UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/348,791	02/07/2006	Georg Kreiner	2005P00918US	4980

7590   09/05/2012

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ART UNIT	PAPER NUMBER
2128	

MAIL DATE	DELIVERY MODE
09/05/2012	PAPER

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PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE
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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES
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Ex parte GEORG KREINER
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Appeal 2010-004976
Application 11/348,791
Technology Center 2100
_____

Before JOHN A. JEFFERY, ERIC B. CHEN, and
BARBARA A. BENOIT, *Administrative Patent Judges*.

BENOIT, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 22-24, 26-34, and 36-40. Claims 1-21, 25, and 35 have been canceled. App. Br. 2. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

Appellant's invention provides user information within a software-based development environment for designing circuits and/or systems constructed from functional units. *See generally* Abstract; Spec. 1.

Claim 32 is illustrative with key disputed limitations emphasized:

32. A system for providing user information, comprising:

a memory having *a software-based development environment for designing circuits or systems* including a plurality of functional units;

a detecting unit for detecting a functional unit selected by a user;

a display device for displaying a demonstration application having the selected functional unit;

a simulator unit for simulating the demonstration application;

a visualization device for visualizing simulation results of the simulated demonstration application;

means for connecting the selected functional unit to other functional units via inputs or outputs within the demonstration application, current states of the inputs or outputs visualized during and/or after the simulation, wherein the connected functional units comprise a circuit block diagram;

a code generator configured to generate a control code corresponding to the circuit block diagram; and

a code loader configured to load the generated control code in a controller.

The Examiner relies on the following references as evidence of unpatentability:

Sally L. Wood, *A New Approach to Interactive Tutorial Software for Engineering Education*, 39 IEEE TRANSACTIONS ON EDUC. 399 (Aug. 1996).

Jeremy Kindy et al., *Design of an Interactive Tutorial for Logic and Logical Circuits*, 6 CROSSROADS 6 (Mar. 2000), *available at* http://xrds.acm.org/article.cfm?aid=331629.

E.L. Dobson et al., *An Evaluation of the Student Response to Electronics Teaching Using a CAL Package*, 25 COMPUTERS EDUC. 13 (1995).

THE REJECTIONS

1. The Examiner rejected claims 22-24, 26-29, 31-34, and 36-39 under 35 U.S.C. § 103(a) as unpatentable over Wood in view of Kindy. Ans. 3-6.[1,2,3]

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[1] Throughout this opinion, we refer to the Appeal Brief filed August 10, 2009, the Examiner's Answer mailed November 13, 2009, and the Reply Brief filed January 7, 2010.

[2] We presume that including claims 30 and 40 in the statement of the rejection is a typographical error and that claims 30 and 40 are rejected only by a separate § 103(a) rejection over Wood in view of Kindy and Dobson. Our presumption is based on the fact that the § 103(a) rejection over Wood in view of Kindy does not include a discussion of claims 30 and 40 in the body of the rejection. We deem this typographical error as harmless, and present the correct claim listing here for clarity.

[3] We also presume that the body of the rejection in the Examiner's Answer at pages 5-6 refers to claim 32 rather than claim 31 as written. Our presumption is based on the fact that claim 31 has been addressed with claim 22 in the body of the rejection (Ans. 3-4), whereas claim 32 is not otherwise addressed in the body of the rejection. In addition, the claim elements discussed in this portion of the rejection body labeled as claim 31 include elements that appear only in claim 32 (such as "a memory having a software-based development environment . . . ; a detecting unit . . . ; a display device . . . ; a simulator unit . . . ; a visualization device . . . "). Accordingly, we believe that the rejection body on pages 5-6 labeled as

2. The Examiner rejected claims 30 and 40 under 35 U.S.C. § 103(a) as unpatentable over Wood in view of Kindy and Dobson. Ans. 6-7.

CONTENTIONS

The Examiner finds that Wood discloses every recited feature of representative claim 32 except for connecting the selected functional unit to other functional units via inputs or outputs within the demonstration application, current states of the inputs or outputs visualized during and/or after the simulation, wherein the connected functional units comprise a circuit block diagram. Ans. 5-6. The Examiner interprets Wood's topics (such as various types of filters shown in Figure 2) as the claimed functional units. Ans. 5 (citing Wood § IV.B, ¶ 2). The Examiner relies on Wood's demonstration feature in manual mode as disclosing the demonstration application, visualized simulation results, and generating and loading a control code. *Id.* (citing Wood § IV.B; Fig. 2). The Examiner cites Kindy as teaching connecting the selected functional unit to other functional units via inputs or outputs within the demonstration application, current states of the inputs or outputs visualized during and/or after the simulation wherein the connected functional units comprise a circuit block diagram. Ans. 6 (citing Kindy 3-4). The Examiner finds that Wood and Kindy are both directed to tutorial systems that allow users to vary the input to the design, simulate the design with the user-controlled inputs, and display the results. *Id.* The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings

applying to claim 31 actually applies to claim 32. We also deem this typographical error as harmless.

of Wood and Kindy to develop a tutorial that provides additional understanding of the material. *Id.* (citing Kindy Introduction).

Appellant contends for various reasons that an interactive tutorial software system, such as disclosed by Wood or Kindy, cannot teach or suggest elements recited by the claim. More particularly, Appellant argues that the claim language requires (i) a software-based development environment for designing circuits or systems that is a design tool rather than an interactive tutorial system, and (ii) generating a control code corresponding to a circuit block diagram and then loading the control code onto a real-world controller, such as a Programmable Logic Controller or PLC. App. Br. 5-7; Reply Br. 1-2. Appellant also contends that Wood and Kindy each "recognize the non-suitability of tutorial software . . . for designing circuits or systems" and therefore cannot be properly combined. Reply Br. 1-2; *see also* App. Br. 6 (stating "the proposed modification would render Wood and Kindy unsatisfactory for their intended purpose of tutoring").

The issues before us, then, are as follows:

ISSUES

1. Under § 103, has the Examiner erred in rejecting claims 22-24, 26-29, 31-34, and 36-39 by finding that Wood and Kindy collectively would have taught or suggested:
    a. a software-based development environment for designing circuits or systems?
    b. generating a control code corresponding to the circuit block diagram?

c. loading the generated control code in a controller?

2. Under § 103, is the Examiner's reason to combine the teachings of Wood and Kindy supported by articulated reasoning with some rational underpinning to justify the Examiner's obviousness conclusion? This issue turns on whether combining Wood and Kindy as the Examiner proposes would render Kindy unsatisfactory for its intended purpose.

ANALYSIS

OBVIOUSNESS REJECTION OF CLAIMS 22-24, 26-29, 31-34, AND 36-39
OVER WOOD IN VIEW OF KINDY

Claims 32-34 and 36-39

Based on the record before us, we find no error in the Examiner's obviousness rejection of representative claim 32. Turning first to the claim language issues raised by Appellant, Wood discloses, according to the Examiner, a software-based development environment for designing circuits or systems including a plurality of functional units in Section IV.B, which describes the structure of Wood's interactive tutorial software for engineering education. Ans. 5. In response to Appellant's arguments, the Examiner also points to Wood's disclosure that the tutorial system includes tutorials on digital analysis for digital logic design, and the Examiner notes the Examiner's express interpretation that digital logic design means circuit design. Ans. 11 (citing Wood § IV.B, ¶ 1).

We do not see error with the Examiner's position that Wood discloses a software-based development environment for designing circuits or systems including a plurality of functional units. Wood's interactive tutorial software runs on a computer, includes tutorials on digital analysis for digital

logic design, and has a demonstration of user interaction in which the user controls relevant parameters and then observes the effects of parameter changes on, for example, various filters that can be used in digital logic design, which the Examiner equates to circuit design. *See* Wood § IV.B (describing manual mode for the demonstration interaction type of the tutorial software). Wood's interactive tutorial software also includes functional units, which the Examiner maps to topics within general subject areas covered by the tutorials. Ans. 5 (citing, for example, Wood § IV.B, ¶ 2, in which a "user selects a topic, for example a filter"). Wood's Figure 2 shows, for instance, various topics concerning filters that could be included in circuits. Wood § IV.B.

Appellant contends that Wood's interactive tutorial software cannot properly read on the claim because tutorial software is not suitable for the invention's intended purpose of designing circuits. Reply Br. 1-2 (citing Wood Abstract); *see also* App. Br. 6 (arguing that "packages for circuit design, (such as recited in the claimed invention) are not meant to be a tutorial for students (such as Wood and Kindy)"). For this proposition, Appellant points to Wood's statement that Wood's interactive tutorial software is "not a design tool." Reply Br. 1 (citing Wood Abstract). Wood, however, also discloses interactive tutorial software that includes "*tutorials on DIgital ANAlysis for digital logic design*." Wood § IV.B, ¶ 1 (emphasis added). Regardless of Wood's statement that the interactive tutorial software is not a design tool, Wood nonetheless discloses that the interactive tutorial software is *for digital logic design*. As such, Wood discloses that Wood's interactive tutorial software is suitable for digital logic design but is not a design tool.

To determine whether Wood's statement that the tutorial software is not a design tool indicates that Wood's interactive tutorial software for digital logic design would render the claimed invention inoperable, we look to the language of claim 32, which recites, among other limitations, a software-based development environment for designing circuits or systems. However, Appellant's Specification does not expressly define a software-based development environment for designing circuits or systems; nor does Appellant's Specification otherwise narrow the definition of a software-based development environment for designing circuits or systems to exclude interactive software tutorials on digital analysis for digital logic design. Rather, Appellant's Specification provides non-limiting examples. *See* Spec. 5 (introducing Fig. 1 as "a user interface . . . in accordance with the invention"), 7 (introducing Fig. 2 as "a further user interface . . . in which the inventive method is used" and Fig. 3 as "an inventive embodiment"). Moreover, Appellant's Specification includes explicit disclaimers that the exemplary embodiments are not limiting and that the invention can be used in other contexts, including pure simulation programs:

> The present invention is not intended to be limited to the exemplary embodiments shown here. . . . The method proposed in accordance with the invention is not only suitable for use within a programming environment. The method can also be employed in pure simulation programs. Examples of this are circuit and system-simulation environments in which a user constructs an electrical circuit diagram or a closed-loop control block diagram in the form of individual functional units.

Spec. 8.

We decline to read limitations into a claim from preferred embodiments described in the Specification. *See In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). Accordingly, a software-

based development environment for designing circuits or systems does not necessarily exclude interactive tutorial software on digital analysis for digital logic design. We therefore, do not see error with the Examiner's position that a software-based development environment for designing circuits or systems does not necessarily exclude Wood's interactive tutorial software on digital analysis for digital logic design, notwithstanding Wood's indication in the Abstract that such interactive tutorial software is not a "design tool."

Turning to whether Wood and Kindy collectively teach or suggest generating a control code corresponding to the circuit block diagram and loading the generated control code in a controller, the Examiner found that Wood discloses generating a control code and loading the generated control code in a controller. Ans. 5 (citing Wood § IV.B, ¶ 4), 10-11. The Examiner explains that Wood discloses generating a control code in generating code that controls the circuit and/or the circuit simulation. Ans. 10. The Examiner further explains that the controller is an entity that controls/performs the simulation; the control code is the simulation code that is generated after the user's input is received; and loading the control code in a controller is the running of the simulation based on the user's input (which is contained in the simulation code). *Id.*

We are also not persuaded of error in the Examiner's position. Nor does Appellant "challeng[e] whether Wood or Kindy may generate some type of software code." App. Br. 6. Rather, Appellant argues that claim limitations of generating and loading the control code in a controller correspond to the embodiment shown in Figure 3 and that "the control code corresponding to a simulated circuit block diagram (simulated by the user with graphical user interface 4) is generated and then loaded onto a real-

world controller, such as PLC 12." App. Br. 5. Appellant's contentions are unavailing, for they rely on non-limiting, exemplary implementations that are not claimed, as the Examiner indicates. Ans. 7.[4]

The Examiner relies on Kindy for teaching "connecting the selected functional unit to other functional units . . . wherein the connected functional units comprise a circuit block diagram." Ans. 6 (citing Kindy 3-4, half-adder circuit). Kindy's Figure 3 unambiguously shows a circuit diagram constructed with various types of gates and the accompanying text describes how "the student can experiment with sets of inputs, and . . . both the circuit output and the truth table values are generated." Kindy 4-5 (describing Fig. 3). Appellant does not contest whether Kindy discloses "connecting the selected functional unit to other functional units . . . wherein the connected functional units comprise a circuit block diagram." *See* App. Br. 5-7; Reply Br. 1-2.

Accordingly, we are not persuaded that the Examiner erred in finding that Wood and Kindy collectively would have taught or suggested (a) a software-based development environment for designing circuits or systems, (b) a code generator configured to generate a control code corresponding to the circuit block diagram, and (c) a code loader configured to load the generated control code in a controller, as recited by claim 32.

Nor are we persuaded that combining Wood with Kindy, as the Examiner proposes, would render Wood and Kindy unsatisfactory for the intended purpose of tutoring, as Appellant contends. App. Br. 6; Reply Br.

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[4] *Accord* Spec. 7 (noting that Fig. 3 "shows *an* inventive embodiment" (emphasis added)), 8 (stating that "[t]he present invention is not intended to be limited to the exemplary embodiments shown here").

1-2. For support, Appellant points to Kindy's disclosure that the "several fairly advanced circuit development packages available" are for circuit design and are not meant to be a tutorial on understanding the relationship between Boolean algebra and logical circuits at an elementary level. Appellant argues that these advanced circuit development packages referred to by Kindy were deemed infeasible for use in tutorials. App. Br. 6 (citing Kindy 1-2). We agree with the Examiner that Kindy's statement does not broadly apply to all circuit development packages or all tutorial applications. Ans. 8-9. Rather, Kindy's statement concerning infeasibility is limited to "several fairly advanced circuit development packages" and notes that "these packages are for circuit design, and are not meant to be a tutorial on understanding the relationship between [B]oolean algebra and logical circuits at an elementary level." Kindy 1-2. Kindy's limited statement does not encompass all tutorial applications, but rather encompasses only those tutorials for "understanding the relationship between [B]oolean algebra and logical circuits at an elementary level."

Moreover, Wood and Kindy both teach interactive tutorial software systems. Wood teaches an interactive tutorial software for engineering education, whereas Kindy teaches an interactive tutorial software system for introducing logic and logical circuits to computer science students, among others. *Compare* Wood Abstract (stating that the "experimental tutorial software described in this paper is designed specifically for engineering education at the university level") *with* Kindy 1. The Examiner recognized that both Wood and Kindy are directed to similar tutorial systems. Ans. 6. Notably, Wood does not purport to be one of Kindy's "fairly advanced circuit development packages," which are said to be infeasible to provide an

interactive tutorial on understanding the relationship between Boolean algebra and logical circuits at an elementary level. Moreover, Wood, in stating that an advantage of the interactive tutorial software is that "the tutorial set can be distributed without license fees or additional software acquisition costs for the user," addresses one of Kindy's reasons for deeming advanced circuit development packages infeasible for use as tutorial software. *Compare* Wood Abstract *with* Kindy 1-2 (indicating one of the three reasons given for infeasibility was the requirement of licenses for each computer running the software). This further weighs against Appellant's contention that the Examiner's proposed modification of Wood renders Wood and Kindy unsatisfactory for their intended purpose of tutoring. *See* App. Br. 6 (citing MPEP § 2143.01(V)).

Moreover, contrary to Appellant's argument, the passage in Kindy does not indicate the infeasibility of using Kindy's connection of functional units in a circuit block diagram for Wood's interactive tutorial software. At most, Kindy's passage may teach away from using Kindy's interactive tutorial for understanding the relationship between Boolean algebra and logical circuits at an elementary level in an advanced circuit development package. The Examiner, however, cites Kindy merely to show the limitation of "connecting the selected functional unit to other functional units . . . wherein the connected functional units comprise a circuit block diagram." Ans. 6 (citing Kindy pp. 3-4, Fig. 3 (showing a diagram of a half adder circuit constructed from various types of gates)). We see no reason why skilled artisans would not combine the teaching of Kindy's half adder circuit example in Kindy's interactive tutorial for logic and logical circuits with Wood's interactive tutorial software in manual mode to connect multiple

filters shown in Figure 2 to show simulated results, for this would provide a tutorial with additional understanding of the material, as the Examiner suggests. *See id.* We are not persuaded of error in the Examiner's reliance on Kindy (*id.*) in this limited way.

We agree with the Examiner's proposed combination of Wood and Kindy because the Examiner's proposed combination predictably uses prior art elements according to their established functions—an obvious improvement. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). Accordingly, we find the Examiner's reason to combine the teachings of the cited references supported by articulated reasoning with some rational underpinning to justify the Examiner's obviousness conclusion.

We are therefore not persuaded that the Examiner erred in rejecting claim 32 and claims 33, 34, and 36-39, which depend from claim 32 and are not separately argued with particularity.

Claims 22-24 and 26-29

We also sustain the obviousness rejection of independent claim 22 and its dependent claims 23, 24, and 26-29 for the reasons described above with respect to claim 32. Claim 22 recites, in pertinent part, generating a control code corresponding to the circuit block diagram and loading the generated control code in a controller. Unlike claim 32, however, claim 22 does not recite a memory having a software-based development environment for designing circuits or systems. Rather, claim 22 recites a method of providing user information within a software-based development environment for designing circuits or systems, the system having a plurality of functional units, the method comprising various recited steps.

Appellant argues that the preamble of claim 22 should be given patentable weight. Reply Br. 2. Even assuming, without deciding, that the preamble of claim 22 should be given patentable weight, we do not perceive error in the Examiner's obviousness rejection finding that Wood and Kindy collectively would have taught or suggested a software-based development environment for designing circuits or systems for the reasons discussed above with respect to claim 32.

We are therefore not persuaded that the Examiner erred in rejecting claim 22, and claims 23, 24, and 26-29, which depend from claim 22 and are not separately argued with particularity.

Claim 31

For the reasons described above with respect to claims 32 and 22, we also sustain the obviousness rejection of independent claim 31 directed to a computer program for providing user information within a software-based development environment for designing circuits or systems. Claim 31 recites, in pertinent part, generating a control code corresponding to the circuit block diagram and loading the generated control code in a controller.

Therefore, according to the reasons described above, the rejection of claims 22-24, 26-29, 31-34, and 36-39 is sustained.

OBVIOUSNESS REJECTION OF CLAIMS 30 AND 40
OVER WOOD IN VIEW OF KINDY AND DOBSON

Likewise, we sustain the obviousness rejection of dependent claims 30 and 40. The Examiner relies on Wood and Kindy as collectively teaching or suggesting every recited feature of claims 30 and 40 except that the selected functional unit is a user-defined functional unit including other functional

units which are inherent components of the development environment. Ans. 7. For this limitation, the Examiner relies on Dobson's disclosure of functional units to create user-defined functional units which can then be simulated. *Id.* (citing Dobson 3-4, Fig. 1).

Appellant has not particularly pointed out errors in the Examiner's reasoning to persuasively rebut the Examiner's *prima facie* case of obviousness. Appellant merely relies on the same arguments with respect to the alleged deficiencies of the combination of Wood and Kindy in connection with independent claims 22 and 32, from which claims 30 and 40 depend respectively, and that Dobson does not cure the deficiencies of Wood and Kindy. App. Br. 7; Reply Br. 3. We are not persuaded by these arguments, however, for the same reasons discussed above with respect to claims 22 and 32. The rejection of claims 30 and 40 is therefore sustained.

CONCLUSION

The Examiner did not err in rejecting (1) claims 22-24, 26-29, 31-34, and 36-39 under 35 U.S.C. § 103(a) as unpatentable over Wood in view of Kindy, and (2) claims 30 and 40 under 35 U.S.C. § 103(a) as unpatentable over Wood in view of Kindy and Dobson.

ORDER

The Examiner's decision rejecting claims 22-24, 26-34, and 36-40 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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