shading value and the first fine shading value." Final Act. 3. The Examiner, however, determines that Yang's "feature-preserving reconstruction technique, which processes object's portion on different levels of detail, suggests a combination of low level and high level of processes. . . ." Final Act. 3. According to the Examiner, it would have been obvious to modify Yang, in view of Nichols, to combine the results from processes of different levels. Final Act. 2.

Appellant, on the other hand, argues that Yang fails to teach "selecting a first pixel from a plurality of pixels based on which pixels included in the plurality of pixels are covered by a graphics primitive." Appeal Br. 10. Appellant points out that the Examiner, in the Final Action, construes a graphic primitive as "regions of change described in Yang." Appeal Br. 10 (citing Final Act. 3–4). Appellant explains that under this interpretation Yang fails to satisfy the claimed limitation because Yang does not teach selecting a pixel based on pixels covered by a region of change.

Appeal Br. 10–11. Instead, according to Appellant, Yang's "pixel shader considers discontinuities in the scene geometry during the second pass based on shading information stored in 'L' during the first pass." Appeal Br. 11 (citing Yang §§ 2, 2.1).

The Examiner then, in the Answer, construes graphics primitives as "Yang's block of r x r pixels." Ans. 9. The Examiner explains

> To map into the claimed invention, Yang's block of r x r pixels is equivalent to the claimed 'graphics primitive' in which the claimed 'first pixel from a plurality of pixels based on which pixels included in the plurality of pixels are covered by a graphics primitive' is a pixel in the Yang's coarse buffer L, and this pixel is also in a r x r block of pixels stored in the fine buffer H.

Id.

Appellant, however, argues that a graphic primitive is distinct from a block of pixels in a buffer. Reply Br. 4. Appellant points out that

> given the Examiner's new claim mappings, in order to teach the above limitations of claim 1, Yang would have to disclose that a first pixel from a plurality of pixels in the frame buffer 'L' is selected based on which pixels of the plurality of pixels in the frame buffer 'L' are covered by an r x r block of pixels in the frame buffer 'H.'

Reply Br. 4. As such, Appellant maintains that Yang does not teach or suggest selecting a first pixel based on which pixels included in the plurality of pixels are covered by a graphics primitive. Reply Br. 4.

We find Appellant's arguments persuasive. While the Specification does not expressly define a graphic primitive, the Specification provides the exemplary embodiment of a triangle primitive and explains the selected pixels are those covered by the primitive or inside the graphics primitive. Spec. ¶¶ 55–56. Appellant also points out, a skilled artisan would

understand "a graphics primitive is a non-interactive rudimentary element displayed on a screen, such as a line, circle, arc, or rectangle." Reply Br. 4.

It is unclear, based on the record before us, how Yang's teaching of a pixel corresponding to a r x r pixel block satisfies the claimed selecting from a plurality of pixels *based on* which pixels included in the plurality of pixels are *covered by a graphics primitive* limitation. For example, "Yang describes a frame buffer technique for controlling the pixel workload in an interactive rendering application." Reply Br. 3 (citing Yang, Abstract). In particular, Yang describes a buffer technique where each frame is rendered in two passes. During the first pass, information, such as color, depth and surface normal is saved for each pixel. This information is then used in the second pass. Yang §§2, 2.1. While Yang's pixel blocks may at times be covered by a graphics primitive, Yang does not teach or suggest performing the two step buffering technique on a first pixel selected *based on* which pixels included in the plurality of pixels *are covered by a graphics primitive.* Therefore, based on the record before us, we persuaded of Examiner error.

Accordingly, we reverse the rejection of claims 1–25 as unpatentable over Yang and Nichols.

THE NONSTATUTORY DOUBLE PATENTING REJECTION

Claims 1–25

The Examiner rejects claims 1–25 on the ground of nonstatutory double patenting over claims 1–21 of U.S. Patent No. 9,552,667. Final Act. 9. The Examiner notes that "[a]lthough the claims at issue are not identical, they are not patentably distinct from each other because the claimed invention of the US patent contains all features of the claims of the pending application." Final Act. 9. Appellant fails to respond to this rejection. As

such, we summarily affirm the nonstatutory double patenting rejection of claims 1–25.

CONCLUSION

The Examiner's rejection of claims 1–25 as unpatentable over Yang and Nichols is reversed, but the non-statutory double patenting rejection of claims 1–25 is summarily affirmed.

DECISION SUMMARY

In summary:

Claims Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
1–25	103	Yang, Nichols		1–25
1–25		Nonstatutory Double Patenting	1–25	
Overall Outcome			1–25	

TIME PERIOD FOR RESPONSE

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

AFFIRMED