UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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INTEL CORPORATION,
Petitioner,

v.

FUZZYSHARP TECHNOLOGIES, INC.,
Patent Owner.

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Case IPR2014-00002
Patent 6,172,679 B1

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Before JUSTIN T. ARBES, TREVOR M. JEFFERSON, and
DAVID C. MCKONE, *Administrative Patent Judges.*

MCKONE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. Background

Intel Corporation ("Petitioner") filed a Substitute Petition (Paper 4, "Pet.") to institute an *inter partes* review of claims 1, 4, and 5 of U.S. Patent No. 6,172,679 B1 (Ex. 1001, "the '679 patent"). FuzzySharp Technologies, Inc. ("Patent Owner") filed a Preliminary Response (Paper 8, "Prelim. Resp."). Pursuant to 35 U.S.C. § 314, in our Decision to Institute (Paper 9, "Dec."), we instituted this proceeding as to all of the challenged claims of the '679 patent.

During this trial, Patent Owner filed a Patent Owner Response (Paper 16, "PO Resp.") and Petitioner filed a Reply to the Patent Owner Response (Paper 19, "Reply"). An oral hearing in this matter and IPR2014-00001 (argued together) was held on October 28, 2014 (Paper 22, "Tr.").

We have jurisdiction under 35 U.S.C. § 6(c). This decision is a final written decision under 35 U.S.C. § 318(a) as to the patentability of the challenged claims. Based on the record before us, Petitioner has demonstrated by a preponderance of the evidence that claims 1, 4, and 5 are unpatentable.

B. Related Proceedings

According to Petitioner, Patent Owner has asserted the '679 patent against Petitioner in Case No. 4:12-cv-04413-YGR (N.D. Cal.) ("Intel action"), which is currently on appeal to the U.S. Court of Appeals for the Federal Circuit. Pet. 2; Paper 18.

According to Patent Owner, the only matter pending that may be affected by a decision in this proceeding is *FuzzySharp Technologies, Inc. v. Nvidia Corp.*, Civil Action No. 12-cv-6375-JST (N.D. Cal.), filed on December 17, 2012. Paper 6, at 2.

Petitioner also filed a petition for *inter partes* review of Patent 6,618,047 B1 ("the '047 patent"). *See Intel Corp. v. FuzzySharp Technologies, Inc.*, Case IPR2014-00001 (PTAB Sept. 30, 2013) (Paper 1). The '047 patent also is asserted by Patent Owner in the Intel action. *See, e.g.*, Ex. 1009.

C. Reference Relied Upon

Petitioner relies upon the following prior art reference: David Salesin & Jorge Stolfi, *The ZZ-Buffer: A Simple and Efficient Rendering Algorithm with Reliable Antialiasing* (1989) (Ex. 1002, "Salesin").

D. Ground of Unpatentability

We instituted this proceeding based on the ground of anticipation of claims 1, 4, and 5, under 35 U.S.C. § 102(b), by Salesin.

E. The '679 Patent

The '679 patent describes techniques for improving three-dimensional ("3-D") computer graphics visibility calculations. Ex. 1001, 1:9–12. A point in a 3-D image can be viewed from multiple viewpoints. *Id.* at 4:44–54. This is illustrated in Figures 2 and 3, reproduced below:
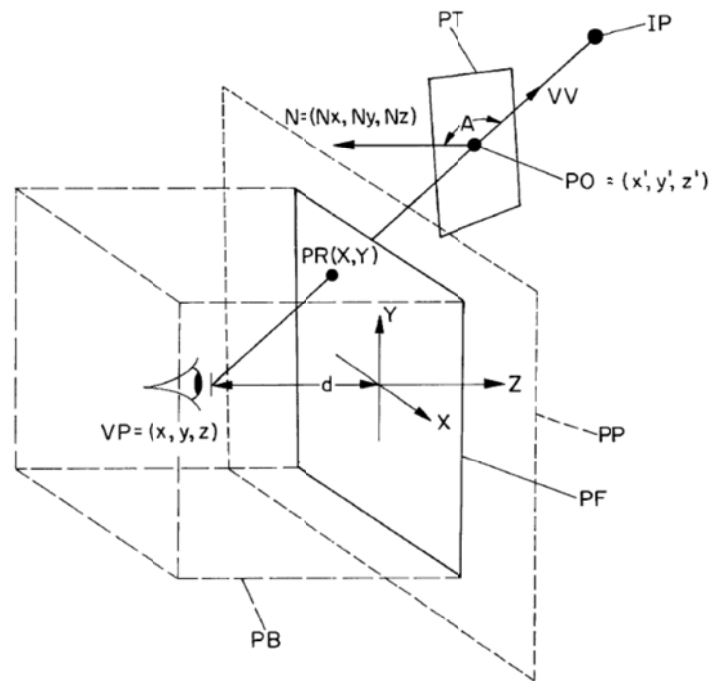
FIG. 2

Figure 2 depicts projections of a point at an arbitrary viewpoint. *Id.* at 3:42.
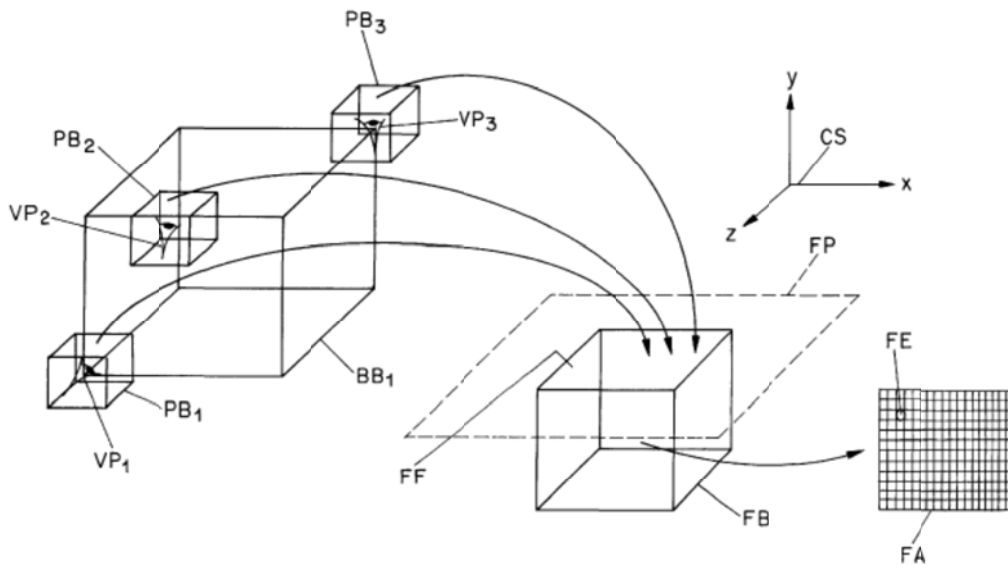

FIG. 3

Figure 3 depicts the relationship between projection boxes and a fuzzy projection box. *Id.* at 3:43–44.

A group of viewpoints (e.g., the three VPs of Figure 3) can be associated with a coordinate system and grouped in a "viewpoint bounding box" (e.g., BB of Figure 3), which the patent describes as the smallest right quadrangular prism enclosing the viewpoints. *Id.* at 4:63–5:1. The point to be observed can be said to be totally visible from the bounding box if it is always visible from every possible viewpoint in the bounding box and totally invisible if it is hidden from every such viewpoint. *Id.* at 5:7–11. The group of viewpoints may contain only a single viewpoint; in that case, the bounding box degenerates into the viewpoint. *Id.* at 5:18–22.

As shown in Figure 2, the point to be observed (PO) can be represented by the intersection of a projection plane (PP) and a vector (VV) from the point to be observed (PO) to a viewpoint (VP). *Id.* at 5:31–43. As shown in Figure 3, to facilitate sampling, the projection plane can be divided into rectangular cells or elements (fuzzy array FA). *Id.* at 6:58–67; Fig. 2. As shown in Figure 2, the point may be included in a visible patch (PT) that occludes an invisible point (IP). *Id.* at 5:48–50.

The '679 patent describes detecting patches that are invisible to all viewpoints in a bounding box. *Id.* at 9:8–10:55. Similarly, it describes detecting patches that are totally visible to all viewpoints in the bounding box. *Id.* at 10:56–11:52. Overlapping patches can be stored in a linked list called a projection patch list. *Id.* at 11:56–61. The '679 patent describes calculating a list of the totally visible and totally invisible patches for a viewpoint group. *Id.* at 11:56–13:26. The patches identified as totally visible and totally invisible can be ignored in subsequent visibility computations. *Id.* at 13:26–35. For example, they need not be compared with other patches to determine their visibility. *Id.* at 13:31–33.

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