Paper No. 32

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte TSU-CHANG LEE

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Appeal No. 1998-2263
Application No. 08/692,612

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HEARD: NOVEMBER 30, 2000

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Before BARRETT, DIXON, and BLANKENSHIP, **Administrative Patent Judges**.

DIXON, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 28, 30, 31, and 34-39, which are all of the claims pending in this application.

We REVERSE.

BACKGROUND

Appellant's invention relates to an automated positioning of relative instances along a given dimension such as time or distance. The system and method adjust the relative positions of objects in the given dimension so as to meet both hard and soft constraints. An understanding of the invention can be derived from a reading of exemplary claim 28, which is reproduced below.

28. In a computer based system comprising a storage device coupled to a processor, the method for modifying a distance between a plurality of objects, each of the objects representing one of blocks, components, and circuit cells in a physical circuit design, the method comprising the steps of:

(a) determining a position of a first object and a second object of said plurality of objects in a physical circuit design;

(b) selecting an axis in said physical circuit design;

(c) determining a first limitation and a second limitation between said first object and said second object, said first limitation representing an absolute minimum separation between said first object and said second object along said selected axis, said second limitation representing a desired minimum separation between said first object and said second object along said selected axis;

(d) determining if said plurality of objects form an over-constrained system, said over-constrained system occurring if said positions of said plurality of objects cause a violation of one of said first limitation and said second limitation;

(e) automatically determining a first value representing a degree of said violation for each of said violations determined in step (d), including the steps of:

(1) obtaining a function from one of a user and the storage device, said function defining a convex function representing a potential energy of a hypothetical elastic

device coupled between said first object and said second object along said selected axis; and

(2) determining, in the processor, said first value as a global minimum solution for said function;

(f) determining a second value representing a combination of all of said first values determined in step (e);

(g) repeating steps (b)-(f) for a plurality of axes; and

(h) determining a third value representing a combination of each of said second values associated with each of said selected axes as determined in step (f), said third value representing a distance between each of the plurality of objects;

(i) modifying the distance between said first object and said second object.

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

Shikata et al. (Shikata)	5,309,371	May 3, 1994 (filed Jun. 26, 1990)

Tsay et al. (Tsay), **PROUD: A SEA-OF-GATES PLACEMENT ALGORITHM**, IEEE DESIGN & TEST OF COMPUTERS, Vol. 5, No. 6, December 1988, pp. 44-56.

Jensen, **Network flow programming**, Chapter 1- NETWORK FLOW MODELS, pp. 1-88, Chapter 11 -THE CONVEX MINIMUM COST FLOW PROBLEM, pp.339-366, Chapter 12 - CONCAVE COSTS, pp. 367-390 (John Wiley & Sons, Inc.), 1980.

Nahmias, **Production and Operations Analysis**, Section 7.6-Sequencing Algorithms for Multiple Machines pp. 306-315, Section 8.1-Representing a Project as a Network pp. 340-343 (Richard D. Irwin, Inc.), 1989.

Claim 35 stands rejected under 35 U.S.C. § 112, first paragraph as failing to adequately teach how to make and/or use the invention. Claims 28, 30, 31, and 34-39

stand rejected under 35 U.S.C. § 101 as being unpatentable because the claimed invention is directed to nonstatutory subject matter. Claims 28, 30, 31, and 34-39 stand rejected under 35 U.S.C. § 102 as being clearly anticipated by Shikata. Claims 28, 30, 31, and 34-39 stand rejected under 35 U.S.C. § 103 as being unpatentable over Jensen in view of Tsay. Claims 28, 30, 31, and 34-39 stand rejected under 35 U.S.C. § 103 as being unpatentable over Nahmias in view of Tsay.

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. 23, mailed Apr. 22, 1998) for the examiner reasoning in support of the rejections, and to the appellant's brief (Paper No. 22, mailed Mar. 31, 1998) 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.

At the outset, we note that the examiner and appellant have provided lengthy discussions of their respective positions. After thorough review of these positions, we

agree with appellant on all issues and reverse the examiner's rejections under 35 U.S.C. § 112, first paragraph, 35 U.S.C. § 101, and 35 U.S.C. §§ 102 and 103.

35 U.S.C. § 112

The examiner maintains that the specification does not adequately teach how to make and/or use the invention as recited in claim 35. (See answer at page 4). Claim 35 is directed to a computer program on a tangible medium to perform the method recited in claim 28. The examiner maintains that the specification fails to disclose the program in some form and therefore, the claim is not supported by the specification. At page 18 of the answer, the examiner maintains that the skilled artisan would not only have to be skilled in multiple arts, but that a solution implementing multiple disciplines would require entirely too much experimentation to implement the claimed invention. We disagree with the examiner that the solution would require undue experimentation. Appellant argues at pages 6-8 of the brief that the specification is enabling and that the actual computer program code is not necessary to enable the claimed invention. We agree with appellant.

At the oral hearing, appellant argued that the examiner's statement of the rejection under 35 U.S.C. § 112, first paragraph was unclear as to what portion of the first paragraph the rejection was based upon. Appellant further argued that the examiner clearly sets forth in the statement of the rejection at page 4 of the answer that the rejection

is based upon a lack of enablement and again in the discussion section at page 18 of the answer, but the accompanying discussion at page 4 of the answer is directed to a lack of a written description in the specification of computer program code in some form. From the examiner's varied treatment of the claim, it is unclear as to the appropriate basis of the rejection under enablement or written description. (**See generally In re Barker**, 559 F.2d 588, 593, 194 USPQ 470, 474 (CCPA 1977), enablement and written description are separate basis for a rejection and one basis does not necessarily support a rejection under the other basis.) We agree with appellant that the basis of this rejection is unclear. We will assume the rejection is based on lack of enablement.

With respect to enablement, appellant cites to page 16 of the examiner's answer where the examiner states, with respect to a rejection under 35 U.S.C. § 103, that "there are numerous computer programs which solve the simultaneous equations used in linear programming, such as LINDO, which would be well known in the art and would inherently be used by an individual who wanted to solve simultaneous equations." The examiner continues in a subsequent rejection under 35 U.S.C. § 103 to state that "the particular equations and defined conditions used would depend on the situation, but one skilled in operations research would inherently be able to write such equations and conditions through linear programming and then solve [them] based on the defined conditions." **Id**. We agree with the examiner that the skilled artisan would have had that ability as argued

with respect to the prior art. Therefore, skilled artisans would have had the ability to make and use the claimed program in light of the enabled method of claim 28. Therefore, we will not sustain the rejection of claim 35 since, in our view and in the examiner's view, the method would have been enabled.

35 U.S.C. § 101

Here, on its face, the examiner appears to have provided a reasoned analysis of the claimed and disclosed inventions under the **Guidelines for Examination of Computer Implemented Inventions**, 61 Fed. Reg. 7478 (Feb. 28, 1996) (**Guidelines**), but the final analysis by the examiner is based upon the Freeman-Walter-Abele test. (See answer at pages 5-13.)

The examiner found that the claimed invention, as recited in claim 28, was directed to a mathematical algorithm. (See answer at page 8.) We disagree with the examiner. Appellant argues that the examiner's limited interpretation of the **Guidelines** is inconsistent with the **Guidelines** and with precedent. We agree with appellant. (See brief at page 10.) With respect to appellant's analysis of the claimed invention at pages 10-15 of the brief, we disagree with appellant that the claimed method is a "specific" machine or process under the **Guidelines**. Appellant relies upon **In re Alappat**, 33 F.3d 1526, 31 USPQ2d 1545 (Fed. Cir. 1994) to support the proposition that claim 28 is a specific process. We distinguish the claims in **Alappat** which were written in means-plus-function

format and interpreted in light of the structure and materials recited in that specification to further define the claimed invention. Here, claims 28 and 36 are directed to a nonspecific process which is not written in means- plus-function format so as to invoke the sixth paragraph of Section 112. Nor are the method steps in step-plus-function format.

From our review of the disclosed and claimed invention and the relevant citation by the examiner (specification, at page 8), we find that the claimed invention is directed to any and every process for evaluating and modifying distances between objects in circuit design using a programmed computer as described throughout the specification at pages 4-13. However, we find that this computer-based process has a practical application in the technological arts which produces a "useful, concrete and tangible result" and is, therefore, directed to statutory subject matter. **See State Street Bank & Trust Co. v. Signature Financial Group Inc.**, 149 F.3d 1368, 47 USPQ 1596 (Fed. Cir. 1998) and **AT & T Corp. v. Excel Communications, Inc.**, 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999). Since the claimed invention is directed to a practical application in the technological arts, we will not sustain the rejection of claim 28 and its dependent claims. Similarly, claims 34, 35, and 36 are directed to a practical application in the technological arts and we will not sustain the rejection of these claims.

35 U.S.C. §§ 102 and 103

At the oral hearing, appellant argued that the examiner did not attempt to read the claimed algorithm embodied in independent claims 28 and 36 on the prior art references and this is untenable in light of the holding in **In re Lowry**, 32 F.3d 1579, 1582-1583, 32 USPQ2d 1031, 1034-1035 (Fed. Cir. 1994). From our review of the prosecution history, we agree with appellant. Here, the examiner postulates that any system of linear equations may be solved by one skilled in the art. This begs the question why would a skilled artisan have been motivated to devise such a methodology as recited in claim 28 without any specific motivation thereto, whether such a methodology may be within the level of the skill of the artisan or not.

Appellant argues in the brief at pages 15-18 that the claimed invention uses the actual shape of the circuit element rather than circles and squares. We disagree with appellant. The language of claim 28 merely requires a "method for modifying a distance between a plurality of objects, each of the objects representing one of blocks, components, and circuit cells in a physical circuit design." The circles and rectangles of Shikata would have been "blocks" as recited in claim 28. Later, in the argument concerning the rejection under 35 U.S.C. § 103 appellant argues that the examiner "ignores most, if not all, of the recited steps of the claimed invention." (See brief at page 21.) We agree with appellant that the examiner has not addressed the specific claim language of claim 28 in the

rejections under 35 U.S.C. § 102 and 103. Therefore, we will not sustain the rejection under 35 U.S.C. § 102 and 103 since the examiner has not set forth a ***prima facie*** case of anticipation or obviousness.

With respect to the rejection under Shikata, the examiner cites to columns 7-10 to support the "soft macros" and "hard macros." (See answer at page 13.) But, in our view, the macros of Shikata are equivalent to the objects of the instant claims and not the constraints of the two minimums. According to Shikata, the aspect ratio of the macro may be changed, not the separation distance as recited in the language of claim 28. Therefore, the examiner's reliance on the soft and hard macros is misplaced, and we cannot sustain the rejection of claim 28 under 35 U.S.C. § 102 since the examiner has not set forth a ***prima facie*** case of anticipation.

Furthermore, at the oral hearing, appellant argued that none of the prior art references teach or suggest the use of two minimums (an absolute constraint and a desired constraint which may be violated). We agree with appellant. Moreover, the examiner has pointed to nothing in any of the prior art which is relied upon to teach or suggest these claim limitations.

The examiner maintains that "[a]ppellant is attempting to claim general network flow modeling through common linear programming methods set in the specific field of circuit design." (See answer at page 24.) We disagree with the examiner. Appellant only claims that which is recited in the language of claim 28 and the specific sequence of claim limitations therein. It is that sequence of steps which the examiner has not addressed in the rejection and that is why we cannot sustain the rejection of claim 28 and its dependent claims 30, 31, 34 and 35. Similarly, since the examiner has not addressed the limitations of claim 36 which contains similar limitations, we cannot sustain the rejection of claim 36 and its dependent claims 37-39.

CONCLUSION

To summarize, the decision of the examiner to reject claim 35 under 35 U.S.C. § 112, first paragraph is reversed; the decision of the examiner to reject claims 28, 30, 31, and 34-39 under 35 U.S.C. § 101 is reversed; the decision of the examiner to reject

claims 28, 30, 31, and 34-39 under 35 U.S.C. § 102 is reversed and the decision of the examiner to reject claims 28, 30, 31, and 34-39 under 35 U.S.C. § 103 is reversed.

REVERSED

LEE E. BARRETT Administrative Patent Judge	)
JOSEPH L. DIXON Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
HOWARD B. BLANKENSHIP Administrative Patent Judge	)

JLD/ki

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