

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

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MIHAI RALEA

Appeal 2007-1557
Application 10/943,536
Technology Center 3600

Decided: June 13, 2007

Before JENNIFER D. BAHR, LINDA E. HORNER, and DAVID B. WALKER,
Administrative Patent Judges.

WALKER, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Mihai Ralea (“Appellant”) seeks our review under 35 U.S.C. § 134 of the Examiner’s final rejection of claims 1-13. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

THE INVENTION

Appellant claims an electromechanical braking system including an electromechanical brake actuator, a main DC power supply, and an electrical energy back-up system that capacitively stores electrical energy and provides the stored energy as the DC supply voltage in an absence of the main power supply (Specification 1:25-32). Claims 1 and 13, reproduced below, are representative of the subject matter on appeal.

1. An electromechanical braking system, comprising:

at least one electromechanical brake actuator for converting an electrical drive signal into mechanical energy to effect braking on a wheel of an aircraft, the at least one electromechanical brake actuator being operative based at least in part on a DC supply voltage typically provided by a main supply source; and

an electrical energy back-up system which capacitively stores electrical energy and provides the stored electrical energy as the DC supply voltage in an absence of the main supply source, the electrical energy provided by the electrical energy back-up system used for a commanded braking operation of the aircraft.

13. An electromechanical braking system, comprising:

at least one electromechanical brake actuator for converting an electrical drive signal into mechanical energy to effect braking on a wheel of an aircraft, the at least one electromechanical brake actuator being operative based at least in part on a DC supply voltage typically provided by a main supply source; and

an electrical energy back-up system which

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capacitively stores electrical energy and provides the stored electrical energy as the DC supply voltage in an absence of the main supply source, the electrical energy provided by the electrical energy back-up system used for a commanded braking operation of the aircraft;

wherein the supply of capacitively stored electrical energy from the electrical energy back-up system is made without switching between the electrical energy back-up system and the main supply source.

THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Fangio	US 5,744,876	Apr. 28, 1998
Corio	US 6,296,325 B1	Oct. 2, 2001

The following rejections are before us for review:

1. Claim 13 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. Claims 1-13 are rejected under 35 U.S.C. § 103(a) as unpatentable over Corio in view of Fangio.

ISSUE

The issues before us are whether Appellant has shown that the Examiner erred in rejecting (1) claim 13 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter

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which Appellant regards as the invention; and (2) claims 1-13 under 35 U.S.C. § 103(a) as unpatentable over Corio in view of Fangio. The definiteness issue turns on whether those skilled in the art would understand what is claimed, particularly the meaning of “without switching” in claim 13, when the claim is read in light of the Specification. The correctness of the obviousness rejection turns on whether the asserted references are properly combined and whether, when combined, they yield the claimed invention.

Rather than repeat the arguments of Appellant and the Examiner, we make reference to the Briefs and the Answer for their respective details. Only those arguments actually made by Appellant have been considered in this decision. Arguments which Appellant could have made but chose not to make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2004). Except as noted in this opinion, Appellant has not presented any substantive arguments directed separately to the patentability of the dependent claims or related claims in each group. In the absence of a separate argument with respect to those claims, they stand or fall with the representative independent claim. *See In re Young*, 927 F.2d 588, 590, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991). *See also* 37 C.F.R. § 41.37(c)(1)(vii).

FINDINGS OF FACT

We find the following enumerated findings to be supported by at least a preponderance of the evidence. *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427, 7

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USPQ2d 1152, 1156 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

1. “To switch” is defined as “to operate an electrical switch so as to turn (as a device) on or off.” A “switch” is defined as “a device for making, breaking, or changing the connections in an electrical circuit.” *Merriam-Webster’s Collegiate Dictionary* 1265, Merriam-Webster Inc. (2005). The Specification discloses supplying backup power from one or more capacitors in the event of loss of primary power supply without operating electrical switches. (Specification 5:19 – 6:2)
2. Corio discloses an electromechanical braking system for an aircraft including at least one electromechanical actuator controller (EMAC) for providing drive control of brake actuators in response to brake command signals and a plurality of brake control units (BSCUs) for converting an input brake command signal into the brake command signals which are provided to the at least one EMAC. At least two BSCUs are configured to function redundantly and are powered via respective power busses having different power sources (Corio, col. 3, ll. 3-17). Corio teaches a variety of alternate braking modes based on the loss of particular power supplies. In the case of failure of all primary power supplies, a DC battery backup is used to provide limited emergency power for braking (Corio, col. 7, l. 61 - col. 8, l. 29).
3. Fangio teaches the use of a capacitive backup power source for an electromechanical actuator to position a mechanical device to a fail-safe

position upon failure of a primary electric power source. A capacitor is provided for storing energy and is charged by the primary electric power source (Fangio, col. 1, ll. 32-37). A mechanical device is movably connected to the electromechanical actuator, which may be a valve proportionally controlled, a fuel control, or any other device which may be controlled by an electromechanical actuator (Fangio, col. 2, ll. 46-58).

DISCUSSION DEFINITENESS

The test for definiteness under 35 U.S.C. § 112, second paragraph, is whether “those skilled in the art would understand what is claimed when the claim is read in light of the specification.” *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986) (citations omitted). The Examiner states that it is unclear what is meant by the limitation “without switching” and asserts that “any backup system involves switching from the primary source to the secondary source” (Answer 3).

Claim 13 was added by amendment and the original specification does not mention the words "switching" or "switch". The Specification thus applies no special meaning to the phrase "without switching", and the plain meaning of the term governs our construction. Given the above definitions, those skilled in the art would understand “without switching” in claim 13, to mean without making, breaking, or changing the connections in an electrical circuit by operating a switch (Finding of Fact 1). Because the Specification discloses supplying backup power

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from one or more capacitors in the event of loss of primary power supply without operating electrical switches, this is consistent with giving the phrase "without switching" its broadest reasonable construction in light of the Specification as it would be interpreted by one of ordinary skill in the art. The Examiner argues that "without switching" should mean without switching performed by an operator (Answer 6). This is not consistent with the plain language of the claim and the Specification.

Thus, those skilled in the art would understand what is claimed, particularly the meaning of "without switching" in claim 13, when the claim is read in light of the Specification. Accordingly, we reverse the rejection of claim 13 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

OBVIOUSNESS

In rejecting claims under 35 U.S.C. § 103(a), the examiner bears the initial burden of establishing a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). *See also In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the appellant. *Id.* at 1445, 24 USPQ2d at 1444. *See also Piasecki*, 745 F.2d at 1472, 223 USPQ at 788. Obviousness is then determined on the basis of the evidence as

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a whole and the relative persuasiveness of the arguments. *See Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444; *Piasecki*, 745 F.2d at 1472, 223 USPQ at 788.

It is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”) (*cited with approval in KSR Int’l. Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007)). In so doing, the examiner is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966). *KSR*, 127 S. Ct. at 1734, 82 USPQ2d at 1391 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”). The necessary determinations include: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; and (3) the level of ordinary skill in the art. *Id.* “Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.” *Id.* (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966)) (internal quotations omitted).

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KSR emphasized “the need for caution in granting a patent based on the combination of elements found in the prior art,” *id.* at 1739, 82 USPQ2d at 1395, and discussed circumstances in which a patent might be determined to be obvious without an explicit application of the teaching, suggestion, motivation test. In particular, the Supreme Court reaffirmed that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* See also *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 151, 87 USPQ 303, 305 (1950) (citing the negative rule accrued from many litigations that “[t]he mere aggregation of a number of old parts or elements which, in the aggregation, perform or produce no new or different function or operation than that theretofore performed or produced by them, is not patentable invention.”) (internal quotations omitted); *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 282, 189 USPQ 449, 452-53 (1976) (concluding that when a patent “simply arranges old elements with each performing the same function it had been known to perform,” the combination is obvious).

The Supreme Court thus articulated one possible framework for applying the *Graham* factors to determine whether a claimed invention is obvious. To reject a patent under this rationale requires the Examiner to make the following factual findings during the *Graham* factor analysis: (1) each of the claimed elements is found within the scope and content of the prior art; (2) one of ordinary skill in the art could combine the elements as claimed by known methods; and (3) one of ordinary skill in the art would recognize that the capabilities or functions of the

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combination are predictable. The Examiner must then complete the *Graham* analysis by weighing any secondary considerations to determine if the claimed invention is, in fact, obvious. This doctrine provides an alternate, though not exclusive, analytical framework for the Examiner to assess the obviousness of a patent claim without requiring the strict application of the teaching, suggestion, motivation test that was rejected by *KSR*.

Appellant separately argues the patentability of 3, 4, 5, 6, and 13. The remainder of the claims stands or falls with Claim 1. Appellant argues that there is no teaching, suggestion, or motivation to combine Corio and Fangio and that, when combined, they fail to disclose the claimed invention. However, as the Supreme Court recently held in *KSR*, “the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 1741, 82 USPQ2d at 1396.

The Examiner relies on Corio for its disclosure of the use of electromechanical actuators as brake actuators on an aircraft that use separate power supplies but not for a teaching of backup power supplies (Answer 3). The Examiner reads Corio too narrowly. In fact, Corio explicitly discloses the use of a DC battery backup for limited emergency braking when all primary power supplies are lost (Finding of Fact 2). The Examiner relies on Fangio for a capacitive backup power system, when he only needs to rely on the reference for the use of a capacitor in place of the backup battery of Corio.

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Corio discloses all of the limitations of claim 1 except the capacitive storage of electrical energy for back-up purposes (its back-up system stores electrical energy in a DC battery) (Finding of Fact 2). Fangio teaches the use of a capacitive electrical energy back-up system for emergency operation of an electromechanical actuator (Finding of Fact 3). Fangio is specifically directed at emergency operation of actuators that need to be placed in a fail safe condition on loss of primary power, arguably a different problem than providing emergency power to operate brakes on an aircraft in the event of loss of primary power. But according to *KSR*, a person of ordinary skill attempting to solve a problem will not be limited only to those elements in the prior art designed to solve the same problem. *KSR*, 127 S. Ct. at 1742, 82 USPQ2d at 1397 (“Under the correct analysis, any need or problem known in the field and addressed by the patent can provide a reason for combining the elements in the manner claimed.”). The utility of Fangio thus is not limited to using a capacitive back up power supply to place an actuator in a fail safe condition.

Since Corio provides the use of DC battery backup for emergency braking, we need rely upon Fangio only for the substitution of capacitive electrical energy storage for DC battery backup. One of skill in the art would be able to combine these known methods to modify Corio to use capacitive backup as in the claimed invention. Each component of the combination performs the same function in the combination as in the base references, so the combination would yield predictable results, leading to a conclusion that the combination likely would be obvious under *KSR*. *KSR* at 1739, 82 USPQ2d at 1395.

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Appellant argues that the combination of Corio and Fangio does not teach each limitation of claims 3-5. With respect to claim 3, Appellant argues that Fangio discloses a single capacitor from which power is derived to energize the actuator into a fail safe condition and Corio does not disclose a back-up power system. With respect to claim 4, Appellant contends that Corio does not disclose a back-up power system and Fangio does not disclose a first and second bank of capacitors arranged to separately support electromechanical brake actuators. With respect to claim 5, Appellant argues that "None of Corio, Fangio or their combination teach or reasonably suggest using first and second banks of capacitors where each bank receives electrical energy to be stored from independent sources." (Br. 11-12).

The Examiner responds that "Fangio teaches at a minimum one capacitor for each electromechanical actuator. One of skill in the art is well aware that a group of smaller capacitors (referred to as banks) can be used instead of one large capacitor." (Answer 6). We agree with the Examiner, and thus find no error in his obviousness determination of claim 3. Further, although not argued by the Examiner, one of skill in the art also would be capable of combining the teaching of Fangio (one capacitor for one actuator) with the multiple actuators of Corio to form a combination with multiple actuators, each with its own capacitor, or banks of capacitors, using conventional methods and yielding only predictable results. As such, it would have been obvious to one of ordinary skill in the art to provide DC supply voltage to electromechanical brake actuators from different banks of capacitors, as required by claim 4. Also, Since Corio teaches powering different

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actuators from independent power supplies, it also would have been obvious to one of ordinary skill in the art to provide electrical energy for storage to first and second banks of capacitors from independent sources as required by claim 5.

With respect to claim 6, Appellant contends that Fangio, at best, discloses using capacitively stored energy to place an actuator in a fail-safe position and then to cease all activity and Corio does not disclose power backup systems (Br. 12). The Examiner correctly responds that the capacity of the system is a design choice based on application and Appellant admits that one of skill in the art would appreciate the choice of system capacity (Answer 6 (citing Specification 6:4-24)).

With respect to claim 13, Appellant argues that the combination of Corio and Fangio fails to disclose (1) the capacitively stored electrical energy from the back-up system is used for commanded braking of an aircraft; and (2) the supply of capacitively stored electrical energy from the electrical energy back-up system is made without switching between the electrical energy back-up system and the main supply source (Br. 12-13). Appellant argues that the combination of Corio and Fangio would not provide for commanded braking because the combination would require the brakes of an aircraft to be placed in a fail-safe condition. Appellant is incorrect. Corio discloses emergency braking in response to pedal commands from a pilot, (Corio, col. 8, ll. 8-20), and Fangio is relied on solely for using a capacitor as a source of back-up power and not for placing an aircraft braking system into a fail-safe condition.

The Examiner's arguments regarding the “without switching” limitation are based on a faulty construction of the term. Applying the proper construction of

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“without switching”, Fangio does disclose using transistors to switch from primary power supplies to capacitive backup supplies, albeit without human intervention (i.e., automatically). Fangio thus does not teach supplying capacitively stored electrical energy from an electrical energy back up system without switching between the back up system and the main supply source. However, Corio discloses no electrical switches for changing from primary power sources to battery back-up.

Since Fangio is relied on only for the use of a capacitor as a back-up power source instead of a battery, the combination of Corio and Fangio would supply capacitively stored electrical energy from the electrical energy back-up system without switching between the electrical energy back-up system and the main supply source. Moreover, although not cited by the Examiner, one of skill in the art would recognize that it is a basic property of capacitors to discharge stored energy to a circuit without the use of a switch when the power supply used to charge the capacitor is lost.

Thus, the combination of Corio and Fangio only unites old elements with no change in their respective functions and yields predictable results. Under *KSR*, such a combination likely would be obvious. Because Appellant has provided no evidence to rebut that presumption, we affirm the rejection of Claim 1-13 as an obvious combination of Corio and Fangio.

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CONCLUSIONS

We conclude that Appellant has shown that the Examiner erred in rejecting claim 13 under 35 U.S.C. § 112, second paragraph, but has not shown that the Examiner erred in rejecting claims 1-13 under 35 U.S.C. § 103(a).

DECISION

The decision of the Examiner to reject claim 13 under 35 U.S.C. § 112, second paragraph, is reversed. The decision of the Examiner to reject claim 1-13 under 35 U.S.C. § 103(a) 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). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2006).

AFFIRMED

vsh:

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