

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JEFFREY J. HOLT

Appeal No. 2000-0766
Application No. 08/825,259

ON BRIEF

Before KRASS, RUGGIERO and BARRY, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-12.

The invention pertains to displaying a line segment on a display having pixels identified by a two-axis coordinate system. Representative independent claim 1, illustrative of the invention, is reproduced as follows:

1. An improved device, of the type utilizing a display having pixels

identified by a two-axis coordinate system, so that each pixel lies at the intersection of a coordinate line from each of the axes, for displaying a line segment having arbitrary endpoints referenced to the same coordinate system, the display operating under control of a digital computer, wherein the improvement comprises:

(a) means for determining as a major axis the axis of the coordinate system with respect to which the line moves most, and for defining the other one of the axes as the minor axis;

(b) intersection means for identifying the major coordinate lines, if any, crossing the line segment to be displayed, based only upon the major axis coordinates of the endpoints of the line segment and

(c) pixel selection means for, with respect to each crossing found by the intersection means, selecting for display a pixel that both (i) lies on the major axis coordinate line at the crossing and (ii) has a minor axis coordinate that is closest to the line segment.

The examiner relies on the following reference:

Foley et al. (Foley), "Computer Graphics: Principles and Practice, Second Edition", pp. 72-79, published by Addison-Wesley Publishing Company (Nov., 1993).

Claims 1-12 stand rejected under 35 U.S.C. § 103 as unpatentable over Foley.

Reference is made to the briefs and answer for the respective positions of appellant and the examiner.

OPINION

We REVERSE.

Each of the independent claims has a paragraph (b) which requires an identification of the major coordinate lines (if there are any) crossing the line segment to be displayed and that this identification is “based *only* upon the major axis coordinates of the endpoints of the line segment” [emphasis added]. Moreover, independent claim 11 further narrows this to make it clearer that this identification is performed “prior to selecting any pixel for display of the line segment.”

In applying Foley to the instant claimed invention, the examiner admits that Foley does not explicitly disclose identifying the major coordinate lines, crossing the line segment to be displayed, based only upon the major axis coordinates of the endpoints of the line segment. However, the examiner contends, at page 4 of the final rejection [Paper No. 18], that only the major coordinate lines crossing the line segment are identified, based only upon the major axis coordinates of the endpoints of the line segment in Foley because Foley “shows finding the next major coordinate line crossing (i.e., intersection), by using the major coordinate line and *adding the slope* (on page 74, first paragraph), thus not depending on the minor axis coordinate” [emphasis ours].

The trouble with the examiner’s reasoning is that by employing the *slope* of the

line segment in determining the intersection of the line segment with a major coordinate line, Foley has, indeed, based the determination, not *only* upon the major axis coordinates, as claimed, but also on the slope of the line segment.

While Foley takes one x-value at a time and computes a corresponding y-value, based on slope, prior to moving on to the next x-value, the instant claimed invention identifies all of the major axis values between the endpoints of the line segment before determining any of the minor axis values. As soon as Foley makes a preliminary calculation of slope, the minor axis coordinates are invoked because the slope gives a minor axis value for each and every major axis value. In contrast, the instant claims require using *only* the major axis coordinates of the endpoints and this must be done *prior* to identification of the major axes crossing the line segment.

We find that, as disclosed and argued by appellant, the claim language, “based only upon the major axis coordinates of the endpoints of the line segment” means that the identification of the major coordinate lines, if any, crossing the line segment to be displayed may not be based, in any part, or in any way, on a previous calculation of the slope. The identification must be based solely on the major axis coordinates of the

endpoints of the line segments. Thus, if the major axis is the x-axis and the line

segment runs between $x=1.5$ and $x=5.5$, based on these two endpoints, the major coordinate lines will be at $x=2$, $x=3$, $x=4$ and $x=5$. The identification is based on identifying the integer values of the major coordinates between the endpoints. No slope is previously calculated or used in any way to obtain these major coordinate lines crossing the line segment. No values of the minor coordinate axis (in this case, the y-axis values) are employed in any manner to obtain the major coordinate lines crossing the line segment. Our decision herein is based on this interpretation, a reasonable interpretation urged by appellant.

Since Foley's line segment display relies on the slope of the line segment (e.g., see page 73, paragraph 3.2.1) in order to find the next major coordinate value, by definition, this depends on minor axis coordinates since the slope is the difference between two minor axis coordinates divided by the difference between two major axis coordinates. Since Foley bases identification of major coordinate lines, at least in part, on minor axis coordinates, Foley does not meet, nor make obvious, the instant claimed subject matter.

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The examiner's decision rejecting claims 1-12 under 35 U.S.C. § 103 is
reversed.

REVERSED

ERROL A. KRASS)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JOSEPH F. RUGGIERO)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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LANCE LEONARD BARRY)	
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