

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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**Ex parte** SUSUMU TACHI, TARO MAEDA, YUTAKA KUNITA  
and MASAHIKO INAMI

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Appeal No. 2002-1047  
Application 09/083,174

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ON BRIEF

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Before THOMAS, FLEMING, and BARRY, **Administrative Patent Judges**.  
FLEMING, **Administrative Patent Judge**.

**DECISION ON APPEAL**

This is a decision on appeal from the final rejection of claims 1 through 14, all the claims pending in the instant application.

**Invention**

The invention relates to a method of and apparatus for

producing images in a virtual space. See page 1 of Appellants' specification. In order to form a three-dimensional image by a computer, it has been conventional practice in the past to resort to geometry based rendering (GBR) or image based rendering (IBR). See page 1 of Appellants' specification. Video conference systems have been utilized to enable persons present in different localities to hold a conference. A video conference system comprises video cameras and display apparatuses provided in rooms located in different localities. These video cameras and display apparatuses are connected to each other by means of telecommunication lines. The prior art video conference system has the disadvantage that the speaker has to face the display apparatus which is fixedly held in position and has only a limited screen area. See page 2 of Appellants' specification. To overcome this problem, prior art video conference systems have utilized two video cameras to provide a stereoscopic vision of the listeners and allowing the listeners to have stereoscopic vision of the speaker. Even in this case, however, it is difficult to allow them to have a stereoscopic vision irrespective of their visual points. See page 3 of Appellants' specification. Appellants' invention is concerned with eliminating these various difficulties. The primary object of

the invention is to provide a method and an apparatus for producing images in a virtual space suitable for use so that it enables persons present in different localities to feel as if they meet together in a room. See page 3 of Appellants' specification.

Referring to figure 1, a video conference system 1 embodying Appellants' invention includes two cylindrical booths disposed in different localities. The video conference system 1 is capable of producing images in a virtual space as shown in fig. 2 to enable the persons in the different localities to feel as if they are meeting together in the same room. See page 7 of Appellants' specification. The prior art practices of producing an image in a virtual space, GBR and IBR, are not suitable for video conference systems for the reasons given on pages 10 and 11 of Appellants' specification. Appellants' invention utilizes a method for producing a virtual image based on the assumption that light beams always pass through a single medium having a constant refractive index. See page 12 of Appellants' specification. Let it be assumed that light beams are emitted from, or reflected on the surface of, an object M shown in fig. 4 and intersect at a point such as P. Also let it be assumed that these light beams cannot be directly recorded at point P, and that the object M is

enclosed with a virtual spherical surface R through which light beams must pass in order to reach point P. Appellants' invention records the light beams on the virtual spherical surface R. By using the mathematics disclosed on pages 12 and 13 of Appellants' specification, Appellants' invention is able to reconstruct the light beams intersected at point P.

Claim 1 is representative of Appellants' claimed invention and is reproduced as follows:

1. A method of producing images in a virtual space, comprising the steps of:

detecting light beams directed toward virtual visual points from among light beams emitted from or reflected on a surface of an object, said detection being effected by an image pickup device in a plurality of positions lying on a virtual closed surface with which said object is enclosed, wherein said virtual visual points are not lying on said virtual closed surface;

converting said detected light beams into image pickup signals;

delivering said image pickup signals to a display device adapted to display an image toward a visual point of an observer in a place different from a place where any of said virtual visual points is disposed; and

displaying said image on a basis of said image pickup signals in such a manner as if light beams were emitted toward said visual point of said observer from various points on a surface of a virtual object disposed in a virtual position corresponding to the relative positions of said object and any of said virtual visual points.

### References

The references relied on by the Examiner are as follows:

Fields	4,400,724	Aug. 23, 1983
Secka	4,760,443	Jul. 26, 1988
Matsugu et al. (Matsugu)	5,625,408	Apr. 29, 1997
Gilblom et al.	5,650,813	Jul. 22, 1997
Green	5,696,837	Dec. 9, 1997

### Rejections at Issue

Claim 1 stands rejected under 35 U.S.C. § 102 as being anticipated by Matsugu. Claims 9 and 11 stand rejected under 35 U.S.C. § 102 as being anticipated by Fields. Claims 2, 3, and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Matsugu in view of Green. Claim 12 stands rejected under 35 U.S.C. 103 as being unpatentable over Fields in view of Matsugu. Claims 5, 10, 13, and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Matsugu in view of Gilblom. Claims 6 through 8 stand rejected under 35 U.S.C. § 103 as being unpatentable over Matsugu in view of Green and Secka.

Throughout our opinion, we make reference to the briefs<sup>1</sup> and

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<sup>1</sup>Appellants filed an appeal brief on July 31, 2001. Appellants filed a reply brief on November 29, 2001. The Examiner mailed out an office communication on December 13, 2001, stating that the reply brief has been entered.

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the answer for the respective details thereof.

#### OPINION

With full consideration being given to the subject matter on appeal, the Examiner's rejections and the arguments of Appellants and the Examiner, for the reasons stated **infra**, we reverse the Examiner's rejections of claims 1, 9, and 11 under 35 U.S.C. § 102 and we reverse the Examiner's rejections of claims 2 through 8, 10 and 12 through 14 under 35 U.S.C. § 103.

It is axiomatic that anticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim. **See In re King**, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986) and **Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.**, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984).

Claim 1 stands rejected under 35 U.S.C. § 102 as being anticipated by Matsugu. Appellants argue that Matsugu does not teach or suggest a method of producing images in a virtual space comprising the steps of detecting light beams directed toward virtual visual points, wherein detection is being effected by an image pickup device in a plurality of positions lying on a

virtual closed surface and where the virtual visual points are not lying on the virtual closed surface. See pages 7 through 12 of Appellants' brief and Appellants' reply brief.

Matsugu is concerned with an image recording/reproducing method which can generate and display a stereoscopic image. See Matsugu, column 1, lines 10 through 15. Matsugu's figure 4 shows the principle of parallax information conversion. Referring to figure 4,  $S_L$  and  $S_R$  respectively represent the camera sensor surfaces upon phototaking.  $S'_L$  and  $S'_R$  respectively represent the retinas of naked eyes or display surfaces upon reproducing, and  $P$  represents the point on a certain object in real space.  $O'_L$  and  $O'_R$  respectively represent the lens centers of the left and right phototaking systems representing the eyes of the observer. See Matsugu, column 4, lines 10 through 25. Thus, Matsugu teaches a system wherein the virtual visual points, which correspond to the eyes of the observer, are lying on the virtual closed surface on which the cameras are positioned. Therefore, Matsugu cannot anticipate Appellants' claimed invention which requires that the "virtual visual points are not lying on said virtual closed surface" as recited in Appellants' claim 1. Furthermore, Matsugu fails to teach detecting light beams directed toward virtual visual points wherein detection is being effected by an image

pickup device and a plurality of positions lying on a virtual closed surface, and wherein the virtual visual points are not lying on the virtual closed surface as recited in Appellants' claim 1. Therefore, we will not sustain the Examiner's rejection of claim 1 under 35 U.S.C. § 102.

Claims 9 and 11 stand rejected under 35 U.S.C. § 102 as being anticipated by Fields. Appellants argue that Fields fails to teach "said first virtual visual point is not lying on said first virtual closed surface" and that "said second virtual visual point is not lying on said second virtual closed surface" as recited in independent claim 9. See page 12 of the brief.

We note that Fields teaches a video conference in which three cameras provide a left, center, and right view of the conferee. Figures 9, 10, 11, and 12 are perspective views showing the different forms of the teleconference station. See Fields, column 3, lines 60 through 63. We fail to find any teaching in Fields that the first virtual visual point is not lying on the first virtual closed surface and that the second virtual visual point is not lying on the second virtual closed surface as required by claims 9 and 11. Therefore, we will not sustain the Examiner's rejection of claims 9 and 11 under 35 U.S.C. § 102.

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Claims 2, 3, and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Matsugu in view of Green. Claim 12 stands rejected under 35 U.S.C. § 103 as being unpatentable over Fields in view of Matsugu. Claims 5, 10, 13, and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Matsugu in view of Gilblom. Claims 6 through 8 stand rejected 35 U.S.C. § 103 as being unpatentable over Matsugu in view of Green and Secka.

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a **prima facie** case of obviousness. **In re Oetiker**, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). **See also In re Piasecki**, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. **In re Fine**, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. **Oetiker**, 977 F.2d at 1445, 24 USPQ2d at 1444. **See also Piasecki**, 745 F.2d at 1472, 223 USPQ at 788.

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An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. "In reviewing the [E]xaminer's decision on appeal, the Board must necessarily weigh all of the evidence and argument." **Oetiker**, 977 F.2d at 1445, 24 USPQ2d at 1444. "[T]he Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion." **In re Lee**, 277 F.3d 1338, 1344, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002). With these principles in mind, we commence review of the pertinent evidence and arguments of Appellants and Examiner.

In each of the above rejections, the Examiner is relying either Matsugu or Fields for the teaching of detecting light beams directed toward visual points, wherein detection is effected by an image pickup device in a plurality of positions lying on a virtual closed surface, and wherein the virtual points are not lying on a virtual closed surface. We have found above that neither Matsugu nor Fields teaches these limitations. Therefore, we will not sustain these rejections for the same reasons as above.

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In view of the foregoing, we have not sustained the Examiner's rejection of claims 1, 9, and 11 under 35 U.S.C. § 102 and the rejection of claims 2 through 8, 10, and 12 through 14 under 35 U.S.C. § 103.

**REVERSED**

JAMES D. THOMAS	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
MICHAEL R. FLEMING	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
LANCE LEONARD BARRY	)	
Administrative Patent Judge	)	

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