

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROY W. LATHAM

Appeal No. 1998-0426
Application No. 08/307,028

ON BRIEF

Before JERRY SMITH, BARRETT, and DIXON, **Administrative Patent Judges**.
DIXON, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the examiner's non-final rejection of claims 1-5, which are all of the claims pending in this application.

We REVERSE.

BACKGROUND

The appellant's invention relates to a computer-implemented method of rendering an image of smoke. An understanding of the invention can be derived from a reading of exemplary claim 1, which is reproduced below.

1. A computer-implemented method of rendering an image of smoke or clouds in an image generator for display of pixels on a display device, said method comprising the steps of:

modeling the smoke as a sphere having nonuniform smoke density, and that is comprised of a center point in three-dimensional model space, a radius, and set of parameters defining its nonuniform density and color;

transforming the center point to screen coordinates;

transforming the radius to a screen coordinate radius;

generating a bounding polygon that surrounds a projection of the sphere in screen coordinates;

clipping the bounding polygon to boundaries of the display device; and

for each pixel in the image, rendering a smoke effect by:

testing if the pixel is within the bounding polygon;

computing an equivalent translucency factor for the smoke at the pixel based upon location of the pixel with respect to the transformed center point, the screen coordinate radius, the set of parameters defining its nonuniform density and color, and penetration depth through the smoke; and

computing the smoke effect for the pixel based upon the equivalent translucency factor.

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The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Sakas et al. "Sampling and Anti-Aliasing of Discrete 3-D Volume Density Textures", Computers & Graphics: Eurographics '91 Award Paper, pgs. 121-134, published by Pergamon Press (1992).

Gardner, "Visual Simulation of Clouds," Computer Graphics, Vol. 19, No. 3, pgs. 297-303, (July 1985).

Claims 1-5 stand rejected under 35 U.S.C. § 103 as being unpatentable over Gardner in view of Sakas.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the examiner's answer (Paper No. 24, mailed Aug. 28, 1997) for the examiner's reasoning in support of the rejections, and to the appellant's brief (Paper No. 23, filed June 16, 1997) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

Appellant argues that Gardner does not disclose the use of a sphere in the simulation of the clouds. Rather Gardner uses ellipsoidal surfaces with texturing applied

only to the surface. We agree with appellant. (See brief at pages 3-6.) The examiner rationalizes that "the ellipsoid is a sphere." (See answer at page 4.) While we agree with the examiner's rationalization of the similarity of the sphere and the ellipsoid, we do not agree that a skilled artisan would have recognized them as the same. Appellant has argued that the sphere was selected "to reduce the calculations . . . when one is within the spheres." (See brief at page 4.) The examiner has not set forth a motivation for changing the ellipsoids of Gardner to spheres and to use the solid sphere rather than merely the surface as taught by Gardner.

Appellant further argues that Gardner does not disclose a "method that models a cloud using spheres with each sphere having a varying density of obscuring material (corresponding to a set of parameters defining the nonuniform density and color of the smoke or cloud)." (See brief at page 5.) We agree with appellant that Gardner does not disclose "computing an equivalent translucency factor for the smoke at the pixel based upon location of the pixel with respect to the transformed center point, the screen coordinate radius, the set of parameters defining its nonuniform density and color, and penetration depth through the smoke" as recited in claim 1.

Appellant generally argues that Gardner is merely concerned with modeling the surface of an ellipsoidal surface which does not have volume or depth beyond the

displayed surface generated. (See brief at page 4.) We agree with appellant that the claimed invention is directed to spherical volumes with a nonuniform density.

The examiner relies upon Sakas to teach the use of a nonuniform density function in 3-D modeling smoke and clouds. While Sakas discloses the use of 3-D models and projection of the model onto the screen (see Sakas figure 2), Sakas does not disclose the use of a sphere, with a center point, as the object being modeled or the computations recited in claim 1. While Sakas does teach the use of density functions, in our view, Sakas does not remedy the above deficiencies in Gardner. Therefore, we will not sustain the rejection of claim 1 and dependent claims 2-5.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-5 under 35 U.S.C. § 103 is reversed.

REVERSED

JERRY SMITH)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
LEE E. BARRETT)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
)	

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JOSEPH L. DIXON
Administrative Patent Judge

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