

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(2) is not binding precedent of the Board.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. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIROSHI MASUDA,
MASAYUKI NUMAO and SHUICHI SHIMIZU

Appeal No. 96-2022
Application 08/132,943¹

ON BRIEF

Before HAIRSTON, JERRY SMITH and CARMICHAEL, Administrative
Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134

¹ Application for patent filed October 07, 1993.

Appeal No. 96-2022
Application No. 08/132,943

from the examiner's rejection of claims 1-8, which constitute all the claims remaining in the application.

The disclosed invention pertains to a method and apparatus for developing solid model representations of a shape which has been defined by three orthographic views of the shape as two-dimensional data.

Representative claims 1 and 6 are reproduced as follows:

1. A solid model construction method in which a shape of a solid model is inputted in the form of three orthographic views to an image processing unit for constructing a solid model from said orthographic views, comprising:

obtaining three-dimensional data of three-dimensional definite lines forming a stereographic wire frame corresponding to patterns from two-dimensional data of vertices and definite lines of said patterns given as said three orthographic views;

dividing individual regions formed by the plurality of three-dimensional definite lines cells having faces and volumes;

holding the divided cells as a non-manifold data structure;

testing said three orthographic views to evaluate whether or not there is a conflict in the boundary relation between said cells; and

a step for constructing a solid model by combining said individual cells according to a combination with no

Appeal No. 96-2022
Application No. 08/132,943

conflict of said cells.

6. A method for developing a solid model representation of a shape provided as three orthographic views, the method operating in a graphics system having a processor and memory, the method comprising the steps of:

transforming said three orthographic views into a plurality of lines in three dimensional space;

transforming said plurality of lines into a plurality of three dimensional polyhedrons each comprising a cell;

constructing a plurality of Boolean equations each representing the conditions for inclusion of one of said plurality of lines in said solid model representation;

solving said plurality of equations to create a list of candidate cells;

constructing said solid model representation from a subset of said candidate cells.

The examiner relies on the following references:

Masuda et al. (Masuda), "A Mathematical Theory and Applications of Non-Manifold Geometric Modeling," Advanced Geometric Modelling For Engineering Applications, 1990, pages 89-103.

Foley et al. (Foley), Computer Graphics: Principles and Practice, 2nd edition, Addison-Wesley Publishing Company, 1990, pages 533-551.

Claims 1-8 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner offers Masuda and Foley

Appeal No. 96-2022
Application No. 08/132,943

taken together.

Rather than repeat the arguments of appellants or the examiner, we make reference to the brief and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the examiner, and the evidence of obviousness relied upon by the examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' arguments set forth in the brief along with the examiner's rationale in support of the rejection and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 6-8. We reach the opposite conclusion with respect to claims 1-5. Accordingly, we affirm-in-part.

Appellants have indicated that for purposes of this

Appeal No. 96-2022
Application No. 08/132,943

appeal the claims will stand or fall together as a single group [brief, page 4]. 37 CFR § 1.192(c)(7) provides that the "Board shall select a single claim from the group and shall decide the appeal as to the ground of rejection on the basis of that claim alone." Although appellants' brief is primarily directed to the patentability of claim 1, we would select independent claim 6 as the representative claim for the entire group of claims on appeal before us because we agree with the examiner that claim 6 is the broadest claim on appeal [answer, page 11]. Even though we are allowed by rule to consider this appeal on the merits of the rejection with respect to claim 6 alone, we will also consider the rejection with respect to independent claims 1 and 2 since all the arguments necessary to render this decision are of record in this case.

As a general proposition in an appeal involving a rejection under 35 U.S.C. § 103, an examiner is under a burden to make out a prima facie case of obviousness. If that burden is met, the burden of going forward then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of

Appeal No. 96-2022
Application No. 08/132,943

the arguments. See
In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed.
Cir. 1992); In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685,
686
(Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223
USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d
1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those
arguments actually made by appellants have been considered in
this decision. Arguments which appellants could have made but
chose not to make in the brief have not been considered [see
37 CFR
§ 1.192(a)].

With respect to our selected representative,
independent claim 6, the examiner has pointed out the
teachings of Masuda and Foley, has pointed out the perceived
differences between this prior art and the claimed invention,
and has reasonably indicated how and why Masuda and Foley
would have been modified and/or combined to arrive at the
claimed invention. In our view, the examiner's analysis is
sufficiently reasonable that we find that the examiner has
satisfied the burden of presenting a prima facie case of

obviousness. That is, the examiner's analysis, if left unrebutted, would be sufficient to support a rejection under 35 U.S.C. § 103. The burden is, therefore, upon appellants to come forward with evidence or arguments which persuasively rebut the examiner's prima facie case of obviousness. Appellants have presented several substantive arguments in response to the examiner's rejection. Therefore, we consider obviousness based upon the totality of the evidence and the relative persuasiveness of the arguments.

With respect to the teachings of Masuda, appellants argue that "Masuda does not disclose theoretically sufficient topological structures to represent non-manifold geometric models or solid model construction of data inputted in the form of three orthographic views" [brief, page 6]. With respect to the former point, there is no recitation in claim 6 limiting the invention to non-manifold geometric models. With respect to the latter point, we agree with the examiner that appellants' own description of the prior art that it was "known to provide systems where structural data in the form of three orthographic views...are converted to shape data in the solid model form" [specification, page 1] is sufficient to

suggest the obviousness of this claimed feature.

Specifically, the solid models shown in Masuda and Foley could be generated from data provided in a number of ways. Since appellants' specification admits that solid models were known to be generated using three orthographic views, it would have been obvious to the artisan to obtain the solid model data shown in Masuda or Foley by entering three orthographic views into Masuda's system or Foley's system as known from the admitted prior art. Therefore, appellants' argument that neither Masuda nor Foley specifically discloses the use of three orthographic views is not persuasive of the nonobviousness of this feature as recited in claim 6.

Appellants next point to independent claim 1 and argue that neither Masuda nor Foley teaches the generation of non-conflicting cell combinations for the solid model. While a conflict in the boundary relations between cells is clearly recited in independent claims 1 and 2, we find no similar recitation in representative claim 6. Thus, even though appellants' argument would be relevant to the nonobviousness of the invention recited in claims 1 and 2, it is not commensurate in scope with the invention as recited in claim

Appeal No. 96-2022
Application No. 08/132,943

6. As noted above, appellants' arguments are not specifically directed to the broader language of representative claim 6.

As discussed above, the examiner's analysis of claim 6 in combination with the teachings of Masuda and Foley is considered sufficient to establish a prima facie case for the obviousness of claim 6. Masuda [Figure 13] and Foley [Figure 12.19] show a solid object made up of lines in three-dimensional space. They also both teach three-dimensional polyhedrons comprising a cell [Foley] or a primitive [Masuda]. Both references also teach the construction of Boolean equations to form the candidate cells or primitives necessary to create the solid model.

Since the examiner has established a prima facie case for the obviousness of independent claim 6, and since appellants have offered no persuasive arguments that the rejection of claim 6 is in error, we sustain the rejection of claim 6. Since claims 7 and 8 depend from claim 6, we sustain the rejection of claims 6-8 under 35 U.S.C. § 103 as proposed by the examiner.

Independent claims 1 and 2, however, do recite

Appeal No. 96-2022
Application No. 08/132,943

obtaining three-dimensional definite lines from the three orthographic views, holding the divided cells as non-manifold data, using the three orthographic views to evaluate whether there is a conflict in the boundary relations between cells, and combining cells with no conflict. Since neither Masuda nor Foley discusses how they obtain the three-dimensional data for the object, there is no suggestion in either reference that three orthographic views be used in the evaluation of conflicts in the boundary relation between cells. In other words, Masuda and Foley apparently resolve conflicts from the wire frame model and not by using three orthographic views as claimed. Therefore, we find no suggestion in Masuda and Foley of the invention recited in independent claims 1 and 2. Therefore, we do not sustain the rejection of claims 1-5 as proposed by the examiner.

In summary, we have sustained the rejection under 35 U.S.C. § 103 with respect to claims 6-8, but we have not sustained that rejection with respect to claims 1-5. Therefore, the decision of the examiner rejecting claims 1-8 is affirmed-in-part.

Appeal No. 96-2022
Application No. 08/132,943

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

)	
Kenneth W. Hairston))
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
Jerry Smith)	
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
)	
James T. Carmichael))
Administrative Patent Judge)	

dm

Appeal No. 96-2022
Application No. 08/132,943

Mark S. Walker- IBM Corporation
Intellectual Property Law Dept.
Internal Zip 4054
11400 Burnet Road
Austin, TX 78758