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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte THREE-DIMENSIONAL MEDIA GROUP, LTD.

Appeal 2009-004087
Reexamination Control No. 90/007,578
United States Patent 4,925,294
Technology Center 3900

DECISION ON APPEAL[1]

Before JOHN A. JEFFERY, KARL D. EASTHOM, and KEVIN F. TURNER, *Administrative Patent Judges*.

EASTHOM, *Administrative Patent Judge*.

Opinion concurring-in-part and dissenting-in-part filed by Administrative Patent Judge TURNER.

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the "MAIL DATE" shown on the PTOL-90A cover letter attached to this decision.

Appellant, Three-Dimensional Media Group, Ltd., the real party in interest and assignee of the patent under reexamination, appeals under 35 U.S.C. §§ 134(b) and 306 from a final rejection of claims 1-24 and 26-44. Claim 25 has been confirmed. (*See* App. Br. 3.)[2] We have jurisdiction under 35 U.S.C. §§ 134(b) and 306.

We AFFIRM.

STATEMENT OF THE CASE

This proceeding arose from a third party request for *ex parte* reexamination by In-Three, Inc. of United States Patent 4,925,294, titled "Method to Convert Two Dimensional Pictures for Three-Dimensional Systems," and issued to listed inventors David M. Geshwind and Anthony H. Handal on May 15, 1990. Appellant's Brief indicates that (at the time of filing of the Brief) there were two related appeals, interferences, or judicial proceedings known to Appellant: *Imax Corp. & Three-Dimensional Media Group, Ltd. v. In-Three, Inc*., No. CV-05-1795 FMC MCX (C.D. Cal. filed Mar. 11, 2005) and *Imax Corp. v. Three-Dimensional Media Group and Unipat.org*, Arb. No. 50 133 T 00201 06 (Am. Arb. Assoc., Int'l Centre for Dispute Res., N.Y., N.Y.). (App. Br. 3.)

The Disclosed Invention

As stated in the '294 patent: "In accordance with the invention . . . standard two-dimensional motion picture film or videotape may be converted or processed, for use with three-dimensional [3-D] exhibition or

[2] This opinion employs the following abbreviations: Appellant's opening Brief ("App. Br.") and Reply Brief ("Reply Br."), and the Examiner's Answer ("Ans.") and Final Rejection ("Fin. Rej.").

transmission systems, so as to exhibit at least some three-dimensional or depth characteristics." (Col. 2, ll. 41-45.) In one embodiment, a computer assisted, human operated system separates a single two-dimensional (2-D) image stream into diverse elements and assigns depth information to some of the elements to produce images of three-dimensional format. (Col. 6, ll. 46-48.) "[T]he separation step may be omitted" for "discrete 2-D film sub-components, such as animation elements." (Col. 2, ll. 48-50.) In one embodiment, the depth information includes left and right image pairs processed by the computer from the 2-D image. (Col. 4, ll. 52-61.)

Claim 1

Exemplary claim 1 on appeal reads as follows:

1. A method of converting a two-dimensional image frame into a three-dimensional image frame consisting of the steps of:

a. inputing [sic] a frame of a two-dimensional image into a computer;
b. specifying at least two individual image elements in the two-dimensional image;
c. separating the two-dimensional image into said image elements;
d. specifying three-dimensional information for at least one of said image elements;
e. processing at least one of said image elements to incorporate said three-dimensional information and create at least one processed image element;
f. generating at least one processed image frame comprising at least one of said processed image elements.

The Prior Art References[3]

Kuperman	US 4,558,359	Dec. 10, 1985
Taylor	US 4,563,703	Jan. 7, 1986
Williams	US 4,608,596	Aug. 26, 1986
Imsand	US 4,723,159	Feb. 2, 1988
Falk	US 4,888,713	Dec. 19, 1989
Oka	US 4,965,844	Oct. 23, 1990
Hiromae	JP 60-52190	Mar. 25 1985[4]

A. Michael Noll, *Computer-Generated Three-Dimensional Movies*, 20, no. 11 Computers and Automation 20 (Nov. 1965)[hereinafter Noll].

Daniel L. Symmes, *Three-Dimensional Image*, Microsoft Encarta Online Encyclopedia (hard copy printed May 28, 2008 and of record, now indicated by the website indicated on the document to be discontinued: http://encarta.msn.com/text_761584746__0/Three-Dimensional_Image.htm) [hereinafter Encarta article].

The Rejections

Claims 1, 8, 10, 13, 15-22, 35-37, and 42 stand rejected under 35 U.S.C. 102(e) as anticipated by Falk.[5]

Claims 1, 8, 10, 13, 15-17, 22, 35-38, and 42 stand rejected under 35 U.S.C. 102(e) as anticipated by Oka.

[3] The Examiner relied upon the Encarta article listed below as an evidentiary reference source. (Ans. 16.) Some of the other relied upon evidentiary sources (from on-line sources such as Wikipedia) relied upon by both the Examiner and Appellant are not listed here but have been considered. Some of these additional references are discussed in more detail below.

[4] Unless otherwise indicated, reference to this Japanese patent refers to the full English translation thereof by translator Yasuyuki Tateishi of Tateishi Consulting, Inc. Appellant also submitted a partial translation of the same patent as discussed further below.

[5] Appellant erroneously lists claims 38 and 39 here too. (App. Br. 15).

Claims 1-4 and 26-28 stand rejected under 35 U.S.C. 102(b) as anticipated by Kuperman.

Claims 1-4, 10, 11, 13-15, 17, 24, 35, 37, 38, and 42 stand rejected under 35 U.S.C. 102(b) as anticipated by Hiromae.

Claims 22 and 23 stand rejected under 35 U.S.C. 103(a) as obvious based on Oka and Taylor.

Claims 10 and 29-31 stand rejected under 35 U.S.C. 103(a) as obvious based on Kuperman and Noll.

Claims 5-7 and 12 stand rejected under 35 U.S.C. 103(a) as obvious based on Hiromae and admitted prior art (APA).

Claim 8 stands rejected under 35 U.S.C. 103(a) as obvious based on Hiromae and Williams.

Claims 9 and 36 stand rejected under 35 U.S.C. 103(a) as obvious based on Hiromae, APA, and Williams.

Claims 18-21 stand rejected under 35 U.S.C. 103(a) as obvious based on Hiromae and Imsand.

Claims 32-34, 40, and 41 stand rejected under 35 U.S.C. 103(a) as obvious based on Hiromae and Kuperman.

Claim 39 stands rejected under 35 U.S.C. 103(a) as obvious based on Hiromae, Kuperman, and Williams.

Claims 43 and 44 stand rejected under 35 U.S.C. 103(a) as obvious based on Hiromae and Noll.

ISSUES

Appellant asserts that in light of the ‘294 patent, skilled artisans would have understood that the term “three-dimensional image” only applies to

images created by a stereoscopic process, and as such, the anticipation rejections based on Falk and Oka are improper. Appellant also asserts that in light of the '294 patent, skilled artisans would have understood that the term "image element" encompasses more than a single pixel, and as such, the Kuperman anticipation rejection is improper. Appellant also asserts that Hiromae's disclosure is non-enabling, and that Hiromae does not disclose various claim elements and disclosed features implied in the independent claims, including inputting digitized images into a computer. Appellant further asserts that the Examiner's anticipation and obviousness rejections are deficient for various reasons. Appellant also asserts that the Examiner failed to properly treat Appellant's expert declarations. (*See e.g.*, App. Br. 16-26, 57-59.) Thus, this appeal involves the following primary issues:

Has the Examiner erred in finding that Falk discloses employing image elements for conversion to three-dimensional images and anticipates claims 1, 8, 10, 13, 15-22, 35-37, and 42?

Has the Examiner erred in finding that Oka discloses employing image elements for conversion to three-dimensional images and anticipates certain claims 1, 8, 10, 13, 15-17, 22, 35-38, and 42?

Has the Examiner erred in finding that Kuperman discloses image elements and anticipates certain claims 1-4 and 26-28?

Has the Examiner erred in finding that Hiromae constitutes an enabling reference, discloses inputting image elements into a computer, and anticipates claims 1-4, 10, 11, 13-15, 17, 24, 35, 37, 38, and 42?

Has the Examiner erred in determining that the prior art combinations listed *supra* render obvious certain disputed limitations of claims 5-10, 12, 18-23, 29-34, 36, 39-41, 43, and 44?

FINDINGS OF FACT

The '294 Disclosure

D1. The Examiner quoted the following passages in the '294 patent to show that "the 'three-dimensional' image terminology, as used in the specification, should not be construed as being limited to 'stereoscopic' images and image pairs." (Fin. Rej. 37-38.):

> "Various systems for the encoding, display, projection recording, transmission or viewing **3-D images** exist, and new systems may be developed. **Specifically**, various techniques for specifying, encoding, and viewing 3-D information may now, or come to exist, which **do not make use of the parallax offset and/or left and right image pairs** and/or viewing glasses, or which embody new techniques or changes or improvements to current systems." (Emphasis added) [Lines 47-55 of column 3]
>
> "In accordance with the invention, standard two-dimensional motion picture film or videotape may be converted or processed, for use with three-dimensional exhibition or transmission systems, so as to exhibit at least some three-dimensional or depth characteristics." [Lines 41-45 of column 2]

Id. at 38 (bracketed citation information and emphasis by the Examiner).

D2. The '294 patent also describes processing and improvements to the final product in terms of 3-D graphics as part of the invention:

> As part of the processing to be performed on the 2-D source image . . . additional effects may be programmed into the computer to heighten the sense of depth. For example, shadows . . . . There are, of course other technical or artistic

> techniques that can be used to indicate depth in an image which may also be incorporated into the image processing programs and would therefore be part of the invention as described herein. Therefore, the above examples are illustrative and should not be construed as limiting the scope of the invention. Alternatively, depth information may be intentionally distorted for effect or for artistic purpose.
>
> Improvements may be made to the final product by including new image elements that were not part of the original 2-D source image. These could include 2-D image elements that are then assigned depth values, 3-D image elements created by 3-D photography and then entered into the computer as left- and right-image pairs, for example, or 3-D synthetic computer generated graphics. In particular, since computer generated image elements can be created with depth information, they can be easily integrated into the overall 3-D scene with vivid effect. For example, a 3-D laser blast could be created by computer image synthesis such that it would in turn obscure and be obscured by other image elements in an appropriate manner and might even be created so as to appear to continue beyond the front of the screen into 'viewer space'.

(Col. 6, ll. 18-52.)

D3. The '294 patent refers to "three-dimensional space" in a computer:

> As various image elements are separated and assigned depth values, a situation develops where diverse objects exist in a 'three-dimensional space' within the computer. It should be noted that, in order to display a realistic representation of the entire scene, forward most objects must obscure all or part of rearmost objects with which they overlap (except in the case where forward most object were transparent). When generating left- and right-eye views, the pattern of overlap of image elements and thus the pattern of obscuring of image elements will, in general, be different.

(Col. 5, ll. 53-63.)

4. The '294 patent refers to "3-D backgrounds" produced by "computer generated graphics":

> the flat 2-D backgrounds may be replaced by 3-D backgrounds. The 3-D backgrounds might consist of computer generated graphics, in which case depth information for the various elements of the background would be available at the time of the background creation. Alternatively, 3-D backgrounds might be created by 3-D photography, in which case depth information for the background elements may be derived, by the computer, from the comparison of the left- and right-image pairs of the 3-D background photographs . . . .

(Col. 6, ll. 55- 67.)

D5. According to the '294 patent, the 3-D conversion system has many similarities with a colorization patent by applicant Geshwind: Both involve computer aided systems which allow the operator to input information separating various image elements within frames, allow the operator to specify attributes (color in one case, depth in the other) for the image elements, and cause the computer to process new image frames from the original, based on the operator input. (Col. 7, ll. 11-25.) The '294 patent process is repeated for additional frames of a video. (Col. 4, ll. 65-66.)

D6. "Depending upon the particular 3-D system to be used, left- and right-image pairs may or may not be the final stage or an intermediate stage or bypassed entirely." (Col. 4, ll. 58-61.)

D7. Appellant states that "another embodiment of the invention as described herein employs a high degree of human interaction with the computer. However, as artificial intelligence progress, a predominantly or completely automated system may become practical and is within the intended scope of the invention." (Col. 3, ll. 11-16.) "Alternately, depth

information to create 3-D background may be specified otherwise by operator input and/or computer processing." (Col. 7, ll. 1-3.). In one embodiment, the computer can be instructed to interpolate and process depth information the entire image element with different portions of the element assigned different depth information. (Col. 5, ll. 1-15.)

D8. The '294 patent concludes with the following disclaimer: "[I]t is intended that all matter contained in the above description or shown in the accompanying figures shall be interpreted as illustrative and not in a limiting sense." (Col. 7, ll. 38-41.)

Falk

F1. Falk discloses a computer aided design (CAD) software system which provides texture mapping of a two-dimensional image to enhance "the three-dimensional appearance of the image" (Abstract) on standard (or slightly upgraded) graphic CRTs using floating-point processors to support control of individual pixels on the CRTs. (Col. 1, ll. 7-10; col. 3, l. 21-35, col. 5, ll. 34-63) For example, a designer enters an image of a model wearing a dress into the CAD system. (Col. 2, ll. 47-51.) "In order to obtain a three-dimensional appearance, the designer . . . creates a perspective mesh overlaying the dress which now gives the designer the ability to represent, in two-dimensional form, the actual three dimensional surface." (Col. 2, ll. 55-59.)

A video camera can provide a picture of an actual room to be designed and then the texture, pattern, and weave of carpet, drapes, and the like can be applied to the room image using the mesh/mapping technique of the invention. (Col. 2, l. 67 to col. 3, l. 6.) "Rather than guessing how a

particular carpet will look in a particular room, the design can now actually 'lay' the carpet the room using a CAD system and see how the carpet looks in a three-dimensional representation." (Col. 6, ll. 6-10.)

F2. Falk discloses adding surface details to a portion of an image:

> The "surface detail", also known as "textures" or "patterns", may be digitized images brought into the system via video camera input, or they may have been designed using other facilities. Those facilities may be paint programs, fabric weaving programs, or patterning programs or some of other functions in standard two-dimensional CAD systems. The textures or patterns (and images, for that matter) are stored on the data storage device, e.g. system hard disk, as a rectangular array of pixels.

(Col. 5, ll. 23-31.)

F3. A designer can retrieve various surface details (in this case various cloth or materials having different, textures, weaves, pattern, colors, and the like) from computer storage and "dress" a model. The system also produces a hard copy of the resulting design. In addition to a CRT output, the system also produces a hard copy of the resulting design. (Col. 2, ll. 59-66; Fig. 1.) For example, Figure 1 discloses output video tape 24, an output camera 26, a graphic CRT 10', a printer 28, and a plotter 30.

The meshes to be applied via the texture mapping process correspond to segments on the original image. The segmented image and mesh boundaries are defined in a manual digitizing process using a light pen or mouse. (Col. 4, ll. 37-56; col. 8, ll. 46-52.) Meshes or sub-meshes are shaped over corresponding image segments. (Col. 5, ll. 3-15.) Meshes can be stored with associated segments by selecting the "Store Mesh with Segment" menu choice followed by selecting the segment with the locating

instrument. (Col. 7, ll. 17-22.) "Each unit in the mesh has a rectangular array of pixels from the stored texture or pattern mapped to it. Since the shape of mesh unit on the segmented image may not be rectangular, the texture will be distorted to fit the shape of the mesh." (Col. 8, ll. 18-23.) Stored pattern or texture files (to be applied to the segmented image according to a particular defined mesh) also are created similar to the process of creating the segmented image. (Col. 11, ll. 43-52.)

F4. In a section describing the generation of meshes, Falk discloses using mesh coordinates to generate internal or sub-meshes. Falk also discloses generating meshes that do not have these internal sub-meshes. (Col. 10, ll. 23-68.) "The mathematical techniques for generating two- and three-dimensional meshes based on four bounding polylines, (see for example, 'Mapping Methods for Generating Three-Dimensional Meshes', *Computers in Mechanical Engineering*, (Aug. 1982) are known and the actual mechanics of the process need not be repeated here." (Col. 10, ll. 27-33.)

Oka

O1. Oka describes transforming a video image onto a mathematically defined three-dimensional curved surface. For example, a flat image can be transformed so that it appears to be formed on a curved cylinder. (Figs. 1A, 1B, 9; col. 4, ll. 10-36.) Oka describes adding weighted shading (col. 4, l. 36) so that images "exhibit a stereoscopic effect of the curved surface" (col. 4, l. 15).

O2. Oka describes the transformation to "three-dimensional" images as follows:

> In the described manner, transformation from a two-dimensional, planar picture image to a three-dimensional, solid picture image can be executed.
>
> The above described image transformation apparatus . . . produc[es] a special effect of the action of turning a page in a book.
>
> Also, when applied to the output unit of a computer, it can express its output data on a three-dimensional curved surface and help the user in its intuitive understanding.
>
> What is important . . . is how to produce a stereoscopic effect. [In some cases] . . . such as a still picture, the stereoscopic effect is frequently lost.
>
> The reason why is because what is exhibited is merely a transformed image onto a three-dimensional image surface as it is. In reality, however, shading constitutes an important factor in producing stereoscopic effect.

(Col. 3, ll. 22-43.)

O3. Oka employs weighting factors to quantify shading created by a virtual light source. The weighting factors take into account first and second vector information of an original image mapped into a three-dimensional surface in which the first vectors correspond to "orientations [of the mapped image] taken by minute areas on the surface" and the second vectors correspond to "directions from the minute areas toward a virtual light source disposed in a position." The input image data or output image data is weighted according to the weighting factors. (Abstract; *see* Fig. 10.)

O4. "When paper is rolled into a cylindrical form as shown in FIG. 6, both the front and back sides come in sight, and when shading for the surfaces is considered, the surface on the front side must be distinguished form the surface on the back side." (Col. 6, ll. 47-51.) Using the vector weighting process, color and luminance values are weighted and applied to

the mapped image data to create the appropriate shading (based on the position of the virtual light source.) (Col. 6, l. 47 to col. 7, l. 60.) "In displaying a three-dimensional image in the above case, it is required not to display the portions hidden from the observing point." (Col. 5, l. 67 to col. 6, l. 1.)

O5. The process transforms original images block by block using a representative data point for each block and using a linear approximation process and keeping track of the address positions of the original data corresponding to the area in the vicinity of the transformed position. (Col. 5, ll. 55-67.)

O6. Oka employs input frame memory 34, output frame memory 36, and an "interpolation circuit" 35. (Col. 7, ll. 61-63.) The input frame memory stores image input video signals. (Col. 9, ll. 9-17.)

American Heritage Dictionary

AH1. A definition of "three-D" follows: "Three-dimensional. Also written 3-D. A three-dimensional medium, display, or performance, especially a cinematic or graphic display in three dimensions."

Two definitions of "[t]hree-dimensional" follow: 1. "Of, pertaining to, having, or existing in three dimensions. 2. Having or appearing to have extension in depth."

The American Heritage Dictionary of the English Language 1340 (1976).

Encarta

E1. The Introduction of Encarta begins as with a generic definition as follows: "Three-Dimensional Image, or 3-D image, flat image enhanced to impart the illusion of depth." (§ I.) The section describes how humans

perceive depth: "Our eyes are spaced about 6 cm (2.5 in) apart, which causes each eye to receive a slightly different image. The brain fuses these two images into a single 3-D image, enabling us to see depth. This way of seeing is called binocular vision, or stereoscopic vision (*see* Vision)." The section also refers to several techniques to create the illusion of depth and which "make the objects in images appear to pop out of the paper, film, or screen on which they appear." (*Id*.)

The next section states: "one way to impart the illusion of depth in a photograph is to create a stereograph – a combination of two photographs of the same scene taken from slightly different angles. The slightly different perspectives mimic stereoscopic vision." (§ II.)

The next two sections respectively describe anaglyphs involving color filters and a superposition of two views of the same scene, and polarized images involving two projectors. (§§ III, IV.) The next to last section describes autostereograms (which include lenticular images, holograms, and, and computer-generated single image random dot sequences). An autosterogram is a stereoscopic image that does not require a special viewing device. (§ V.)

E2. The final section describes "3-D computer graphics using a process called rendering. In this case, the term 3-D refers not to stereoscopic images but to graphics rendered with highly accurate shape, shading, and perspective using mathematical calculations on a computer." (§ VI.)

PRINCIPLES OF LAW

"[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability." *In*

re Oetiker, 977 F.2d 1443, 1445 (Fed. Cir. 1992). Appellant has the burden on appeal to present arguments with respect to any ground of rejection. Arguments not presented are deemed waived. *See id.*; 37 C.F.R. § 41.37(c)(1)(vii); MPEP 2275 VI (Rev. 7, July 2008)(37 CFR § 41.37 "requires that the brief must set forth the authorities and arguments relied on, and to the extent that it fails to do so with respect to any ground of rejection, that ground may be summarily sustained. A distinction must be made between the lack of any argument and the presentation of arguments that carry no conviction." In the former case, summary affirmance is warranted, while in the latter case, "a decision on the merits is made, although it may well be merely an affirmance based on the grounds relied on by the examiner.")[6] "A statement which merely points out what a claim recites will not be considered a separate argument for patentability of the claim." 37 C.F.R. § 41.37(c)(1)(vii)

"'[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.'" *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 418 (2007)

[6] *Accord Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010), *avail*. at http://www.uspto.gov/ip/boards/bpai/decisions/prec/index.jsp (precedential) ("If an appellant fails to present arguments on a particular issue — or, more broadly, on a particular rejection — the Board will not, as a general matter, unilaterally review those uncontested aspects of the rejection."); *Hyatt v. Dudas*, 551 F.3d 1307, 1313-14 (Fed. Cir. 2008) (the Board may treat arguments appellant failed to make for a given ground of rejection as waived).

(citation omitted). Obviousness is determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments.

"[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp*., 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

ANALYSIS

Claim Construction – Expired Patent on Reexamination

As the Examiner noted, the '294 Patent term expired during the reexamination proceedings thereby foreclosing amendments to the original patented claims. (*See* Fin. Rej. 2.) Under similar circumstances, the Board in *Ex parte Papst-Motoren*, 1 USPQ2d 1655, 1656 (BPAI 1986) held that is error to follow the normal rule of reexamination claim construction announced in *In re Yamamoto*, 740 F.2d 1569, 1571 (Fed. Circ. 1984) in which claims are given the "broadest reasonable construction consistent with the specification." Conversely, the Board also stated that it would be error to read "inferential limitations" into the claims. *Papst-Motoren*, 1 USPQ2d at 1657 (citation omitted) (contrasting "construing express claim language" "narrowly" in light of the specification with reading improper "inferential limitations" into a claim).

Papst-Motoren instructs that, rather than applying the "broadest reasonable" rule, claim construction rules as followed in infringement suits serve as appropriate guides. *See id*. at 1656 (citing *In re Prater*, 415 F.2d 1393 (CCPA 1969)). As one non-limiting example, prosecution history may

shed light on claim scope for issued patents, but is not employed as a guide during initial prosecution prior to patent issuance.[7] *See e.g.*, MPEP 2111.01 § I (Rev. 6, Sept. 2007) (discussing different claim interpretation rules).

More recent Federal Circuit precedent dictates that in all cases, claims "must be read in view of the specification. . . . [T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315 (internal citations omitted). Accordingly, this opinion follows general claim construction guidelines announced in *Phillips* and also specific guidelines enunciated in cases pertaining to infringement suits.

Claim Interpretation of "Three-Dimensional Image"

Except as otherwise noted below, Appellant's arguments generally focus on claim 1 as representative of claims 1, 8, 10, 13, 15-22, 35-37 and 42 rejected as anticipated by Falk, and as representative of claims 1, 8, 10, 13, 15-17, 22, 35-38 and 42 rejected as anticipated by Oka. The arguments against each anticipation rejection are similar. (*See e.g.*, App. Br. 16.) Accordingly, claim 1 is selected to represent each group, at least with regard to the common issue involving the meaning of "three-dimensional image." *See* 37 C.F.R. § 41.37(c)(1)(vii).

[7] Neither the Examiner nor Appellant relies on the prosecution history pertaining to the initial '294 patent prosecution. In any event, the '294 patent examination record (i.e., prior to the reexamination proceeding giving rise to this appeal) does not reveal any prosecution history which would shed light on the meaning of any claim terms in dispute here (or any other claim terms). (*Accord* Request for *Ex Parte* Reexamination 5 ("The prosecution history for the '294 patent was notably uneventful.").)

This common issue involves whether "three-dimensional image" as recited in claim 1 should be restricted to mean "stereoscopic three-dimensional image." Appellant "contends, and the declarations of two experts (Chou, paragraphs 11-17, and Feiner, paragraphs 15-21, attached hereto as Exhibits B & A, respectively) in the field concur, that as used in the '294 'three-dimensional' means stereoscopic, and not the automated artists' technique of Falk." (App. Br. 33.) [8] The experts do not specifically refer to Falk (or Oka).

Appellant argues that "an applicant may be his own lexicographer" and to establish "specific meanings for particular terms" that "the claims, **when read in light of the specification**, reasonably apprize [sic] those skilled in the art both of the utilization and scope of the invention." (App. Br. 25.) This argument tracks Appellant's prior arguments during the reexamination proceeding before the Examiner. (*See e.g.*, Appellant's Response 14-15 *supra* note 8.) Prior to Appellant's Response, the Examiner stated that "the Patent Owner agreed to provide the location of the special definition "three-dimensional image" in the '294 patent."

[8] Appellant refers to two affidavits attached to Appellant's Brief in support of various positions advanced by Appellant: Declaration of Michael F. Chou ("Chou Dec'l"), Declaration of Steven K. Feiner, PhD. ("Feiner Dec'l"). The expert affidavits (and another by a translator as discussed further below) were originally submitted in an After-Final Response. (Response to Final Office Action (filed Nov. 7, 2007).) Initially, the Examiner did not indicate whether any affidavits had been entered. (*See* Advisory Action (mailed Nov. 27, 2007).) Subsequently, the Examiner indicated that the Chou and Feiner affidavits had been considered. (Ans. 65-66.) As such, these two affidavits are considered to be of record and before the Board.

(Examiner's Interview Summary (10/24/2007).) The Examiner maintained in the Answer that "[w]hen a patentee acts as his own lexicographer in redefining the meaning of particular claim terms away from their ordinary meaning, he must clearly express that intent in the written description." (Ans. 64 (citing MPEP § 2111.01 [IV] (quoting *Merck & Co., Inc. v. Teva Pharmaceuticals*, 395 F.3d 1364, 1370, 1379 (Fed. Cir. 2005)).)

As the Examiner indicated, a patentee, acting as his own lexicographer, must clearly establish a definition contrary to the plain meaning of a term in order to narrow the term. *Merck*, 395 F.3d at 1370, 1379 (discussing the "lexicographer rule" and quoting *Union Carbide Chems. & Plastics tech. Corp. v. Shell*, 308 F.3d 1167, 1177-78 (Fed. Cir. 2002) ("stating that 'the presumption in favor of the claim term's ordinary meaning is overcome, however, if a different meaning is clearly and deliberately set forth in the intrinsic evidence.'"); *Johnson Worldwide Assocs., Inc. v. Zebco Corp*., 175 F.3d 985, 989 (Fed. Circ. 1999) ("The general rule is, or course, that terms in the claims are to be given their ordinary and customary meaning.")

Appellant's reliance on the lexicographer rule indicates that the plain (i.e., ordinary and customary) meaning of "three-dimensional image" (or, equivalently, "3-D image") is not in dispute. In other words, Appellant's arguments are interpreted as not disputing that the plain meaning of three-dimensional image includes non-stereoscopically produced images.[9] Rather

[9] By failing to clearly argue that the plain meaning of 3-D (or three-dimensional, or three-dimensional image) is in dispute in the opening Brief, Appellant has waived that potential argument. (*See supra*, note 6.) Assuming for the sake of argument that the plain meaning issue has not been

as indicated *supra*, Appellant agreed to provide a "special definition" located within the '294 patent – a definition by the patentee as lexicographer which is contrary to the plain meaning.

Notwithstanding the documented agreement, Appellant points to no special definition, but argues that in the '294 patent "specification, 'three-dimensional' and '3D' always mean stereoscopic 3-D." (App. Br. 26 (citing "ExhB"; i.e., Chou Dec'l ¶ 17).) Mr. Chou and Dr. Feiner gave similar opinions. Dr. Feiner opined as follows:

> As used in the '294 patent, it is unambiguous to anyone skilled in the art that the terms "3D" and "three-dimensional" refer to the stereographic imagery, where a different view is presented to each eye of the viewer. It is clear that, as used in the '294 patent, the terms do *not* refer to the use of shading, texturing, perspective projection, or other techniques employed to give the impression of depth (but no true stereoscopic depth effect) in a two-dimensional image when that single image is viewed by both eyes.

(Feiner Dec'l ¶ 15.)

To support the statement, Dr. Feiner pointed to specific passages in the '294 patent and opined that despite the Examiner's reliance on portions of the '294 patent (such as col. 2, ll. 41-45, col. 3, ll. 47-55 – *see* D1), the '294 patent clearly refers to stereoscopically created images. (Feiner Dec'l

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waived, the evidence here supports a broad plain meaning in which the term "three-dimensional image" is not limited to images created by stereographic systems. (*See* AH1 (defining "three-dimensional"); E1 (defining "Three-Dimensional Image, or 3-D image"); F1 (describing "the three-dimensional appearance of the image"), O2 (describing, *inter alia*, "a three-dimensional, solid picture image"), and D1-D8 (as discussed more fully below, the '294 patent uses the term three-dimensional" broadly to include computer graphics, artistic techniques, and other depth enhancing methods).)

¶¶ 15-21.) While Dr. Feiner stated that "the meaning of the term '3-D' in the '294 patent is clear from *the entire specification*," Dr. Feiner refers to isolated passages such as one describing Figure 1 as showing left and right images. (*Id*. at ¶ 17 emphasis added, citing col. 1, ll. 32-55, col. 2, ll. 57-61, and col. 3, ll. 17-46).) Declarant Chou's statements parallel those of Dr. Feiner (i.e., not quite verbatim). (*See* Chou Dec'l ¶¶ 11-17.)

The entire specification of the '294 patent does not support Appellant's argument (or the experts' opinions) that 3-D always means stereographic. The term "stereographic" (or any form of the term) does not even appear in the '294 patent. But even if it did, or even if the term is implied from the patent's disclosure, the '294 patent nonetheless specifically disavows any "limiting" effect based on the "illustrative" "description." (D8.)

Moreover, the '294 patent refers to "3-D" without limitation. (*See* D1-D7.) For example, the '294 patent describes a "3-D synthetic computer generated graphics" technique to create "computer generated *image* elements . . . with *depth* information" (emphasis supplied) and *contrasts* that technique with a known stereoscopic technique (i.e., in which left and right image pairs in a 3-D photograph are generated). (D2.) Similarly, the '294 patent refers in general to overlap of near and far images "in order to display a realistic representation" in "'three-dimensional space' within the computer," and *contrasts* that technique to a more limited specific stereoscopy technique: "*[w]hen generating left- and right-eye views*, the pattern of overlap of image elements and thus the pattern of obscuring of image elements will, in general, be *different*." (D3 (emphasis added).) In

still another instance, the '294 patent similarly contrasts "depth information" in "3-D backgrounds [which] might consist of computer generated graphics" with a stereographic alternative technique of using left- and right-eye views. (D4.)

Finally, as the Examiner notes, the '294 patent describes conversion of "standard two-dimensional motion picture film or videotape . . . for use with three-dimensional exhibition or transmission systems, so as to exhibit at least some three-dimensional or depth characteristics." (D1.) This phrase, in light of other phrases noted here, implies that while "depth" is interchangeable with "three-dimensional," neither term is interchangeable with *stereoscopic* three-dimensional.

In other words, the '294 patent does not consistently interchange "3-D" with "stereoscopic 3-D," notwithstanding Appellant's arguments. *Cf. Edwards Life Sciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (2009) (holding that the consistent interchanging of "interluminal graft 10" with "graft 10" in the patent and use of the phrase, "as defined above," created a narrowing definition of graft to mean an interluminal graft). "The interchangeable use of the two terms is akin to a definition equating the two." *Id*. Appellant has not met the burden under *Edwards* to establish a clear disavowal of the plain meaning of the disputed term "three-dimensional."

Contrary to Appellant's argument, neither of the experts opines that the term 3-D *always* means stereoscopic 3-D in the '294 patent, even though they do opine that "the terms do not refer to the use of shading, texturing, perspective projection or other techniques employed by *artists* to give the

impression of depth (but no true stereographic depth effect) . . . ." (Feiner Dec'l ¶ 15 (emphasis added); *accord* Chou Dec'l ¶ 15).) As Oka and Falk involve techniques created by skilled mathematical and computer artisans to create three-dimensional software/hardware conversion routines (F1-F4; O1-O6), the failure by the experts to address the Falk and Oka patents specifically, and this oblique reference to "artists" is not helpful.

In any event, even if the experts were referring implicitly to Falk and Oka, Mr. Chou narrowly concludes that "the terms 'three-dimensional' and '3-D' used in the disclosure and claims of the '294 describe an invention that produces true stereoscopic depth, and not an invention for creating an illusion of depth *in a single 2D image* via the use of artistic techniques such as shading, texture, or 2D perspective." (Chou Dec'l ¶ 17 (emphasis added); *accord* Feiner Dec'l ¶ 21 ("a single 2D image").) In the first half of the sentence, Mr. Chou concludes that the term 3-D supports true stereoscopic depth. The support for stereoscopy is not in dispute here.

In the second half of the sentence, neither expert concludes that *in terms of a video having multiple frames* (i.e., a movie with more than "a single 2D image" – *see* D1), the term 3-D does not support other forms of mathematical or technical conversion routines for these other frames. Moreover, to the '294 patent discloses computer graphics techniques and

> *other technical or artistic techniques* . . . to indicate depth in an image which may also be incorporated into the image processing programs and would therefore be part of the invention as described herein. [*These examples*] *should not be construed as limiting the scope of the invention. Alternatively, depth information may be intentionally distorted for effect or for artistic purpose, for at least some of the multiple frames in a video*.

(D2 (emphasis added).)

In other words, stereoscopy is not unequivocally disclosed in the '294 patent as the sole technique for each (single) frame of a video. To the contrary, "left- and right-image pairs . . . may be bypassed entirely." (D6.) The '294 patent discloses conversion of multiple frames in a video sequence (e.g., movie) using several 3-D conversion techniques, including stereoscopy, computer graphics, and/or other artistic depth conversion techniques. (*See* D1-D5.) Claim 1 is broad enough to read on conversion of a single frame by either 3-D stereoscopy, 3-D computer graphics, other 3-D artistic depth conversion techniques, or by a combination of all techniques. Neither expert's opinion refutes this reading of the '294 patent and claim 1.

In addition to narrowing a term based on the lexicography rule, an alternative to the ordinary meaning can also be adopted "if the intrinsic evidence shows that the patentee distinguished that term for prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention." *Edwards*, 582 F.3d at 1339.

To show support for the broader definition, as noted *supra*, the Examiner cited passages at columns 2 and 3 of the '294 patent. (D1.) The column 2 passage (i.e., describing "three dimensional or depth characteristics") is briefly discussed *supra* and further *infra*. The column 3 passage refers to new systems which "may now, or come to exist, which do not make use of the parallax offset . . . ." (D1.) Appellant, apparently relying on the experts, argues that both of these passages only encompass 3-

D stereoscopy. (*See* App. Br. 31-33 (arguments tracking statements appearing in the affidavits without attribution).)

These arguments demonstrate, at most, that the '294 patent discloses a preferred embodiment wherein some frames in a video are converted by stereoscopy, as indicated in the discussion *supra*. For example, Appellant, tracking the experts, reasons that the other 3-D systems referenced in the '294 patent which "do not make use of the parallax offset and/or left and right image pairs**"** (D1), must refer to other stereoscopic systems, including lenticular and holographic systems, because otherwise, images would appear to be the same in 2-D and 3-D systems during exhibition thereof. (*See supra* note 9; App. Br. 31.)[10] The Encarta reference also describes holographic and lenticular systems as stereoscopic. (E1.)

Appellant's argument ignores the references in the passages cited by the Examiner describing the '294 patent method as involving the storage and transmission of movies. (*See* D1.) Mere storage and transmission does not require any difference in exhibition. The argument also presumes that all prior art 2-D (e.g., old analog television and/or CRT) systems can exhibit

[10] Stereoscopically created images might appear to "pop out" of a flat surface from which they appear. (E1.) Appellant not only does not argue that stereoscopy requires the images to pop out, but alternatively (in addition to "room space" 3-D (i.e., a pop out)), describes a "3-D space behind the screen (away from the viewer)" in reference to "the practice of '294." (App. Br. 45.) The '294 patent also states "a 3-D laser blast could be created by computer image synthesis such that it would in turn obscure and be obscured by other image elements in an appropriate manner and *might even be created so as to appear to continue beyond the front of the screen into viewer space*." (D2 (emphasis added).) The emphasized portion indicates that a "3-D laser blast" need not "pop out," but that such a computer-generated blast is still "3-D" – i.e., whether produced by stereoscopy or not.

computer graphic 3-D or other 3-D depth conversion techniques (such as shading, texturing, and transformation, as disclosed in Oka and/or Falk) without any system upgrades or modification. No evidentiary basis exists for such an underlying presumption. Some modification must occur to create a three-dimensional appearance in existing systems. (*See* O1-O6, F1-F4.) As such, the '294 patent and claim 1 do not preclude frames viewed in a 2-D system modified with memory expansion, digital conversion, and software, etc., in order to handle computer generated non-stereoscopic 3-D information and create 3-D images as occurs in Falk and Oka. (*Id*.)

Further as to the column 2 passage of the '294 patent and the meaning of "three-dimensional or depth," Appellant states it must mean "at least some partial stereoscopic effect . . . ." (App. Br. 33.) This conclusory statement does not explain why "three-dimensional" simply does not equate to depth as the passage plainly states.

In any event, at most, based on the foregoing discussion, Appellant's arguments throughout the Briefs may imply that 3-D stereoscopy is the sole embodiment (at least for some frames) required to meet an objective (i.e., stereographic 3-D exhibition). However, even if only a sole embodiment is disclosed to meet a certain objective, claims need not be construed to include every intended purpose. *Leibel-Flarsheim Co. v. Medrad, Inc*., 358 F.3d 898, 906 (Fed. Cir. 2008) ("Even when the specification describes only a single embodiment, the claims of a patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using 'words of manifest exclusion or restriction.'") The "fact that a patent asserts that an invention achieves several objectives does not require

that each of the claims be construed as limited by structures that are capable of achieving all of the objectives." *Id*. at 908. In other words, even if stereoscopic exhibition viewing pertains to an objective of the sole disclosed embodiment, *Leibel-Flarsheim Co* dictates that without more, claim 1 will not be construed as so limited.

In the '294 patent, the main, or at least one, purpose behind the invention appears to be the ability to process images to provide both depth and color to images in successive frames. (*See* D5.) A separation step, and left and right image pairs, for some embodiments can be eliminated. (D7; "The Disclosed Invention" section of the opinion *supra*.) It follows that the disclosed generic depth and color processing is not limited to stereoscopic processing, at least for each frame processed in a (color) movie.

Further, mere inferences pointing to stereoscopy (as the sole or preferred embodiment) do not establish that the specification clearly describes an invention which includes only one method of producing a 3-D image. *See Johnson Worldwide Assocs., Inc. v. Zebco Corp*., 175 F.3d 985, 988 (Fed. Circ. 19999) (distinguishing *Laitram Corp. v. Morehouse Industries, Inc*., 143 F.3d 1456 (Fed. Cir. 1988) as involving a "written description that made clear that 'the asserted claims will bear *only one* interpretation . . . .' Here of course, there is no such unambiguous language in the written description; nothing suggests that 'heading' is required to be the heading of the trolling motor.")

The Examiner also cites the Encarta reference to show that the term 3-D generically includes 3-D computer graphics. (Ans. 65-66 (citing the Encarta reference).) The Encarta reference refers to 3-D stereoscopic

images and also to 3-D graphics. As the Examiner found, Encarta defines a "3-D image" as a "flat image enhanced to impart the illusion of depth." (Ans. 66; E1.) Encarta's description appears cumulative to Oka, Falk, and the '294 patent in terms of the normal meaning of the term "three-dimensional"– which Appellant does not dispute in the opening Brief as indicated *supra*. (*See* note 9).

In the Reply Brief, Appellant on the one hand maintains the "right to be his own lexicographer" but on the other hand, says that "Appellant is not attempting to read the limitation of stereoscopic into his claim from the specification" because the term "'stereoscopic' is not found in the disclosure" and "3-D" always refers to imagery where different images are presented to each eye of the viewer." (Reply Br. 13.) This argument is confounding since a lexicographer typically seeks to establish a contrary meaning by reliance on the specification.

Appellant also argues that the Encarta reference does not contradict the experts, essentially repeating earlier arguments. (*See* Reply Br. 9.) Appellant also argues that when the Encarta author used the phrase "image enhanced to impart the illusion of depth," the author clearly "was talking about creating a slightly different image." (Reply Br. 9.) Appellant attempts to support this position by arguing that the author's reference to "'imparting the **illusion** of depth' is in contrast to actually viewing reality." (*Id*.) (emphasis by Appellant.) Encarta's generic definition is not so limited and does not support Appellant's position. Encarta's reference to an illusion includes stereoscopically created illusions. (*See* E1, E2.) Moreover, stereoscopic systems, which may produce images that "pop out," do not

involve "actually viewing reality" - unless one refers to the human stereoscopic perception system. (*See* E1, E2, *supra* note 10; *accord infra* I3 (describing, like Encarta, human depth perception as stereographic).)

Appellant also argues that the Examiner ignored the expert opinions and that underlying factual determinations made by the experts must be accepted. (Reply Br. 12-13.) Notwithstanding these arguments, the Examiner's findings (Ans. 64-66) reference earlier findings (*see* D1) and indirectly address the expert opinions which essentially mimic Appellant's position. Moreover, despite Appellant's arguments, it is Appellant who ignored the mutual agreement for Appellant to provide a lexicographic special definition.[11]

In the Reply Brief, Appellant also appears to argue that a distinction exists between the terms 3-D *graphics* and 3-D *images* as understood by skilled artisans, with the latter limited to stereoscopic creation. (*See* Reply Br. 8-9.) This argument is untimely because, as indicated *supra*, Appellant invoked the lexicography rule, did not contest the normal meaning of "three-dimensional" or "three-dimensional image," and asserted throughout prosecution that "3-D" always means "stereoscopic 3-D" in the '294 patent – i.e., without limitation as to any distinction between graphics and images. *See Ex parte Borden*, 93 USPQ2d 1473 (BPAI Jan. 7, 2010) (informative); *Ex parte Nakashima*, 93 USPQ2d 1834 (BPAI Jan. 7, 2010).

But even if Appellant's latest position is interpreted to be in response to a new position advanced by the Examiner in the Answer, the arguments

[11] Also, claim construction is a matter of law, judges have discretion to adopt a claim construction from an expert, to find guidance from it, or not. *Markman v. Westview Instruments, Inc*., 517 U.S. 370, 387-90 (1996).

and evidence do not detract from the intrinsic record discussed at length *supra*. As used in the '294 patent, computer graphic technology is employed to create *images* in movie frames. Stereoscopy and computer graphics each create *an illusion or impression* of depth in *images.* (Notes 9, 10, E1-E2, O1-O6, F1-F3, *see also infra* I3.) References to true depth or reality fail to precisely define the invention. *See In re Morris*, 127 F.3d 1048, 1056 (Fed. Cir. 1997) ("It is the applicants' burden to precisely define the invention, not the PTO's.")

The Wikipedia source cited by Appellant in the Reply Brief also is not particularly helpful because while it attempts to distinguish "objects in a 3-D world" from games "viewed in 3-D," it also refers to "3-D" whether or not the term applies to stereoscopy.[12] In any event, that source does not shed light on the intrinsic record. In addition, Wikipedia is generally not considered to be as trustworthy as traditional sources for several reasons, for example, because (1) it is not peer reviewed; (2) the authors are unknown; and (3) apparently anyone can contribute to the source definition. *See*, *e.g.*, *Techradium, Inc. Blackboard Connect Inc*., 2009 WL 1152985 *4 n. 5 (E.D. Tex. 2009)("The Court agrees with Blackboard that Wikipedia disclaims any validity of the content listed on its website, and is therefore not a reliable

[12] Appellant attached a hard copy of the reference to the Reply Brief: *3-D film –Wikipedia, the Free Encyclopedia*, *available* at http://en.wikipedia.org/wiki/3-D_film. This source states: "In the context of many computer games, 3D computer graphics refer to being composed of objects in a virtual 3-D world, not that they can be viewed in 3-D. For a stereoscopic 3-D games [sic], as for everything else stereoscopic, two pictures (one for each eye), are needed." *Id*. at *2.

source of technical information.")[13] Unsurprisingly, Appellant "strongly objects" to the Examiner's use of "an unattributed Wikipedia entry" as extrinsic evidence with respect to another issue. (Reply Br. 10.)

Accordingly, based on the foregoing discussion, the term "three-dimensional image" is not limited to mean a "stereographic three-dimensional image." The discussion now turns to additional specific arguments advanced against the anticipating references, Oka and Falk.

Falk, Oka – Anticipation, Claim 1

With respect to claim 1, Appellant argues "there is nothing in the cited references that is comparable to the human-operated, computer-assisted specification of depth for said image elements of step d.; and there cannot possibly be, especially in as much as the input image is not so specified and separated into such image elements for which depth could thereto be specified." (App. Br. 34.) Appellant argues that the processing in steps a-f is also not "present in the cited references." *Id.*

These arguments rely on the assertion that Falk and Oka do not disclose image elements, and specifying such elements, because there is no disclosure of "human-operated, computer assisted outlining of coherent human-recognizable features." (App. Br. 34). These arguments are not persuasive because they are not commensurate in scope with claim 1 which does not require human interaction to define depth, assist in outlining, specify images, separate images, or anything else alleged by Appellant. Moreover, the '294 patent discloses completely automated systems without

[13] *But see, U.S. v. Crooker*, 608 F.3d 94, 95 n.1 (1st Cir. 2010) (using Wikipedia as source for definition); *Lantz v. C.I.R.*, 607 F.3d 470, 482-83 (7th Cir. 2010) (Wikipedia as source for longest human lifespan).

any human interaction. (D7.) In addition, the '294 patent disavows implied claim limitations from any disclosed embodiments. (D8.)

Still further, Falk employs human interaction by allowing a designer to specify image elements such as dress from a file or a video to be mapped with a specific texture with aid of a pen to define the mesh mapping, thereby specifying and separating image elements and defining depth therefore. (*See* F1-F3.) The Examiner found that Falk's segmenting image step 36 and storing image segment step 38 correspond to specifying and separating image elements as required by claim 1 steps b and c. The Examiner also found that Oka's block-by-block transformation process, whereby each image element comprises multiple blocks, corresponds to specifying and separating image elements as required by claim 1 steps b and c. (Fin. Rej. 27 (*citing* Oka, col. 1, ll. 37-42).) Appellant does not respond in particular to these findings.

Appellant's argument that, based on an earlier Non-final Office Action, the Examiner agrees with Appellant that "'the Okada [sic] system does not convert a two-dimensional image into a three-dimensional image as is recited in the preamble of each independent claim'" (App. Br. 67 (quoting the Examiner, Non-final Off. Act. 10, Jan. 25, 2006)) is unhelpful given the Examiner's later refined position in the Final Office Action: "i.e., the Oka system does not convert two-dimensional images into three-dimensional images *comprised of stereoscopic image pairs*" (Fin. Rej. 10 (emphasis added).)

The Examiner reasoned that Oka and Falk convert 2-D images by using different techniques to create a 3-D appearances in images. This is not

in dispute. (O1-O2; F1-F2.) Appellant's related arguments that (*see e.g.*, App. Br. 30, 34-35, 36-37; 66-67) Falk and Oka merely present the illusion or appearance of depth which thereby precludes certain claim steps lacks merit based on the discussion *supra*: i.e., stereoscopic systems likewise present an illusion or appearance of depth.

Appellant's remaining arguments at various sections of the Brief amount to general denials that Falk and Oka do not satisfy claim 1 because Falk and Oka allegedly do not disclose an image element created by a human operator or a three-dimensional image. (*See* App. Br. 33-38; 62-68.) These arguments are not persuasive for the reasons discussed *supra*. In addition, the arguments do not address the Examiner's findings which specify how Falk and Oka satisfy the elements of claim 1. (*See e.g.*, Fin. Rej. 14, 27; Ans. 5, 17-19.)

Consequently, based on the arguments presented, the Examiner has not erred in determining that Falk and Oka each separately anticipate 1.

Falk – Anticipation, claims 8, 10, 13, 15-22, 35-37, and 42

Additional Facts - Falk

(F5) Figure 1 of Falk depicts a central processor 18 with an arrow pointing thereto from the video camera, implying information flow in the corresponding direction. Figure 1 also shows an arrow from the processor to the camera, indicating "color slides" are produced in the process. Falk describes the hardware in Figure 1: a video camera 22 and frame grabbing hardware for inputting video to the central processing unit 18 with output directed to a video tape 24 or output camera 26. (Fig. 1; col. 5, l. 33 to col. 6, l. 19.)

Falk Discussion

With respect to claim 8, Appellant alleges a lack in Falk of "processed image elements incorporating three-dimensional information." (App. Br. 65.) Claim 8 recites "a method as in claim 1 comprising the additional step of . . . recording said process image frame." As discussed below further with respect to claim 13, Falk teaches a hardcopy output including several with an output camera and other output devices. (F3.) As such, Appellant's argument is not persuasive.

Appellant argues that "[a]s to Claims 10 and 13, while the reference shows a video tape 24, which is a storage medium, it fails to provide a method for recording successive frames in which image elements incorporate three dimensional information, not [sic nor?] a product produced by such a method." (App. Br. 65.)

Claims 10 and 13 follow:

10. A method as in claim 1 wherein said steps are applied to successive frames in a motion picture sequence.

13. A product produced by the method described in claim 10.

The argument is not clear because clam 10 does not require recording. In any case, the Examiner relies on video camera 22 and video tape 24 in Figure 1 of Falk for inputting "successive frames in a motion picture." The Examiner also relies on the video tape to show a product recited in claim 13. (Ans. 7.) Appellant's terse reference to a storage medium and alleged lack of a product does not detract from this evidence and reasoning, nor explain why Falk does not anticipate claims 10 and 13. Falk supports the Examiner's finding that the video camera provides successive video frames

such as for a carpet and an output product thereby anticipating claims 10 and 13. (F1-F3.)

While Appellant lists claims 15-18 on the page 65, Appellant does not present separate arguments for patentability of claims 15-18 there (App. Br. 65) but does present arguments in another section of the Brief for patentability of claims 16-18 (App. Br. 58).

With respect to claim 16, Appellant argues that none of the image elements in any of the four references are shadow elements. (*Id*.) The Examiner's Answer states that Falk's texturing process produces a "shading/shadow effect." (Ans. 8 (citing Fig. 2).) Appellant does not specifically address this finding nor show how claim 16 distinguishes over Falk. Producing realistic three-dimensional texture patterns of a dress or carpets, etc. as occurs in Falk reasonably corresponds to producing a shadow element (*see* F1) especially where Appellant fails to provide a distinguishing argument. Therefore, the Examiner did not err in rejecting claim 16 based on Falk.

"With respect to claim 17 and its dependent claim 18 which recite the hole filling technique to 'include additional two-dimensional image information not contained in the original unprocessed two-dimensional image' Appellant submits that none of the cited 102 references perform this step, or derive it 'from another image' as in claim 18. Claims 17 and 18 are not anticipated on their face . . . ." (App. Br. 58.)

As to claim 17, the Examiner refers to "additional two-dimensional image information comprising texture and pattern information (steps 42, 44, 46 shown in Fig. 2) not contained in the original unprocessed two

dimensional image." (Ans. 8.) The cited steps of Falk's Figure 2 disclose applying different textures from images not in the original image as the Examiner indicated. (*Accord* F2, F3.) As to claim 18, requiring the additional information of claim 17 to be derived from another image, the Examiner referenced the same steps in Figure 2. Step 42 of Figure 2 ("CREATE IMAGE VIA DRAWING OR VIDEO CAMERA INPUT") and step 44 ("STORE PORTION OF IMAGE AS TEXTURE OR PATTERN FOR LATER APPLICATION") supports the Examiner's position. The Examiner also referred to other textures and patterns as "broadly interpreted as derived from another image (col. 5, lines 26-28, 54-56.)" (Ans. 8.) The stored textures are then applied to the processed image. (F1-F3.)

Contrary to Appellant's arguments, Falk satisfies claims 17 and 18 "on their face," i.e., a prima facie showing. Appellant's terse countervailing arguments do not outweigh this showing.

With respect to claims 19-22, 35-37, and 42, Appellant alleges a lack in Falk of processed image elements incorporating three-dimensional information, three-dimensional image elements, three-dimensional information, a sequence of images, and an image frame. (App. Br. 65.) Based on the discussion of claims 1 and 10, these terse arguments are not persuasive and do not address the Examiner's findings with respect to these claims. (Fin. Rej. 16-19, 21, 23, 25.)

In another section of the Brief, "[w]ith [further] respect to claim 19, and its dependents 20 and 21, which recite 'additional 3D image element not derived from the image source (19) and whether that 3D information is a '3D photograph' (20) or a 'computer generated 3D image" (21), Appellant

submits that none of the four references perform this step . . . ." (App. Br. 58.) This argument by Appellant does not squarely address the Examiner's finding that Falk's "mesh and texturing process includes the process of obtaining image texture and pattern information from other sources [e.g., @steps 42, 44, and 46 of figure 2]." (Fin. Rej. 25.)

The terse argument also does not address the Examiner's further reasoning that the "'3-D' terminology of claims 19-21 have been broadly interpreted as being inclusive of two-dimensional information that provides the appearance of three-dimensionality." (*Id*.) Falk's citation to a prior art technique employed by Falk refers to "Generating Three-Dimensional Meshes." (F4.) These meshes are applied to Falk's image. (F3.) The Examiner repeated the findings with additional explanation in the Answer. ((*See* Ans. 9) (referencing texture and pattern files 20 stored as digital images).) In Falk's Figure 2, step 42 in Falk' refers to creating an image from a video camera input, while step 44 refers to storing a portion of the image as a texture or pattern. (*Accord* F1, F2 (video camera supplying digitized information.)

In the Reply Brief, Appellant presents a separate argument for patentability of claim 20, describing the Examiner's broad interpretation of Falk's digital image files of textures and patterns as derived from a 3-D photograph as "stretching the bounds of credulity" because "*3-D photographs are composed of both left and right images*." (Reply Br. 14 (citing Encarta, emphasis added).) This argument is not persuasive because as discussed *supra* with respect to claim 1, the term 3-D does not require separate images.

If some other reason exists as to why Falk's camera inputs stored as digital texture files (and later combined with meshes and another image to provide a 3-D appearance) do not constitute a 3-D image file derived from a 3-D photograph as claim 20 requires, Appellant does not present it on appeal. "It is the applicants' burden to precisely define the invention, not the PTO's." *Morris*, 127 F.3d at 1056. Therefore, based on Appellant's arguments, the Examiner's anticipation rejection of claims 19-21 based on Falk is sustained.

With respect to claim 22, Appellant acknowledges Falk's teachings of interpolation but argues that "Falk discloses no image elements incorporating three-dimensional image information, and provides no mechanism for either storing or processing such elements, likewise he has no disclosure relevant to interpolating three-dimensional information." (App. Br. 65.) Based on the discussion *supra*, Falk processes and stores image elements having three-dimensional information. (F1-F4.) The Examiner relies on the column 10 passage of Falk described *supra* and apparently referenced by Appellant as teaching interpolation. (*See* Fin. Rej. 25; F4.) The passage shows that Falk employs known three-dimensional mesh generation and that only some meshes have internal sub-meshes. Thus, some portions of an image have internal mesh points and some do not. (F4.) Thus, Falk's system specifies three-dimensional information only at some image points and interpolatively derives such information for other points as set forth in claim 22. Appellant's arguments fail to demonstrate a clear distinction of claim 22 over Falk.

"With respect to Claim 42 . . . which perform[s] 3D conversion on separate image elements (42) . . . Appellant submits that none of the four 102 references perform this function . . . ." (App. Br. 58.) This terse argument does not address the Examiner's findings nor demonstrate a claim distinction over Falk. (Fin. Rej. 23.)

Consequently, the Examiner has not erred in determining that Falk anticipates claims 8, 10, 13, 15-22, 35-37, and 42.

Oka Anticipation, Claims 8, 10, 13, 15-17, 22, 35-38, and 42[14]

With respect to the above-listed claims, Appellant relies on arguments presented for patentability of claim 1 and only presents separate patentability arguments as noted below. (*See* App. Br. 68.)

While Appellant lists claims 15-17 on the page 65 of the opening Brief, Appellant does not present separate arguments for these claims there, but does present separate arguments in another section of the Brief for claims 16 and 17. (*Compare* App. Br. 65 *with* 58.)

With respect to claim 16, Appellant argues that none of the images in any of the references are shadow elements. (App. Br. 58.) The Examiner points to column 12, lines 54-55 of Oka, disclosing shading, as corresponding to the disputed shadow elements. (Ans. 21.) Oka discloses shading image elements. (O1-O4.) Appellant does not address the Examiner's finding nor explain why shading does not correspond to shadow elements. Oka provides an example of this shading as related to a virtual

[14] The Examiner also rejected claim 22 under an alternative obviousness rationale based on Oka and Taylor. (*Compare* Fin. Rej. 38 *with* 54; Ans. 17 with 62 (reference to Falk on page 21 of the Answer in the rejection of claim 22 constitutes an obvious harmless typographical error).)

light source to distinguish front and back surfaces of a three dimensional image object such as a rolled piece of paper. (*See* O3, O4.) This shading reasonably corresponds to a shadow element because the back surface would be in the shadow of the front surface, for example, in relation to the virtual light source. The Examiner's explanation constitutes a prima facie case of anticipation which Appellant's argument has not rebutted.

With respect to claim 17, Appellant presents the same argument with respect to Oka (*see supra*) as made with respect to Falk. The Examiner refers to "weighting factors for quantifying the shading" as satisfying the disputed step which requires additional image information not included in the original unprocessed image. (Ans. 21.) Appellant's terse argument does not outweigh this prima facie showing because the weighting factors are not part of the original image. (O1-O4.)

With respect to claim 38, Appellant argues that "*Oka* provides no disclosure for the generation, processing, storage, or transmission of true three-dimensional information." (App. Br. 68.) The argument with respect to "true" information lacks merit as discussed *supra*. Claim 38 calls for transmitting the three-dimensional image sequence of claim 37 which the Examiner reads on Oka's disclosure of transmission to an output device (Fin. Rej. 39) or disclosure of transmission as implied by an "'apparatus for broadcasting'" (Ans. 27 (citation to Oka omitted)). Appellant's recitation of claim steps does not address, much less demonstrate deficiencies in, the Examiner's findings.

"With respect to claim 42 . . . which perform[s] 3D conversion on separate image elements . . . , Appellant submits that none of the four 102

references perform this function . . . ." (App. Br. 58.) This terse argument by Appellant does not address the Examiner's rejection of claim 42 and specific finding which points to separate image elements disclosed by Oka as separate blocks of picture elements. (Ans. 28.)

Appellant does not present separate patentability arguments for the other claims listed under the section sub-heading. Consequently, the Examiner has not erred in determining that Oka anticipates claims 8, 10, 13, 15-17, 22, 35-38, and 42.

Obviousness, Oka with Taylor – Claims 22 and 23

Additional Facts - Taylor

T1. Taylor teaches a special effects picture manipulation technique for broadcast television and other video systems which employs address interpolation to update frames so to produce a gradual change over eight frames. (Abstract, col. 5, ll. 62-68.) Both spatial and temporal interpolation produces gradual shape changes over the eight frames. (Col. 5, ll. 62-58; col. 6, ll. 24-56.) Figure 5 shows the special effect of a page being turned whereby the corner flap of the page can be either opaque or clear respectively to obscure or render visible the underlying page. (Col. 4, ll. 41-47.)

Discussion – Oka with Taylor

Claim 22 calls for "[a] method as in claim 1 wherein said three-dimensional information for at least one of said image elements in step d is specified only at certain points and is interpolatively derived for other points on said image element."

Claim 23 calls for "[a] method as in claim 10 wherein said three-dimensional information for at least one of said image elements in step d is specified only for certain frames and is temporally interpolated for frames between said certain frames."

In rejecting both claims 22 and 23, the Examiner relied on Taylor to teach the interpolation recited in the claims, and combined Taylor with Oka, as follows:

> Taylor evidences the fact that, when performing three-dimensional transformations on video images (e.g. figure 5), it was advantageous to store the transformation data only for selected elements of selected pictures and to derive the missing information via spatial and temporal interpolation (e.g. figure 7) in order to achieve processing at real time video rates. It would have been obvious to one of ordinary skill in the art to modify the system of Oka in accordance with the teachings of Taylor to permit processing at real time rates an/or to reduce the "power" of the processor (i.e. thereby reducing system cost).

(Fin. Rej. 54; *accord* Fin. Rej. 55)

In response, Appellant does not challenge the finding that Taylor teaches spatial and temporal interpolation of data, or that such a system reduces processing overhead. For example, Appellant argues that "Taylor deals with interpolation of missing data" and "provides a mechanism for spatial and temporal address interpolators, using which one can 'generate the desired information from address information which is only provided on some of the store locations and which is updated over more than one frame period.'" (App. Br. 85 (Taylor citation omitted).)

Appellant then concludes that "there is no motivation to combine Oka with the missing data techniques of Taylor because Oka is concerned with transforming 2-D input image data onto a three-dimensional surface." *Id.*

Appellant does not specify whether the arguments apply to claims 22 or 23. These arguments do not address the Examiner's proposed motivation of reducing the required processor rates by using data interpolation techniques.

Appellant also argues in the alternative that even if the references could be combined, the "combination would still fail to *disclose* all the limitations of the subject claims, at least because like *Oka*, the Taylor patent is not concerned at all with 3-D frame conversion, nor does the reference provide any mechanism by which three-dimensional information is either stored or processed." (*Id*. (first emphasis added).) This argument about what each reference "discloses" does not demonstrate insufficiencies in the Examiner's rejection which is based on what the combination of references fairly suggest.

In addition, Appellant's argument is not clear in that it does not clearly point to which elements in which claims 22 or 23 would be missing from the Examiner's proposed combination. As such, the arguments are interpreted as grouping claims 22 and 23 together, with claim 22 chosen as representative of the two claims. While the arguments apply superficially to claim 22 (or claim 23), the arguments appear to re-assert the alleged shortcomings of Oka with respect to independent claim 1 in disclosing the lack of "three-dimensional information" and "3-D frame conversion." The alleged lack of "three-dimensional" information is discussed *supra* in the discussion of claim 1 and is not persuasive for the reasons given there. Oka also discloses "frame memory," while the Examiner relies on an image frame in Fig. 1B. (O6; Fin. Rej. 27).

Further, notwithstanding Appellant's argument, the Examiner's rejection of independent claim 1 (from which claims 22 and 23 ultimately depend) shows that the three-dimensional information in Oka includes processed frame data. (Fin. Rej. 27; *accord* O2, O6.) For example, Oka teaches processing frame data representing the turning of pages of a book. (*See* O2.) Taylor teaches similar three-dimensional processing involving page turning. (T1.)

The Examiner's rejection proposes modifying Oka' process of transforming 2-D video frames into frames containing 3-D information by employing Taylor's interpolation method. (Fin. Rej. 54-55.) Oka's transformation process employs a linear approximation technique involving memory address position tracking of input video image frame data. (*See* O2, O5, O6.) Based on Appellant's description of Taylor's interpolation method as described *supra*, Taylor and Oka employ similar approximation or interpolation methods since each involves only transforming some of the data while approximating or interpolating the transformation for other data based in part on tracking memory addresses. As such, even if Appellant's (unclear) argument is that the proposed combination only interpolates 2-D information and assuming for the sake of argument that that is correct, the argument fails because as the combined process transforms the 2-D information into 3-D information, it follows that the process interpolatively *derives* 3-D information only at certain points as claim 22 requires.

Appellant's arguments support the Examiner's underlying factual finding that Taylor teaches spatial and temporal interpolation of frame data based on address tracking of the data and do not outweigh the Examiner's

rationale based on the proposed combination. Based on the foregoing discussion, Appellant has failed to demonstrate the deficiencies of the Examiner's obviousness rejection of claims 22 and 23.

Anticipation, Kuperman

Additional Facts-Kuperman (FF)

K1. Kuperman discloses stereoscopically viewing left and right images. (Abstract; Fig. 1.)

K2. Kuperman's Figures 3A-3C appear below:

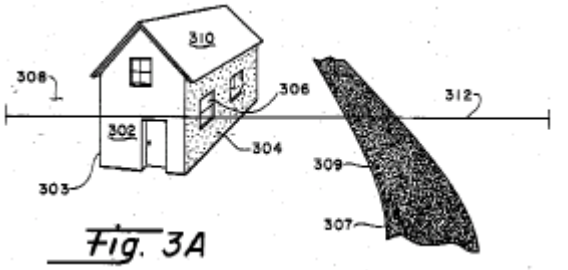

Fig. 3A

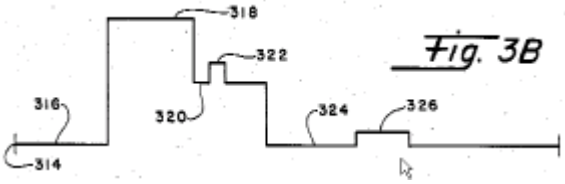

Fig. 3B

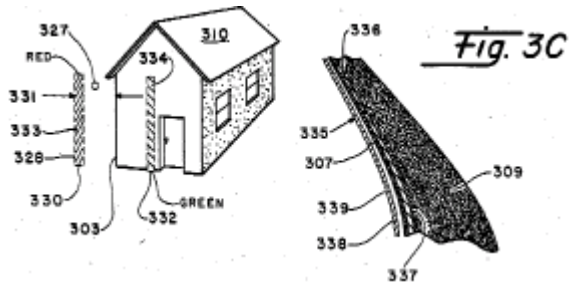

Fig. 3C

Figures 3A to 3C represent a stereoscopic process in which lines 303 and 307 represent boundaries between different regions of pixel intensity such as may occur in an original photograph as depicted in Figure 3A.

Figure 3B represents varying degrees of intensity in Figure 3A and shows that the front of the building has a high pixel intensity (see line 318 in

Fig. 3B) relative to other areas. Figure 3C represents a partially reconstructed image of the original image represented in Figure 3A. (Col. 5, ll. 32-41.)

The intent of the invention is that the separation of the left and right "offset pixels" (such as 330 and 332) from the "causing pixels" near a boundary (such as 303) (col. 5, ll. 50-55) will

> be in proportion to the original image pixel intensity of brightness or density or amplitude of height – whichever is the appropriate description of the video signal amplitude in the image being processed. An X-ray image is usually described in terms of image density for example while a photograph of the sun could be described in terms of brightness and a radar image could be described in terms of return signal amplitude and an aerial photograph in terms of height or elevation. These terms are used interchangeably in describing the invention herein.

(Col. 5, ll. 58-67.)

K3. After the images are scanned, offset pixels near the boundaries are shifted, the two offset and the original pixels are displayed in three different colors. Different mutually exclusive colors or image representations (e.g., horizontal and vertical light polarization) can be employed. Red, green, and blue pixel colors are disclosed for the embodiment depicted above. (Col. 5, ll. 4-25; col. 6, ll. 1-9.) Color separation filters are employed to create "a view which appears to have depth or three dimensions." (Col. 5, ll. 24-25.)

K4. Figure 2 depicts a flow diagram of Kuperman's process: pixel data are input in step 202, left and right offset values are assigned in step 204, filtering occurs in step 206, and then red-left, blue-original, and green-right offset images are generated in steps 208, 210, and 212.

Three separate channels correspond to three distinct refresh memories 102, 104, and 106 which store information corresponding to the three different colors to produce the red-left and green-right offset images and the blue original non-shifted image. (Col. 3, ll. 39-65; Fig. 1.)

"The processing therefore involves generating for each pixel of image feature information in a scan, additional pixels of information immediately succeeding the original pixel in a reconstructed image." (Col. 5, ll. 4-9.)

Claim 1

Appellant argues that Kuperman does not disclose shifting image elements as required by claim 1. Appellant asserts that Kuperman processes images on pixel by pixel bases and a single pixel cannot be an image element. (App. Br. 47-49.) Appellant asserts based on the patentee as lexicographer, an image element in the '294 patent cannot correspond to a single pixel. (App. Br. 47.) Appellant also argues that claim 1 requires human interaction to define an image element having an "arbitrary (yet meaningful) shape" such as a face or cartoon. (App. Br. 49.) Appellant's arguments are unconvincing.

Contrary to Appellant's arguments, claim 1 does not require any human judgment. The '294 patent also does not preclude an image element as a single pixel, even if one embodiment does operate by human interaction to define a group of pixels as an image element. The '294 patent indicates that any sized image element can be defined, and operated on, to provide varying degrees of depth to different regions of an image element. In any case, no matter how small a human designates an image element, the '294 patent operates on pixel by pixel basis to assign depth to each pixel. Further,

the '294 patent discloses computer control without human interaction, implying operation on either a single pixel, or otherwise to a group on a pixel by pixel basis, without a human-defined group of pixels as an image element. (*See* D7.)

Moreover, Kuperman's Figure 2 clearly shows shifting more than a single pixel, for example the line array of pixels representing the edge of a house. (K2-K4.) The Examiner similarly pointed to Figure 3B and found that Kuperman's system offsets (selects) the pixels based on attributes of the pixels (e.g., density, amplitude, intensity) and stated that "[t]his may correspond to geometry of the objects being detected [see figure 3B]." (Fin. Rej. 46 (bracketed information by the Examiner).)

Appellant responds in part by stating that Kuperman's system only produces a result similar to Appellant's system "by some coincidence" or "by chance" to "produce the similar result" and therefore cannot anticipate the claims, either by inherency, or otherwise. (App. Br. 69.) To the contrary, by design, Kuperman's system operates on image elements comprising groups of pixels which define a boundary between grouped regions of similar intensity or density so as to cause a shift of the entire group. (*See* K2-K4.) Such a pixel group meets Appellant's definition quoted *supra* of an image element having an "arbitrary (yet meaningful) shape."

Appellant's argument that Kuperman "does discuss the 'image elements' of '294" but uses a different term has no bearing on the Examiner's claim interpretation involving different image elements in Kuperman. (App. Br. 51.)

Appellant relies on the above-described unpersuasive assertion that Kuperman does not disclose an image element and thereby cannot disclose the steps recited in claim 1. Apart from the unavailing reliance on the alleged lack of an image element in Kuperman, Appellant's listing of each claim element, without more, does not rise to the level of a patentability argument as required on appeal. (*See* App. Br. 52-54.)

In a related argument, Appellant focuses on claim steps b and c and asserts that the Examiner lumped them together because the Examiner referenced the same element 204 of Figure 2. (App. Br. 53.) Appellant also argues that Kuperman's "deriving" information does not amount to "specifying" it. (*Id*.) Appellant also compares the '294 patent disclosure with Kuperman. (App. Br. 54-57.) Appellant presents several other arguments throughout various portions of the Briefs. None of these arguments show how claim 1 distinguishes over Kuperman or how the Examiner's rejection is deficient. (Fin. Rej. 46-48; Ans. 42-44.) For example, the comparison of the respective disclosures does not distinguish claim 1 over Kuperman.

In particular, Kuperman's preprocessing and inputting steps 200 and 202 satisfy step a of claim 1. Kuperman specifies at least two image elements near boundaries 303 and 307 by measuring and determining their intensities (or other properties) relative to the remaining image (step b). The specified image elements are separated from the remaining image elements

by either locating each of them in distinct memory locations, or by specifying their locations as correlated with intensity (step c).[15]

Kuperman's step 204 in Figure 2 states "ASSIGN L&R OFFSET VLAUES (TABLE LOOK UP)." Figure 1 also indicates that look-up tables 112, 120, and 126 serve to assign color. It follows that Kuperman specifies three dimensional information by determining how much to offset each specified (step b) and separated (step c) image element via a look up table, and/or by specifying the color for each image element (step d). The image elements are then processed to include this offset and color information (step e), and finally the image is produced as a composite output consisting of the original and shifted image elements for stereoscopic viewing (step f).[16] (*See* K1-K4; Kuperman Figs. 1, 2.)

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[15] Reference by Appellant to element 44, a memory element according to the '294 patent, indicates that "separation" can occur in memory and that separation need not occur prior to any other steps as explained further below (*infra* note 15). (*See* App. Br. 4.) Also, the '294 patent does not provide much detail as to what the "separation" entails, or specify when it occurs. Kuperman separates a shifted element from its original element by placing each in different refresh memories, channels, and output memories. (*See* Fig. 1 of Kuperman, K2-K4.)

[16] According to Figure 1, Kuperman assigns L & R offset values and applies color via hardware lookup tables 114, 120, and 126 (steps d and step e), downstream, or after, designating (step a) and separating (step b) the image element components into three separate channels. In any event, claim 1 is broad enough to allow the separating step c in claim 1 to occur before, during, or after steps d and e in claim 1 because the image elements (shifted and/or original) logically can be separated from one another before, during, or after specification and processing of the 3-D information (i.e., information as to shifting amount and color). Appellant's reference (App. Br. 4) to column 4, lines 55-58 (reciting "Left and Right image pairs or a 3-D composite image is processed by the computer by the 2-D image . . .") as

Therefore, as Appellant's arguments fail to demonstrate that Kuperman does not anticipate claim 1, the Examiner did not err in concluding that Kuperman anticipates claim 1.

Claims 2-4 and 26-28

With respect to the above-listed claims, Appellant relies on arguments presented for claim 1 and does not present separate patentability arguments for claims 2-4. (*See* App. Br. 70.) With respect to claim 26-28, Appellant additionally argues that "*Kuperman* has no disclosure or suggestion of deriving three dimensional information from measurements associated with

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supporting separating step c, reveals that step c does not necessarily occur before step d, the step for specifying three dimensional information, because that information must be specified before or while the image pairs are created. Similarly, reference to "elem. 40, 43, 44 & 50" in Figure 2 (App. Br.4) which signify separated right images 40, 42, memory 44, and composite image 50, as further support for the separating step c, also bolsters this claim interpretation, as do Appellant's references to the same passages to support the various claim steps (*id*.). *See Interactive Gift Express Inc. v. Compuserve Inc*., 256 F.3d 1323, 1342-1343 (Fed. Cir. 1991) (holding no order in method steps required); *Altris, Inc. v. Symantec Corp.*, 318 F.3d 1363, 1369 (2003) (citing *Interactive Gift*, reversing trial court, and holding steps not required to be in order written if they can be logically performed in another order); *cf. Mantech Envt'l Corp. v. Hudson Envt'l Servs., Inc.* 152 F.3d 1368, 1375-76 (holding that the recitation of claim steps required the steps to be performed in the order written). In *Mantech*, 152 F.3d at 1375-76, notwithstanding that claim 1 there recited steps labeled (a) through (d) similar to claim 1 here, that alphabetical ordering did not factor into the court's analysis of determining that claim 1 *logically* required a sequential order. Nothing in the claim 1 or the specification of the '294 patent directly, logically, or implicitly requires a narrow construction of ordered steps and Appellant does not present a convincing argument demonstrating that such an order is required.

aspects of an 'image element', including aspects pertaining to either geometry or illumination of such element." (App. Br. 70.)

Dependent claim 26 requires the three-dimensional information referenced in step d of claim 1 to be "derived from the measurement of at least one aspect of an image element." Claims 27 and 28 respectively require the aspect recited in claim 26 to pertain to geometry and illumination.

As the Examiner found, Kuperman discloses specifying three-dimensional information based on measurements of "density or intensity or amplitude." (Ans. 45 (quoting Kuperman, col. 5, ll. 13-16).) The Examiner reasoned that density pertains to geometry and intensity pertains to illumination, *id*., and also noted that density, amplitude, and intensity of the pixels each correspond to the geometry of the objects being detected (Fin. Rej. 46 (citing Kuperman Fig. 3).) Appellant does not explain persuasively how these findings are deficient.

Kuperman discloses measurement aspects based on geometry and illumination. For example, density in an X-ray corresponds to geometry while the pixel intensity or brightness of images in generic computer type images correspond to illumination. (*See* K2.) The detected amplitude relationship (Fig. 3B) also reveals a relationship between the geometry of the detected objects near the edges of two different image objects (Fig. 3A, Fig. 3C). The amplitude (Fig. 3B) also corresponds to the measured pixel intensity or brightness. (K2.)

Consequently, based on the foregoing discussion of claim 1 and the discussion here, the Examiner did not err in rejecting claims 2-4 and 26-28 as anticipated based on Kuperman.

Obviousness, Kuperman with Noll – Claims 10 and 29-31

Appellant's arguments for patentability are interpreted as relying on the same arguments as arguments presented for patentability of claim 1. (App. Br. 84.) Despite Appellant's attempt to reserve the right to present arguments against the Examiner's proposed combination of Kuperman and Noll because "the Office Action is not understood to rely on some sort of combination of the two references" (*id*.), no such reservation is warranted. (App. Br. 84). The Examiner relied on the combination to reject the above-listed claims. (Fin. Rej. 54.) Based on the foregoing discussion of claim 1 and the discussion here, the Examiner did not err in determining that the combination of Kuperman and Noll renders obvious claims 10 and 29-31.

Anticipation, Hiromae – Claims 1-4, 10, 11, 13-15, 17, 24, 35, 37, 38, and 42

Additional Facts - Hiromae

H1. Hiromae discloses stereoscopically viewing left and right images. Hiromae discloses that prior art systems typically present two shifted images from each other, with those two images colored differently and presented to the eye through special colored glasses to provide "an image rich in stereoscopic sensation." (P. 3.) In contrast, in the preferred embodiment, Hiromae's system provides a means to automatically shift a sub-image or multiple sub-images from an original base image, thereby simplifying the process (by forming only a shift of the sub-image(s) relative to the base

image). Sub-image portions can be shifted differently based on determining what portions of the base image represent distant or proximate parts of the image (such as the root and tip parts of a slanted bar or rod). Similar to the prior art process, the sub-image(s) and base image are colored differently. (P.4-7; Figs. 4-5.) Hiromae also varies the size of the input images, divides a single input image into a plurality of parts, and shifts sub-images depending on the most distant and proximate parts of the input images. (Pp. 6-7.)

H2. The base image is identified by a designation means 5 (a key board or a touch pen) which also serves to identify the most proximate and most distant part of a designated base image. (Pp. 4-5.) Processing the base image includes an option of slightly shifting/moving it. (P. 6.) Other sub-images, or portions of images, such as the bar described *supra*, can also be shifted, and more than one such sub-image, especially in the case of animated films, can be shifted. (Pp. 6-7.)

H3. Appellant describes Hiromae's invention as designating different depth values to different portions of an image to "permit 3D viewing with anaglyphic glasses." (App. Br. 44.) According to Appellant, each image (e.g., circle, square) within the same grid or square of scan lines on a screen in Hiromae's system will be shifted by the same amount so that they "both appear to protrude slightly from the screen at their lower edge, and will tilt identically to recede far into the screen at their lower edge." (App. Br. 44; *see id*. at 43 (Figure A depicting Appellant's comparison of Appellant's and Hiromae's disclosed inventions.)

H4. Hiromae includes as the "basic image input means (1) . . . a video tape recorder, an optical read means, etc." The designation means (5) includes "a console key board, a touch pen. etc." The input means and designation means can be combined into one device. (P. 5.) Hiromae also discloses element 11 as a "micro computer" (i.e., microcomputer) "having a CPU, a RAM, a ROM, a clock, etc." (P. 5; Fig. 2.)

Figure 1 is described as showing "the image processing unit . . ." (p. 4) and depicts elements (1) "base image signal input means," (2) "coloring means,"; (3) "display means," (4) "CRT," (5) "designation means," (6) "distance signal calculating means," (7) "sub-image forming means," and (8), another "coloring means." (P. 8; Fig. 1.)

Figure 2 is described as "a block diagram which shows the electrical constitution." (P. 7.) Figure 2, but not Figure 1, depicts microcomputer (11) and "I/O interface" (12). (P. 5.) Figure 1 and Figure 2 commonly depict elements 1, 3, 4, and 5. Figure 2 does not depict elements 2 and 6-8 which Figure 1 does depict.

Discussion - Hiromae

Claim 1

Appellant focuses on an alleged lack of digital processing in Hiromae:

> Hiromae does not state that the based images to be processed (resulting in the sub-images) are digitized within the computer, or more particularly, within the microprocessor element 11 of figure 2, for such processing; and, there is nothing in Hiromae that would require the base images to be digitized for processing. *The fact that the base image is input into the microprocessor in order to register a cursor for display to a user, to facilitate coordinated input from a designation means element 5 (e.g., a mouse or keyboard controller), does not mean*

> *that the image is necessarily digitized; nor, if the image were digitized for that purpose, does it mean that the image is further processed within the microprocessor*.

(App. Br. 39 (emphasis added).)

Appellant presents a similar argument in their Reply Brief. (Reply Br. 16 (citing Feiner Dec'l ¶ 8, Chou Feiner Dec'l ¶ 30).)

Under one rationale, the Examiner reasoned that "*the digitizing feature has not been claimed* and that the microcomputer 11 including the peripheral device comprising I/O interface block shown in Fig. 2 of the Hiromae patent may be broadly interpreted as a computer." (Examiner Interview Summary (Oct. 24, 2007) (emphasis added).)

In any case, the Examiner's claim interpretation is correct. Claim 1 does not require digitizing and nothing precludes the claimed computer from including Hiromae's I/O interface block or any other peripheral devices, including ROM or RAM memory, attached to Hiromae's microprocessor.

Appellant also asserts that "the rectangular strip of the video frame" in Hiromae does not correspond to the image element of the claim. (App. Br. 40.) Nothing in claim 1 precludes the image element from being such a rectangle (especially where it may define a rectangular image element like a rod or bar (*see* H1).) Contrary to Appellant's related argument (*id*.), claim 1 does not require a human operator, as discussed *supra* with respect to Falk, Oka, and Kuperman. As also discussed *supra*, the '294 patent makes that clear by disclosing complete processing by a computer without any human interaction and processing of separate small portions or features of any image. (D7.)

In Hiromae, a frame is input to the microcomputer system as Appellant notes. An operator uses a pen to specify different images to be processed as 3-D images. The program separates the image specified into at least two images and/or sub-images. The system also specifies how much a sub-image portion will be shifted from the original base image. The system processes the information to create at least one processed image element. Finally, the program generates at least one processed frame. (*See* H1-H4.)

As such, Hiromae anticipates claim 1 and Appellant's numerous arguments fail to distinguish show otherwise. For example, Appellant's argument that Hiromae does not separate an image element because Hiromae "process[es] an entire full-width rectangular band of his video screen, treating as a single un-separated unit all of what '294 would **specify** as **separate** into diverse background and foreground elements" (App. Br. 42) does not distinguish claim 1 because it relies on what "'294" *discloses*. Further, according to Appellant's description (H3; App. Br. 42-44), either the remainder of the video frame in Hiromae below the full-width rectangular band or the base image would not be shifted, thereby corresponding to specified and separate images. Under the latter interpretation, the remainder of the video frame below and above the shifted rectangle corresponds to a background while the sub-image corresponds to a shifted foreground. (*See also* H1-H2.)

Further, in another section of the Brief, Appellant admits that "*Hiromae* provides two separate images to the left and right eyes." (App. Br. 80.) In any event, Hiromae provides for specifying, separating and

shifting any number of sub-images from a base image to produce a stereoscopic output. (H1-H4.)

Appellant's arguments notwithstanding, claim 1 does not require a user to follow the contour of a visually coherent object in order to designate and separate the image object from its background. (*See* App. Br. 73.) In any case, Hiromae's combined input pen (1 and/or 5) provides for such an image designation. (H4.) In a related theme, Appellant argues that "**Hiromae processes video lines by shifting them and NOT individual points or pixels.**" (App. Br. 60.) This line of reasoning is not clear given that Appellant also argues that "image elements" in claim 1 cannot be individual pixels as far as Kuperman is concerned. In any event, Appellant does not explain clearly why shifting video lines (which results in separated image elements) demonstrates a lack of anticipation by Hiromae.

Based on the foregoing discussion, the Examiner did not err in finding that Hiromae anticipates claim 1.

Under an alternative rationale, assuming for the sake of argument that claim 1 requires digitization of the images to satisfy the inputting step of claim 1 (and similar inputting or scanning steps in claims 35-37 and 42) as Appellant argues (*see* App. Br. 74-75), Appellant's argument lacks a sufficient factual foundation. (*Accord* Feiner Dec'l ¶ 25 (opining, with insufficient or unpersuasive foundation, that "in light of the disclosure" the claim 1 steps require digitizing).) As the Examiner found, the hardware diagram in Figure 2 shows only one element for processing the software routines implied as elements 2 and 6-8, the microcomputer 11 having a CPU, RAM, ROM, clock, etc. (Fin. Rej. 41-42; *see* H4.)

Appellant's argument (*see* App. Br. 75) and similarly the experts' opinions, are interpreted as postulating that the I/O interface 12, but not the microcomputer 11, functions to process and hold analog images using the processing elements 2 and 6-8, so that the images need not be digitized in the microcomputer 11. Nothing in Hiromae supports this conjectural notion that the I/O interface is anything more that what it plainly shows in Figure 2, an interface between the microcomputer 11 and the input (1, 5) and output (3) devices. (*See* H4; Hiromae Fig. 2.)

Dr. Feiner opines that Hiromae "does not state that the base images to be processed . . . are digitized within the computer . . . . The fact that the base image is input into the microprocessor in order to register a cursor for display to a user . . . does not mean that the image is necessarily digitized." (Feiner Dec'l ¶ 8.) Dr. Feiner bases this opinion on the assertion that nothing indicates where "image processing elements 2, 7, and 8 of Figure 1" are located so that it is "quite likely that they are included as part of the unspecified I/O element 12 of figure 2, and thus separate from or peripheral to the digital microcomputer 11." (Feiner Dec'l ¶ 9.) Dr. Feiner reasons that "Hiromae's description of his microcomputer element 11 lists no such exotic or unusual microcomputer devices." (*Id*.) As such, Dr. Feiner concludes that processing elements 2, 7, and 8 would have analog inputs and outputs, would be located in the I/O device 12 as separate from or peripheral to the microcomputer, and would be digitally controlled by the microcomputer. (*Id*.)

The description is based on speculation by Dr. Feiner that the "unspecified" I/O device must include the multifarious processing and

coloring which occurs in processing blocks 2, 7, and 8.[17] Figure 2 depicts a hardware block diagram. The microcomputer hardware 11 necessarily processes these software blocks, as the Examiner found. (Fin. Rej. 42.)

Elements 2, 6, 7, and 8 in Figure 1 correspond to "coloring means," "sub-image forming means," "distance calculating means," and "coloring means." None of these elements appear in the hardware diagram of Figure 2. Since the I/O device 12 is not depicted and described as anything more than an interface between the hardware input and output devices 1, 3, and 5, according to its normal function, skilled artisans would have understood that the elements 2, 6, 7, and 8 depicted in flow diagram Figure 1 but not depicted in hardware diagram Figure 2 describe software processing components residing in the only hardware depicted in Figure 2 as capable of running these components, the microcomputer 11 (including its RAM and ROM). In other words, if Appellant is correct, the "unspecified" (i.e.,

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[17] Dr. Feiner does not address the location of the "distance signal calculating means" 6, but Appellant does. Appellant, relying in part on a partial translation, provided by an expert translator, Mr. Marchioro, and attached as Exhibit 1 to the "Declaration of John Marchioro" ("Marchioro Dec'l") (*see supra* note 8), alleges that certain single translated words support Appellant's view that element 6 (a "calculating" means according to the expert's translation) is most likely performed in the microcomputer, while element 7 (a "forming" means according to the expert's translation) is most likely performed in another "outboard signal processing apparatus or device." (App. Br. 39.) Despite Appellant's assertions, Appellant's expert's translation does not contradict or alter in any meaningful way the full translation used in the opinion as far as elements 2 and 6-8, or any other issues, are concerned. In any case, as discussed here, Hiromae discloses no such outboard processing apparatus or device or any separate processing device apart from the microcomputer.

typical) I/O interface 12, as Dr. Feiner describes it, would have to be an "exotic" device according to Dr. Feiner's parallel explanation of what the microcomputer 11 would have to be in order to run ordinary software programs.

To support the lack of input digitization, Dr. Feiner postulates that to control the different images in analog fashion, that "Hiromae tilts a band running completely across the video frame . . . ." (Feiner Dec'l ¶ 13.) Nothing in Hiromae describes any such band tilting. As such, the analog input analysis involves speculation on the part of Dr. Feiner. Mr. Chou's similar averments are cumulative. (*See* Chou Dec'l ¶¶ 29-31, 33-35.)

Appellant's and the experts' creative explanation might show at most that skilled artisans possibly would have envisioned Hiromae's broad disclosure as including two types of systems, 1) the simple and likely digital system described by the fully translated Hiromae patent as found by the Examiner, and 2) the far less likely combined digital/analog system envisioned by Appellant (and/or the experts).

Appellant characterizes Hiromae's anticipation rejection as faulty because digitizing of the input is not "express or inherent" in Hiromae "for the simple reason that different and *at least equally plausible interpretations of the disclosure are possible*." (App. Br. 75 (emphasis added).) Appellant's argument fails for the following reasons: First, Appellant's alternate analog interpretation is based on conjecture and is not as plausible as the Examiner's interpretation. Second, an express disclosure is not required for anticipation. Hiromae's disclosure of the digital microcomputer as the only known hardware processing unit at least implies a digitized input.

In re Preda, 401 F.2d 825, 827 (CCPA 1968) ("It is proper to take into account not only the specific teachings of the reference but also inferences which one skilled in the art would reasonably be expected to draw therefrom."). Finally, even if both embodiments are "equally plausible" as Appellant describes them, then the anticipation rejection is proper based on the limited number of plausible embodiments disclosed – in this case two. *In re Petering*, 301 F.2d 676, 682 (CCPA 1962) (A small genus can be a disclosure of each species within the genus.); *Bristol-Myers Squibb Co. v. Ben Venue Labs, Inc.*, 246 F. 3d 1368, 1380 (Fed. Cir. 2001) ("[T]he disclosure of a small genus may anticipate the species of that genus even if the species are not themselves recited.").

Appellant's argument that Hiromae's "video tape recorder, or an optical read means is consistent with the use of analog video recording equipment that was prevalent in August 1983, at the time the original application was filed," (App. Br. 75), and other arguments of record, do not demonstrate that Hiromae's preferred embodiment does not digitize the images, or otherwise fails to anticipate claim 1. Even if digital input systems were not prevalent, this does not show that Hiromae did not disclose a digital input stereographic system. Moreover, evidence of record, including the patents to Kuperman, Oka, Falk, Williams, Imsand, and Taylor, shows that similar digital input video/pixel systems were well-known before the filing of the '294 patent.

Based on the foregoing alternative discussion of Hiromae's digital system, the Examiner did not err in finding that Hiromae anticipates claim 1.

Claims 2 and 17

Claim 2, rejected for anticipation based on Hiromae, follows: "A method as in claim 1 wherein said step f results in the generation of a left and right pair of processed image frames. Appellant asserts that, based on steps e and f of claim 1, that claim 2 requires "the process of producing a pair of left and right images where both left and right have been processed to incorporate three-dimensional information." (App. Br. 57.)

Appellant asserts that "while both the left and right image in Hiromae are colored, only one of the two images in processed to incorporate three-dimensional information." (*Id*.) Because color aids in creating the stereoscopic three-dimensional effect, Appellant's argument is not persuasive. Also, Hiromae varies the size of the input images, divides a single image into a plurality of parts, and shifts images depending on the most distant and proximate parts. (H1.) These actions also create three-dimensional information for the left and right images. Still further, while Hiromae indicates that the prior art method of shifting both images involves more processing in prior art systems, Hiromae reasonably includes such shifting as an option in Hiromae's disclosed automated system. (*See* H1, H2 (moving and shifting the base image).)

As to claim 17, Appellant presents the same argument with respect to Hiromae (*see supra*) as made with respect to Falk. (App. Br. 58, 77.) The Examiner refers to a shifted sub-video signal that was not part of the original image. (Ans. 34.) As Appellant notes, Hiromae also discloses adding color to the images and skewing them. (App. Br. 44.) In any event, Hiromae satisfies the disputed element because the shifted, colored, re-sized, divided,

and/or skewed image contains information which is not part of the original image.

Based on the foregoing discussion including that involving claim 1, the Examiner did not err in rejecting claims 2 and 17 for anticipation based on Hiromae.

Claims 10, 11, and 13-15

Appellant asserts that claims 10, 11, and 13-15 are patentable over Hiromae for the same reasons as claim 1 and also because Hiromae "has no disclosure of providing a tangible product that embodies the steps of the disclosed method." (App. Br. 76-77.) This argument is not persuasive because it is not commensurate in scope with the claims. The claims do not recite the entire disclosed method. The products recited in claims 13-15 read on the stored or displayed images rendered as animated or regular output video frames in Hiromae's CRT. (*See* H4; Ans. 32-23.))

Based on the foregoing discussion including that involving claim 1, the Examiner did not err in rejecting claims 10, 11, and 13-15 for anticipation based on Hiromae.

Claims 35, 37, and 42

Tracking arguments for claim 1, Appellant asserts that Hiromae does not input images or scan images into a computer as required by the claims. (App. Br. 61, 74-75.) These arguments are unavailing based on the discussion of claim 1. With respect to claim 35, Hiromae also discloses inputting images via an "optical read means, etc." (H4.) Notwithstanding Appellant's arguments, such an optical read means constitutes or implies a

means for scanning as required by this claim. *See In re Preda,* 401 F.3d at 827.

"With respect to Claim 42 . . . which perform[s] 3D conversion on separate image elements (42) . . . Appellant submits that none of the four 102 references perform this function . . . ." (App. Br. 58.) Claim 42, calling for at least two image elements in a frame, does not specify if the two image elements correspond to two original individual elements or one original and one shifted image element. In any event, Appellant's terse argument does not address the Examiner's rejection of claim 42 and specific finding which points to separate image elements in each frame as disclosed by Hiromae as found in animated films. (Ans. 40.) Hiromae's disclosure is not limited to a single image per frame and discloses or at least implies shifting multiple sub-images (e.g., in a bar, or rod) or any number of images (e.g., animated or otherwise) in one frame, or partial sub-divided images, and the base image. (*See* H1-H4.)

Based on the foregoing discussion including that involving claim 1, the Examiner did not err in rejecting claims 35, 37 and 42 for anticipation based on Hiromae.

Claims 3, 4, 24, and 38

Appellant did not present separate patentability arguments for these dependent claims. Based on the foregoing discussion including that involving claims 2, 10, and 37 from which the above-listed claims depend, the Examiner did not err in rejecting claims 3, 4, 24, and 38 for anticipation based on Hiromae.

Obviousness Rejections Based on Hiromae and Admitted or Cited Prior Art

Hiromae with Admitted Prior Art (APA) - Claims 5-7 and 12

Additional Facts – '294 Patent

D9. The '294 patent describes several binocular type systems as prior art, each of which provide a unique image to the left and right eye: 1) red- and green- tinted images projected and viewed through red and green lenses, 2) images projected through cross-polarized filters and viewed through corresponding polarized filters, and 3) left and right images displayed alternately on odd and even frames using television CRT television and viewed through alternate synchronized shutters on specialized glasses. According to the '294 patent, on standard television receivers, the first method produces strange tints, the second method cannot be used, and the third method may flicker. None of the methods can be used on standard home televisions without specialized glasses. (Col. 1, ll. 33-62.)

Discussion

Claims 5, 6, and 7, dependent from claim 2, respectively call for passing a pair of images through mutually perpendicular lenses, encoding the pair for alternate video display of each image in the pair, and processing the pair for viewing so that when viewed through glasses having a dark and light lens, 3-dimensional effects are perceived.

In addition to relying on the arguments presented with respect to claim 1, Appellant argues that Hiromae discloses only one type of processing, one of the APA techniques listed the '294 patent in the Background Art section. (*See* D9.) Appellant notes that Hiromae discloses

an anaglyphic technique using spectacles having glass or cellophane colored to be the same color as the images. (*See* App. Br. 78.)

Appellant submits that the alternative stereographic techniques recited in claims 5-7 would not have been obvious substitutions (App. Br. 78) for the specific stereographic technique of Hiromae because skilled artisans "would have had no motivation to replace its anaglyphic processing with alternative techniques, as defined in Claims 5-7 of the instant patent" (*id*. at 79).

Appellant also asserts with respect to claim 5 that "it is well known in the art that the use of polarized filters, as recited in claim 5, is incompatible with the use of standard CRT displays as used by Hiromae. Indeed, the instant patent specifically states that the use of polarized filters is 'not at all usable with standard home television receivers.'" (App. Br. 78.) With respect to claims 6 and 7, Appellant asserts that Hiromae's system respectively cannot perform the alternate-frame display technique and is not compatible with the dark and light lens use technique. (App. Br. 78-79.)

These arguments are not persuasive. Hiromae employs a microcomputer adapted to produces stereographic images on a CRT. Appellant's arguments, directed to a standard (i.e., unmodified) home television receiver, focus too narrowly on the back-end CRT display disclosed in Hiromae or on some unmodified television. Hiromae provides stereoscopy via a modified microcomputer system, irrespective of whether or not the CRT display itself, or some other television receiver, has been modified. As such, Hiromae's stereographic teachings are not incompatible with other types of known stereographic systems identified by the Examiner

(Fin. Rej. 50; Ans. 46-48, 76-77) as admitted prior art (APA) in the '294 patent (D9), even if Hiromae does disclose a sole anaglyphic embodiment.

Appellant's arguments, discussed *supra* with respect to claim 1, that the'294 patent supports all forms of stereography, even lenticular and holographic techniques which are not discussed at all in the '294 patent, cut against the argument here that Hiromae is limited to a single stereographic technique, especially here in the obviousness context.

Moreover, Appellant's arguments focusing on Hiromae's singular teachings do not refute the Examiner's rationale which involves combining the '294 patent admitted prior art (APA) techniques (D9) with Hiromae's system. (Fin. Rej. 50; Ans. 47-48, 76-77.) With further respect to claim 7, the Examiner found that using light and dark colored lenses was well known in the art (apparently based on the known technique of using red and green tinted lenses). (*See* Ans. 47-48). Appellant does not address this latter finding.

At a basic level, these prior art techniques each involve presenting different images to the left and right eye, by some form of filtering, including time shuttering. "[W]hen . . . the prior art . . . is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result," *KSR*, 550 U.S. at 416, or "involve more than the . . . mere application of a known technique to a piece of prior art ready for the improvement," *id*. at 417.

The Examiner relied on the same rationale to reject claim 12. (Fin. Rej. 51.) Appellant does not address that rationale either, but relies on arguments with respect to claim 7, and also arguments with respect to claims

10, 11, and 13-15. (App. Br. 79.) Based on the foregoing discussion here, and the discussions of claims 1, 10, 11, and 13-15 *supra*, the Examiner did not err in finding claims 5-7 and 12 obvious based on the combination of Hiromae and APA.

Hiromae with Williams – Claim 8; Hiromae with Williams and APA – Claims 9 and 36.

With respect to these claims, Appellant relies on arguments presented for patentability of claim 1. (App. Br. 79-80.) Based on the foregoing discussion of claim 1, Appellant's arguments are not persuasive.

Hiromae with Imsand – Claims 18-21

Additional Fact Findings – Imsand

I1. Imsand discloses a layered technique involving three cameras. One camera directed to a background portion of an image remains fixed, while midground and foreground directed cameras move or rotate slightly to produce "changing texture to produce the depth effect." (Col. 6, l. 26.) The three images are combined to produce a three-dimensional image. Imsand discloses that the moving cameras present slightly different images much like a user who moves his head, thereby presenting a three-dimensional illusion (even if only one eye is used). Imsand also describes conventional techniques, including polarized glasses, color filter glasses, and shutter techniques; i.e., the various techniques disclosed by the '294 patent as background art (*see* D9.). One of Imsand's preferred embodiments replaces a solid color background of a motion camera with the background of other scenery obtained from another fixed camera, thereby providing a foreground with a continuously changing texture to produce a depth effect. (Col. 1, ll.

45-52; col. 4, ll. 36-62, col. 6, ll. 9-46; col. 8, ll. 28-68.) Imsand states that, in comparison to a different (shifted) image presented to each eye, "a less obvious method is to simply alternately expose the two stereo images to both eyes of the viewer." (Col. 1, ll. 53-56.)

I2. Imsand also states that "[h]uman binocular visual perception of three-dimensions requires, in part, stereo images, one image corresponding to each eye, view from slightly different angles corresponding to the separation of the eyes. This causes the eyes to see a slightly different image." (Col. 1, ll. 42-46.)

I3. Imsand describes human perception of three-dimensional depth under a sub-heading titled "Stereoscopic Vision" as follows: "When a person looks at an object, the retinal image in the right eye is different (disparate) from the retinal image in the left eye. This disparity is the result of the two eyes viewing the object from the two slightly different positions." (Col. 2, ll. 46-51.) "The modest differences in the two eye images of a single object that are caused by viewing the object from the two different positions are referred to as texture disparities." (Col. 3, ll. 28-31.)

A subsequent section titled "Binocular Fusion" similarly describes human perception: "When an object is viewed by the two eyes, although the two retinal images may be different, only a single image is normally perceived. This phenomenal process by which the two disparate images are merged into one and which takes place in the visual cortex of the sensory system is known as binocular fusion." (Col. 2, ll. 63-68.)

Discussion

Claim 18 depends from claim 17 and requires additional two-dimensional information to be derived from another image instead of from the original unprocessed image. Appellant asserts that Hiromae and Imsand "are incompatible as they work in entirely different ways" because "*Hiromae* provides two separate images to the left and right eyes" while "as best as the entire teachings of *Imsand* are understood, the reference relies on motion parallax rather than binocular stereoscopy." (App. Br. 80-81.)

In response to Appellant's arguments, the Examiner states that "the test for obviousness is. . . . what the combined teachings would have suggested to those of ordinary skill in the art." (Ans. 78 (citing *In re Keller*, 642 F.2d 413 (CCPA 1981).). The Examiner also noted that Imsand was applied "because it teaches additional two-dimensional image information to create stereoscopic presentations." *Id*.

The Examiner's position is more persuasive. Imsand discloses systems like Hiromae's as background art, discusses various theories involved in three-dimensional perception, and merely suggests alternative techniques to obtain three-dimensional perception of two-dimensional images. (*See* I1-I3.) A mere substitution of known techniques would have been obvious. *See KSR*, 550 U.S. at 416-17 (quoted *supra*).

Appellant's argument that motion parallax does not produce stereoscopic perception is not persuasive and lacks a factual foundation. (App. Br. 81.) Imsand's system presents different foreground, midground, and background images. The different images, due to the complexity of human three-dimensional perception, produce slightly different textural

differences to each eye. The human brain fuses the different perspectives into one image. (I1-I3.) Consequently, Appellant's argument that the combination would not result in the claimed invention, without more, is not persuasive. (App. Br. 81.)

Imsand also discloses replacing the solid color background of a motion camera with that of a fixed camera focused on another background to create a depth effect. (I1.) As such, replacing a solid color background in one of Hiromae's base images, i.e., "one of said images in step e" of claim 1 as required by claim 17, so that it contains another (fixed camera produced) image as suggested by Imsand, renders obvious the "two-dimensional image information derived from another image" as required by claim 18.

With respect to claims 19-21, Appellant's arguments group the claims together (App. Br. 81) such that claim 19 is hereby selected as representative of the group. Claim 19 calls for a "method as recited in claim 1 wherein said processed image elements in step f are combined with at least one additional 3-D image element not derived from the source image to create said processed image frame."

In addition to relying on arguments presented with respect to claim 18, Appellant argues that "*Imsand* is even less applicable, because the claims recite the addition of 3-D (stereoscopic or binocular) elements, while *Imsand* combines 2-D image streams . . . to create a composite 2-D moving image stream." (App. Br. 81-82.) This argument lacks merit because it is based on the untenable premise that Imsand's system does not produce composite 3-D images. (I1-I3.) Hiromae discloses processing regular and animated films, while Imsand discloses combining elements from different cameras. (H1-

H2; I1-I3.) Given these teachings, combining two separate 3-D images from different sources would have resulted in the predictable result of having different types of 3-D images in the same frame.

Based on the foregoing discussion, the Examiner did not err in determining that the combination of Hiromae and Imsand render claims 18-21 obvious.

Hiromae with Kuperman – Claims 32-34, 40, and 41

With respect to claims 32-34, rejected by the Examiner as obvious based on the combination of Hiromae and Kuperman (Fin. Rej. 52-53, Ans. 56-58), Appellant relies on arguments presented with respect to claim 1, "reserving the right to distinguish the claims from the combination." (App. Br. 82.) Based on the foregoing discussion of claim 1, this argument does not point to or demonstrate sufficient deficiencies in the Examiner's rejection of claims 32-34.

With respect to claims 40 and 41, Appellant does not present a separate patentability argument in the opening Brief in a section referencing these claims in the title: "Claims 32-34, 40 and 41 are patentable over *Hiromae* in view of *Kuperman*." (*See* App. Br. 82.) In another section, titled "**6. Regarding Some Dependent Claims**," Appellant groups claims 32-34 and 39-41 together and asserts that "adding color" (which claims 32 and 40 recite) requires "motion picture colorization" as opposed to "anaglyphic coloring for 3D display." (App. Br. 57-58.) This argument is not commensurate in scope with claim 32 or claim 40, which are respectively chosen to represent groups 32-34 and 40-41 based on the arguments presented. That is, claims 32 and 40 require adding color to

black and white elements. Hiromae provides color (even if it is anaglyphic coloring" as Appellant asserts) and the Examiner reasoned that the combination of Hiromae and Kuperman at least suggests the addition of such color to black and white elements. (*See* Fin. Rej. 52-53.)

With further respect to claims 40 and 41, in the Reply Brief, Appellant argues that "[w]hile the Examiner mentions that these claims are rejected, Examiner as provided no rationale for the rejections in his answer. For that reason, Appellant submits that those claims should be allowed." (Reply Br. 18.)

Appellant's argument is not persuasive. The Final Office Action separately describes the rejection of claims 32-34 and 40-41 in similar detail on separate pages. (*Compare* Fin. Rej. 52 *with* 53.) The Answer groups claims 40-41 together with claims 32-34, implying, in light of the Final Rejection, that the rationales pertaining to each group are similar or the same. (Ans. 56-57.) Appellant's terse arguments (in both Briefs) do not demonstrate deficiencies in the Examiner's rejection amounting to a patentable distinction. Based on the foregoing discussion, the Examiner did not err in determining that the combination of Hiromae and Imsand render claims 32-34 and 40-41 obvious.

Hiromae with Kuperman and Williams – Claim 39

Appellant relies on arguments with respect to claim 1 (App. Br. 82-83) and claim 32 (App. Br. 58). Based on the foregoing discussion of claims 1 and 32, the Examiner did not err in finding that the combination of Hiromae, Kuperman and Williams renders claim 39 obvious.

Hiromae with Kuperman and Noll – Claims 43 and 44

Additional Facts - Noll

N1. Noll teaches creating three-dimensional films (p. 21, Fig. 1), includes three-dimensional processing stick figures (p. 23, Fig. 4), and concludes that "scientists, animators, artists, and others" might create the "computer-generated three-dimensional movies described in this article" (*id*.).

Discussion

Appellant's arguments are interpreted here as relying in part on arguments presented with respect to claim 1 and addressed *supra*. (*See* App. Br. 83-84.) Appellant also asserts that Noll does not convert 2-D film into 3-D. (*Id*.) Appellant also asserts that "none of the four 102 references" "perform 3D conversion on . . . animation sub-components" and "*Noll* . . . does not change this." (App. Br. 58.) The Examiner found that Noll evidences "it was known . . . to convert animated films into 3-D." (Fin. Rej. 54.) Claim 43 requires deriving the individual image elements in step a of claim 42 from an animated film, with claim 44 calling for a product produced by the method of claim 42. Claim 42 is similar in scope to claim 1.

Appellant's arguments do not demonstrate the unobviousness of claims 43 and 44 based on the combination of Hiromae and Noll. Hiromae discloses using animated film to create 3-D images. (H2.) Noll reasonably suggests that animators create 3-D films using stick figures. (N1.) The combined teachings suggest using sub-components of an animated film to create 3-D films as called for in the method of claim 43 and the product of

claim 44. Based further on the foregoing discussion of claims 1 and 42, the Examiner did not err in rejecting of claims 43 and 44 as obvious based on Hiromae and Knoll.

Non-enablement of Hiromae as an Anticipating Reference

Appellant argues, in several places, that Hiromae's disclosure constitutes a non-enabling reference essentially because it is not clear. (*See e.g*. App. Br. 24, 38, 76). Appellant cites *Elan Pharm., Inc. v. Mayo Found. for Med. Educ. & Research*, 346 F.3d 1051, 1054-55 (Fed. Cir. 2003)(stating that factual premises required to demonstrate non-enablement of an anticipating reference must include a showing of undue experimentation, and citing *In re Wands*, 858 F.2d 731 (Fed. Cir. 1988)). (App. Br. 24.) Appellant states that the Examiner had earlier stated that the Patent Owner had not set forth a sufficient basis to support the non-enablement argument. (*Id*.)

Apparently, in response to the Examiner's statement, Appellant submitted affidavits by experts Chou and Feiner who rendered a conclusion similar to that of Appellant. (App. Br. 24.) Appellant also relies on the Marchioro Declaration. (App. Br. 38 (citing Exhibits A, B, and C of the Brief, the three declarations noted, *see supra* note 7).) Mr. Marchioro, a translator of Japanese language documents, in addition to providing a partial translation of Hiromae, opined that the Hiromae reference lacks "relatively comprehensive detail, customarily provided to specify the nature of the hardware being disclosed or the process being described." (Marchioro Dec'l" ¶ 5.)

Despite the citation to *Elan Pharm., Inc,* Appellant's evidence does not address the *Wands* factors discussed therein. In addition, Appellant's "argument . . . fails to recognize that prior art references must be 'considered together with the knowledge of one of ordinary skill in the pertinent art.'" *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Similar to the situation in *Paulsen* (in which a prior art reference "only discloses a box for a calculator"), the skill level of artisans involved in computer processing of images and contemplating Hiromae's teachings was "quite advanced." *Id*. Mr. Marchioro, an experienced professional translator of ten years, does not aver that he was aware of the skill level involved in computer image processing at the time of the invention and does not address the skill level. (*See* Marchioro Dec'l" ¶ 2-4.) Therefore, any conclusion in support of a non-enabling disclosure based on comparison to other Japanese document disclosures is of limited value to the non-enabling issue presented here.[18]

Appellant's technical experts similarly set forth little or no factual basis upon which to support a conclusion of non-enablement. Dr. Feiner concludes that the patent is "so vague as to make it impossible to ascertain a full or definite understanding of its hardware and mode of operation." (Feiner Dec'l ¶ 5.) Mr. Chou makes a similar conclusion and states that the "patent does not provide sufficient detail to enable one skilled in the art to practice the invention." (Chou Dec'l ¶ 27.) However, neither expert sets

[18] It does not appear that the Examiner entered Mr. Marchioro's declaration (including the attached partial translation). In any case, the declaration portion (i.e., not the entirety of the partial translation) is considered in this opinion as indicated to address Appellant's arguments.

forth a sufficient factual foundation to support a conclusion reflecting the proper legal standard for enablement based on undue experimentation under the *Wands* factors. Neither expert even alleges undue experimentation.

Further, Dr. Feiner was also able to "deduce" certain "conclusions and opinions regarding the Hiromae patent." (*Id*. ¶ 6.) For example, the images "will be parallax shifted an identical amount and will, thus, appear to protrude from or recede into the screen in the depth direction by the same amount at each particular height." (*Id*. ¶ 7.) "The fact that the base image is input into the microprocessor in order to register a cursor for display to a user, to facilitate coordinated input from a designation means 5 (e.g., a mouse or keyboard controller), does not mean that the image is necessarily digitized; nor, if the image were digitized for that purpose, does it mean that the image is further processed within the computer." (*Id*. ¶ 8.) Mr. Chou made similar observations, and described how Hiromae's invention functions. (Chou Dec'l ¶¶ 27-36.)

As indicated *supra*, Appellant also describes in some detail how Hiromae's invention works (to show that it cannot anticipate the claims). (App. Br. 39-45.) Thus, Appellant's arguments and the expert conclusions notwithstanding, Appellant and the experts indicate that skilled artisans could have practiced the invention of Hiromae without undue experimentation. Hiromae's disclosure is at least as detailed as Appellant's disclosure. For example, the '294 patent shows only one system block diagram (Fig. 2 - nine blocks) while Hiromae depicts two such block diagrams (Fig. 1 - eight blocks, Fig. 2 – 6 blocks). Both disclosures are relatively short and lacking in super detail about hardware and the functions

of the various block elements. *See Paulsen*, 30 F.3d at 1481 n.9 ("We also note that under the enablement standard that AST would have us apply to Yokoyama, the '456 patent itself would be non-enabling.")

In any event, as indicated *supra*, despite Appellant's reference to "undue experimentation" and citation to *Elan Pharm., Inc.* (App. Br. 24), Appellant does not mention the required factors to render that determination, such as the level of skill involved, the quantity of experimentation necessary, the predictability or unpredictability of the art, the breadth of the claims, etc. *See Elan Pharm., Inc.*, 346 at 1055-56; s*ee also In re Sasse*, 629 F.2d 675, 681 (CCPA 1980) (discussing the shifting burdens with respect to an alleged non-enabling anticipation reference). Accordingly, Appellant has not established that Hiromae constitutes a non-enabling anticipating reference.

Response to the Dissenting Opinion

The dissenting opinion reasons that the implied definition of "three-dimensional" espoused by the majority opinion embraces all types of two-dimensional objects such as paintings in museums. The implied definition, carefully circumscribed based on claim construction precedent and the arguments and evidence of record, is not so broad. The implied definition limits three-dimensional images to those produced by known two-dimensional to three-dimensional frame conversion techniques. The majority holding reveals that such known techniques include computer implemented stereoscopic techniques and mathematical-type transformation techniques involving curved or textured surfaces, each of which produces a depth effect which *skilled artisans* describe as "three-dimensional."

Based on the fear of an overly broad definition, the dissenting opinion proposes to re-define the disputed term (to a plain meaning) in which images "pop out." However, Appellant does not propose such a definition (and did not contest the plain meaning). Such a definition is not before the Board and was not before the Examiner, and as such, has not survived the rigors of examination. As such, the approach runs counter to normal appellate practice.

Perhaps Appellant does not provide such a definition because Appellant does not want to limit the claims as proposed by the dissenting opinion. For example, Appellant carefully describes a "3-D space *behind the screen (away from the viewer)*" *in reference to "the practice of '294*." (*Supra* note 10 (emphasis added).) In other words, some frames may have objects that pop out, while others may not because they may consist solely of objects which exist behind the screen. Included in the latter category are the images produced by the mathematical techniques of Falk and Oka.

There may be any number of reasons why Appellant does not propose the definition advanced by the dissenting opinion. In any event, the Federal Circuit has indicated that the PTO does not have the duty espoused by the dissenting opinion; i.e., the duty to define terms in a precise fashion so as to avoid the unintended consequences of capturing certain prior art: "We decline the attempt to harmonize the applicant's interpretation with the application and prior art. *Such an approach puts the burden in the wrong place. It is the applicant's burden to precisely define the invention, not the PTO's*." *In re Morris*, 127 F.3d at 1056 (emphasis added).

While there is no doubt that the *Morris* rationale partially relies on policy advanced by pre-issuance claim construction rules, *see In re Morris*, 127 F.3d at 1054, portions of the rationale also apply to the more restrictive situation involved here, the reexamination of an expired patent. That is, underlying *Morris* is the notion that a definition that survives examination scrutiny and which was advanced after careful consideration by an applicant, whether it be during the initial examination or reexamination, produces a distinctly claimed invention which serves the public notice function. *See id.* at 127 F.3d at 1056. Under the dissenting opinion approach of creating un-requested and un-examined definitions, the public notice function would be ill-served as the approach would cast a cloud over the meaning of claim terms in patents yet to be reexamined.

While Appellant attempts to precisely define the invention by limiting claim terms based on certain embodiments, Appellant's attempt, and similarly, the dissenting opinion's approach, does not square with the '294 patent disclosure which clearly disavows any potential limiting effects by descriptions in the patent (D8).

CONCLUSION

Based on the record, the Examiner did not err in concluding the following:

Falk discloses employing image elements for conversion to three-dimensional images and anticipates claims 1, 8, 10, 13, 15-22, 35-37, and 42. Oka discloses employing image elements for conversion to three-dimensional images and anticipates claims 1, 8, 10, 13, 15-17, 22, 35-38,

and 42. Kuperman discloses image elements and anticipates claims 1-4 and 26-28. Hiromae constitutes an enabling reference, discloses inputting image elements into a computer, and anticipates claims 1-4, 10, 11, 13-15, 17, 24, 35, 37, 38, and 42. The prior art combinations listed *supra* render obvious the disputed limitations of claims 5-10, 12, 18-23, 29-34, 36, 39-41, 43, and 44, on appeal.

DECISION

The Examiner's decision to reject appealed claims 1-24 and 26-44 is affirmed.

Requests for extensions of time in this ex parte reexamination proceeding are governed by 37 C.F.R. § 1.550(c). *See* 37 C.F.R. § 41.50(f).

AFFIRMED

ack

TURNER, *Administrative Patent Judge*, CONCURRING-IN-PART, DISSENTING-IN-PART:

I concur with the majority's affirmance of most of the Examiner's rejections of the claims (Maj. Op. 80), but I respectfully dissent from the majority's affirmance of the Examiner's rejections as follows:

Claims 1, 8, 10, 13, 15-22, 35-37, and 42 stand rejected under 35 U.S.C. 102(e) as anticipated by Falk;

Claims 1, 8, 10, 13, 15-17, 22, 35-38, and 42 stand rejected under 35 U.S.C. 102(e) as anticipated by Oka; and

Claims 22 and 23 stand rejected under 35 U.S.C. 103(a) as obvious based on Oka and Taylor.

For the reasons that follow, I would not sustain the above-cited Examiner's rejections.

I concur with the majority's analysis that Appellant cannot incorporate "stereoscopic" or "stereographic" into the limitation "3D" in the claims (Maj. Op. 18-32). The use of "3D" in the Specification, the prior art, and the discussions of the Examiner and Appellant is broad ranging, and I concur that limiting "3D" to stereographic applications is over limiting. As such, Appellant has not acted as his or her own lexicographer to supplant the plain meaning of the claim limitation "three dimensional." Nonetheless, I do not agree with the plain meaning of "3D" or "three dimensional" that is being espoused by the majority (Maj. Op. 25, 80).

I would suggest that Appellant is trying to incorporate the essence of "stereoscopic" into the claim term "3D images" because that term can be interpreted in different ways, as evidenced by the discussion *supra*.

However, given that claim interpretation is a matter of law, we are required to identify the "plain meaning" of "3D images" used in the claims.

Without such a "plain meaning," it is not clear how a claim can be pronounced to be unpatentable; i.e., a claim scope must be proffered in order to determine whether the prior art falls within. By determining that Oka and Falk teach or suggest "three dimensional images," the majority has defined the term by proxy, but not explicitly. Even if the majority is correct, and Appellant would not be satisfied with our definition of "three dimensional," I do not believe that absolves us of the responsibility.

If the term "3D image[s]" is interpreted as any 2D image that contains elements that indicate depth, then almost all photographs would have to be 3D, even though they are planar. Almost all have shadows and other depth cues that tell the viewer that they are looking at a 2D representation of a 3D object. I don't find this comports with the use of "3D images," as discussed in Appellant's specification. I fear that under the proposed definition, the only "2D" images left would be signs or monochromatic images, i.e. images with no discernible depth. Any shading on a computer screen would provide simulated depth and would be considered a 3D image, under such a definition. Every painting in a museum would also be considered to be a 3D image, as well as every photograph of those paintings. Such a definition of "3D images" would have that claim term read upon almost every 2D image, thus rendering the claims as providing almost no utility, i.e. converting 2D image frames into 2D image frames.

As such, in my opinion, the other prior art references (Hiromae, Kuperman) show systems that would present 3D images, as defined in the

Encarta article, cited by the Examiner, as "[s]uch techniques [which] make the objects in the images appear to pop out of the paper, film, or screen on which they appear." I find Oka and Falk as disclosing techniques providing "[f]lat images, such as illustrations, photographs, films, and graphics on a computer screen" (further quoting the Encarta article). While 3D images may be hard to define, that does not relieve us of the burden of determining the proper scope for such a claim term. Interpreted by one of ordinary skill in the art, I do not find that "3D" would have the scope being proffered by the majority.

For the foregoing reasons, I find the collective teachings of the cited references Falk and Oka simply do not teach or suggest all limitations of representative claim 1. Therefore, I would reverse the above-cited Examiner's rejections of the claims citing Oka and Falk.

cc:

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