UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PATRICK JOSEPH CURRAN

Appeal No. 2005-2423
Application No. 09/634,823[1]

ON BRIEF

Before LEE, TORCZON and MEDLEY, Administrative Patent Judges.

LEE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's rejection of appellant's claims 1, 3, 4, 6-10, and 12-17. Claims 2, 5, 7, 11 and 18 have been cancelled.

References relied on by the Examiner

Kidston et al. ("Kidston")	5,615,933	April 1997
Zittlau et al. (Zittlau WO")	International Patent App. WO 98/369,356	August 1998
Zittlau et al. ("Zittlau")	6,213,567	April 2001
Kade et al. ("Kade")	5,511,859	March 1996

[1] Filed August 8, 2000. The real party in interest is Ford Global Technologies, Inc.

The Rejections on Appeal

Claims 3 and 4 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim that subject matter which the applicant regards as the invention.

Claims 16 and 17 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention.

Claims 1, 6, 8-10, and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable for obviousness over Kidston and Zittlau WO.

Claims 3-4, 12-13 and 15 stand rejected under 35 U.S.C. § 103 as being unpatentable for unobviousness over Kidston, Zittlau WO, and Kade.

The Invention

The invention is directed to a braking system for a vehicle having a first pair of electrically driven wheels and a second pair of wheels. The vehicle is operative to detect an antiskid braking event occurring at said first or second pair of wheels and to recognize whether the antiskid event is occurring at the first pair or second pair of wheels. The braking system controls a known regenerative braking function at the first pair of wheels. Generally speaking, regenerative braking uses the vehicle's electric motor to provide negative torque to the driven wheels to convert the vehicle's kinetic energy into electric energy to recharge the vehicle's battery (Spec. at 1). It was generally known that reduction or elimination of regenerative braking during activation of an antiskid event is required due to the tendency of regenerative braking systems to work against or impair the operation of the antiskid function (Spec. at 2).

According to the appellant, a drawback with prior art regenerative braking systems is that they frequently are shut down upon the sensing of any antiskid event, even those occurring at non-driven wheels (Spec. at 2). The appellant explains that the regenerative braking system actually need not be shut down when an antiskid event is occurring only at non-driven wheels, and that when they are, the vehicle unnecessarily loses the power generating capabilities of the regenerative braking system (Spec. at 2). The appellant's system selectively disables the regenerative braking function "only if" an antiskid braking event is detected at either of the first pair of wheels. Furthermore, antiskid detection signals are communicated to the module selectively disabling the regenerative braking redundantly through two independent communication buses.

Independent claim 1 reads as follows:

> 1. A breaking system for use within a vehicle having a first pair of wheels which is selectively driven by an electric motor, and a second pair of wheels, said braking system comprising:
>
> a communication bus;
>
> a first portion including a motor control module and said electric motor coupled to said first pair of wheels, said motor control module is connected to said communication bus and configured to control said electric motor to control a regenerative braking function of said electric motor at said first pair of wheels;
>
> a second portion connected to said first portion by said communication bus to provide an antiskid braking function at said first and second pair of wheels, said second portion including a frictional braking member coupled to each of said first and second pair of wheels, and wherein the second portion further includes an antiskid control module to detect an antiskid braking event at each of said wheels such that said antiskid control module identifies an origin of said detected antiskid braking event as occurring at at least one of said first or second pair of wheels and which communicates a signal to said first portion, effective to selectively disable said regenerative braking function only if an antiskid braking event is detected at either of said first pair of wheels;

an auxiliary bus disposed only between said motor control module and said antiskid control module to transmit signals between said motor control module and said antiskid control module; and

wherein said antiskid control module communicates the signal to disable said regenerative braking function through both said auxiliary bus and said communication bus to said motor control module disable said regenerative braking function such that transmitting said signal through both said auxiliary bus and said communication bus provides reliability to ensure disablement of said regenerative braking function if one of said auxiliary bus or said communication bus fails.

Discussion

A. The Indefiniteness Rejection

The examiner states (Answer at 4):

> Claim 3 recites "said electric machine." There is insufficient antecedent basis for his limitation in the claims.

For two reasons, the indefiniteness rejection of claims 3 and 4 is moot and need not be considered. First, the obviousness rejection of these claims is affirmed as will be discussed hereinafter. Secondly, the applicants have offered to make appropriate amendment to eliminate the lack of "antecedent basis" problem articulated by the examiner. Accordingly, the rejection of claims 3 and 4 under 35 U.S.C. § 112, second paragraph, is dismissed, without prejudice to it being renewed if the applicants fail to make an appropriate amendment and if the obviousness rejection of claims 3 and 4 is overturned.

B. The Lack of Description and Enabling Disclosure Rejection

The examiner rejected claims 16 and 17 under 35 U.S.C. § 112, first paragraph, "as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention."

The written description clause of 35 U.S.C. § 112, first paragraph, provides two separate disclosure requirements for the specification, the "written description" requirement and the "make and use" enablement requirement. Vas-Cath Inc. v. Mahurkar, 935 F.2d 1555, 1561, 19 USPQ2d 1111, 1115 (Fed. Cir. 1991). In Vas-Cath Inc., 935 F.2d at 1563, 19 USPQ2d at 1117, the Court of Appeals for the Federal Circuit stated:

> This court in Wilder (and the CCPA before it) clearly recognized, and we hereby reaffirm, that 35 USC 112, first paragraph, requires a "written description of the invention" which is separate and distinct from the enablement requirement.

To satisfy the written description requirement, the specification must reasonably convey to one with ordinary skill in the art that the inventor had possession of the invention claimed, i.e., that he or she invented what is claimed. Vas-Cath Inc., 935 F.2d at 1563, 19 USPQ2d at 1116. To satisfy the "make and use" enablement requirement, the specification must enable one with ordinary skill in the art to make and use the claimed invention without "undue experimentation." In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). In In re Wands, id., the Court of Appeals for the Federal Circuit stated:

> Factors to be considered in determining whether a disclosure would require undue experimentation have been summarized by the board in In re Forman. [Footnote omitted.] They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. [Footnote omitted.]

In this case, it is not clear whether the examiner's rejection of claims 16 and 17 is based on purported failure to satisfy the written description requirement, the enablement requirement, or both. We will discuss the rejection in the context of the two different requirements, in turn.

The feature in method claim 16, which underlies the examiner's rejection is the step of:

> **reducing the amount of said regenerative braking force relative to said total braking force, effective to improve braking feel consistency**.

Because the initial burden is on the examiner to make out a prima facie case of unpatentability, the rejection's failure to address any of the factors set out in Wands, supra, as applied to the above-quoted claim limitation in the context of the rejected claims renders itself unsustainable assuming that it was based on the enablement requirement. It is simply not known why in light of the specification one with ordinary skill in the art would require undue experimentation to make and use the invention claimed. The examiner has not articulated anything as being so complex that undue experimentation would be required from one with ordinary skill in the art in order to make and use the invention as claimed, and if so, why.

As for the written description requirement, the examiner correctly noted that nothing in the specification refers to reducing the amount of regenerative braking force provided by the regenerative braking system of the claimed invention (Answer at 7). The examiner also correctly noted that the specification merely discloses that according to the invention a significant majority of the braking force is provided through the use of friction brakes (Answer at 3 and 7). The examiner recognized that there is disclosure in the specification to the effect that the regenerative braking portion of the entire braking force is selected in the appellant's invention at a smaller ratio than that generally associated with prior art braking systems. That description, however, does not correspond to or otherwise reflect the feature at issue here, as the "said regenerative braking force" as referenced in claim 16 cannot reasonably be construed as the regenerative braking force that generally existed in prior art systems. The claim makes no reference to any preexisting prior art, specifically or in general. The only reasonable interpretation is that the force reduced is that provided by the regenerative braking system identified in the preamble of independent claim 14 from which claim 16 indirectly depends.

Claim 14 reads as follows, with the portion introducing a regenerative braking force emphasized in bold text:

> 14. A method for braking within a vehicle having a first pair of wheels and a second pair of wheels, **a regenerative braking system which selectively provides a braking force to said first pair of wheels** and an antiskid braking system which selectively provides a friction braking force to said first and second pair of wheels, said method comprising the steps of:
>
> providing an auxiliary bus;
>
> selectively and directly coupling said regenerative braking system and said antiskid braking system together by use of said auxiliary bus and an encoded CAN bus, wherein said auxiliary bus is only communicatively disposed between said regenerative braking system and said antiskid braking system and is effective to communicate only unencoded signals between said regenerative braking system and said antiskid braking system;
>
> detecting an antiskid braking event;
>
> determining whether said antiskid braking event is occurring at either of said first pair of wheels; and
>
> transmitting an unencoded signal through said auxiliary bus and said encoded CAN bus to selectively disable said regenerative braking system if said antiskid is occurring only at either of said first pair of wheels such that transmitting said signal through both said encoded CAN bus and said auxiliary bus provides reliability to ensure disablement of said regenerative braking function if one of said encoded CAN bus and said auxiliary bus fails.

None of the description in the specification, as pointed out by the appellant in the appeal brief in response to the rejection, indicates that the braking force provided by the regenerative braking system, is reduced from the level first provided by the regenerative braking system of the invention without regard to whether an antiskid event is occurring at a driven wheel. To whatever extent the appellant intended the limitation to mean that the reduction is made relative to regenerative braking force generally applied in prior art systems, the claim does not so read.

The appellant argues that claim 16 is an original claim in appellant's application and thus is itself a part of the written description in the specification as filed. The assertion about an

original claim's constituting its own written description even if that subject matter is not found elsewhere in the specification is generally true, but not always. Where there is lack of correspondence between the specification and the original claim, the specification provides inadequate written description support under 35 U.S.C. § 112, first paragraph. In re Marzocchi, 394 F.2d 571, 574, 157 USPQ 504, 506 (CCPA 1968). In In re Gardner, 480 F.2d 879-880, 178 USPQ 149 (CCPA 1973), the Court of Customs and Patent Appeals limited the principle applied in Marzocchi by recognizing that where the specification adequately discloses a broader class of compounds, original claims directed to a specific subgenus would constitute their own written description under 35 U.S.C. § 112, first paragraph. We do not have the facts of Gardner. The subject matter of claim 16 is not a subgenus of a broader invention described in the specification.

In his discussion of the rejection under 35 U.S.C. § 112, first paragraph, the examiner found that the feature explicitly recited in claim 16 is not consistent with the description elsewhere in the specification. We agree. The specification discusses the invention's lowering the portion or ratio of regenerative braking force within the total braking force, as compared to that ratio characteristic of prior art regenerative braking systems. It nowhere discusses reducing the regenerative braking force initially supplied by the invention after it has been produced, regardless of whether an antiskid event is occurring at any wheel, as is recited in claim 16 per our interpretation as discussed above. According to the specification, disabling of regenerative braking occurs only when an antiskid event has been detected at a driven wheel. The lack of relationship between claim 16 and what is described in the specification is manifestly evident.

Claim 17 depends from claim 16 and thus include all the features of claim 16.

For the foregoing reasons, the rejection of claims 16 and 17 under 35 U.S.C. § 112, first paragraph, is **affirmed**, for the specification's failure to satisfy the written description requirement of that paragraph.

C. Obviousness Rejection of Claims 1, 6, 8-10 and 14

A conclusion of obviousness is based on four underlying factual inquiries: (1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art, and (4) any objective evidence of unobviousness. Graham v. John Deere Co., 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). 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), and to provide a reason why one with ordinary skill in the art would have been led to modify or combine prior art references to arrive at the claimed invention. Such reasons must stem from some teaching, suggestion, or implication in the prior art as a whole or knowledge generally possessed by one with ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. See, e.g., In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); In re Piasecki, 745 F.2d 1468, 223 USPQ 785, 788 (Fed. Cir. 1984). There can be no prima facie

case of obviousness if the examiner has not identified all the differences that exist between the claimed invention and the applied prior art. On the other hand, alleged differences which do not actually exist between the claimed invention and the prior art do not support an argument to overturn the examiner's rejection.

According to the appellant, the examiner failed to recognize three differences between the claimed invention and the prior art cited in support of the rejection. First, it is argued that independent claims 1, 8 and 14 each requires that regenerative braking is disabled "**only if** an antiskid braking event is detected at a first pair of wheels, and not a second pair of wheels" (Brief at 8). The argument is rejected with respect to claims 1 and 8 because nothing in claims 1 and 8 can reasonably be interpreted as requiring that the condition triggering disablement of regenerative braking includes the non-detection or absence of an antiskid event at the second pair of wheels. Based on the language of claims 1 and 8, all that is required is that disablement is not triggered if an antiskid event is not detected at the first pair of wheels. Whether an antiskid event is occurring at the second pair of wheels is simply not figured into the condition. For instance, in pertinent part, claim 1 recites: "effective to selectively disable said regenerative braking function only if an antiskid braking event is detected at either of said first pair of wheels." Essentially the same language appears in claim 8. The triggering condition is not based on anything that is happening or not happening at the second pair of wheels. Only when an antiskid braking event is detected at the first pair of wheels shall the regenerative braking function be disabled. That is what the claim says, nothing more. During examination of a patent application, claim features are properly construed according to their broadest reasonable interpretation consistent with the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1990). In the context of claims 1 and 8, the broadest reasonable

interpretation consistent with the specification does not require the non-detection or absence of an antiskid braking event at the second pair of wheels. The specification on page 14 describes disablement of the regenerative braking function when an antiskid event is detected at the first pair of wheels, regardless of whether there is an antiskid braking event occurring at the second pair of wheels. Pertinent portion of that description is reproduced below (Spec. at 14, lines 6-21):

> If the ABS [antilock braking system] event is not occurring at either of the front or "driven" wheels 20 . . . . Otherwise, if the ABS event is occurring at the front or "driven" wheels 20, braking system 20 proceeds to step 66 and disables the regenerative braking function performed by motor/generator 14, thereby preventing the negative torque produced during regenerative braking from interfering with the ABS function of assemblies 30.

Independent claim 14, however, reads quite differently from claims 1 and 8 and includes language directly supporting the appellant's argument. Rather than reciting that regenerative braking is disabled only if an antiskid event is detected at the first set of wheels, as is the case with claims 1 and 8, claim 14 recites, in pertinent part: "selectively disable said regenerative braking system if said antiskid braking event is occurring only at either of said first pair of wheels." In the language of claim 14, the word "only" is used to distinguish the first pair of wheels from any other pair of wheels rather than to distinguish whether an antiskid event is detected at the first set of wheels. Because of the different claim language, the appellant's argument is supported by the language of claim 14. The examiner has failed to properly recognize a significant difference between the invention of claim 14 and the system disclosed by Kidston.

The appellant next argues that the claims on appeal require an immediate disablement of the regenerative braking function without a ramping down of the regenerative braking force, whereas Kidston discloses a ramping down of the regenerative braking force prior to disabling

the regenerative braking function (Brief at 8). The purported difference, however, does not exist. The appellant's interpretation of the claims on appeal is unduly narrow. Nowhere in the claims on appeal appears any language specifying that the disablement must be immediate and without an initial period of a ramping down the regenerative braking force. The applicants state (Reply at 3):

> The Appellants contest the Examiner's position and submit that the meaning of disabled is clearly set forth in the claims as interpreted in light of the specification and the file wrapper to embody immediate disablement without any ramping down of regenerative braking force.

But the appellant cites to nothing in the specification, the file wrapper, or the prosecution history to support the above-quoted contention that disablement requires immediate disablement without any gradual reduction by ramping down the regenerative braking force. The argument is rejected.

Our review of the specification reveals that the term "disable" is used by the applicants in a much broader sense which includes a reduction of the regenerative braking force. In that portion of the specification describing the prior art regenerative braking systems, the applicants refer to them as "disabling" the regenerative braking function (Brief at 2, lines 25-26) even though they have been described on the same page of the specification as reducing or eliminating the regenerative braking force (Brief at 2, lines 4-7). Therefore, in the context of the applicants' specification, disabling is sufficiently broad to encompass reduction by ramping down, and certainly if the ramping down continues until the regenerative braking force is eliminated as is the case in Kidston (Figure 8, Flow Chart portion including Boxes 286, 288, 290 and 292). The appellant is arguing an interpretation that is not supported by the specification. The appellant has demonstrated no basis to read into the claims the extraneous limitations that the disabling is accomplished immediately without ramping down the regenerative braking force. Kidston's

ramping down to zero is one way of disabling its regenerative braking function. The examiner correctly found that the feature "disable said regenerative braking function" is met by Kidston.

Finally, appellant argues that in Kidston ramping down of regenerative braking does not occur even if an antiskid event has been detected at the driven-wheels, unless it has also been determined that the surface friction parameter μ is low (Brief , paragraph spanning pages 8-9 and first complete paragraph on page 10). If true, then according to the appellant disabling of regenerative braking does not necessarily occur in Kidston even when an antiskid event has been detected at a driven wheel, and thus there would be a difference between the claimed invention and the prior art which is not recognized and accounted for by the examiner.

However, what the appellant asserts about Kidston is not true. Figure 7 of Kidston illustrates an operational flow chart. It reveals that the "blend regen ramp down status flag" is set to true (258) as soon as any antiskid event is detected at either front wheel, even prior to determining whether either front wheel is on a low friction μ surface (260, 262). The description from column 8, line 58 to column 9, line 2, reflects the same. Setting of the blend regen ramp down status flag to true puts the regenerative braking function in ramp down mode, in which it is gradually ramped down until it reaches below a certain threshold at which time it is completely eliminated in one step (Column 9, lines 45-61). What actually happens in Kidston is that if it is further determined that either driven wheel is on a low friction μ surface, then any remaining regenerative braking is zeroed out if it has not already been ramped down to zero during the time it took to calculate surface friction at the two driven wheels. In that regard, note the following description in Kidston in column 9, lines 2-9:

> If at least one of the wheels is on a low μ surface, the enable regen flag is set false <264> before the subroutine exits. In this embodiment, all regenerative braking is disabled at task 264. Since it takes some time for the SURFACE μ a to be determined, the BLEND REGEN torque is generally ramped out by this time. If

> it is not, it is set to zero anyway, as vehicle stopping ability and stability takes precedence over braking smoothness.

The appellant's argument is without merit even if it were assumed that in Kidston the regenerative braking is not disabled unless either one of the front driven wheel is determined to be on a low friction surface. The appellant's claim language is broad. Whether either front driven wheel is on a low friction surface is inconsequential to whether regenerative braking is to be disabled. The breadth of the claims in that regard encompasses the specific triggering condition in Kidston, i.e., that an antiskid event has been detected at a driven wheel and one of the driven wheels is determined as being on a low friction surface. The claim language reads on the triggering condition of Kidston and thus in that connection Kidston anticipates the claims. The appellant's claims do not require that the driven wheels not be on a low friction surface.

Claim 6 depends from claim 1 and claims 9 and 10 each depends from claim 8. The appellant does not advance any other argument with respect to claims 6, 9 and 10. Thus, those claims would stand or fall with claims 1 and 8.

For reasons discussed above, the rejection of claims 1, 6, and 8-10 as unpatentable over Kidston and Zittlau WO is **affirmed**, and the rejection of claim 14 as unpatentable over Kidston and Zittlau WO is **reversed**.

D. Obviousness Rejection of Claims 3, 4, 12, 13 and 15

Claims 3 and 4 depend directly or indirectly from claim 1. Claims 12 and 13 depend directly or indirectly from claim 8. Claim 15 depends from claim 14. With respect to the rejection of claims 3, 4, 12, 13, and 15 as being obvious over Kidston, Zittlau WO, and Kade, the appellant advances no argument other than those already discussed above in connection with the rejection of claims 1, 6, 8-10 and 14 over Kidston and Zittlau WO.

For reasons discussed above in connection with the affirmance of the rejection of claims 1 and 8, the rejection of claims 3, 4, 12 and 13 as unpatentable over Kidston, Zittlau WO, and Kade is **affirmed**.

Kade has not been applied by the examiner in any way that makes up for the deficiency of Kidston and Zittlau with regard to the claim features of claim 14. Accordingly, for reasons already discussed above in connection with the reversal of the rejection of claim 14, the rejection of claim 15 as unpatentable over Kidston, Zittlau WO, and Kade is also **reversed**.

Conclusion

The rejection of claims 3 and 4 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim that subject matter which the applicant regards as the invention is **dismissed**.

The rejection of claims 16 and 17 under 35 U.S.C. § 112, first paragraph, is **affirmed** insofar as it is based on the written description requirement of that paragraph, but **reversed** insofar as it is based on the enablement requirement of that paragraph.

The rejection of claims 1, 6, and 8-10 under 35 U.S.C. § 103 as being unpatentable for obviousness over Kidston and Zittlau WO is **affirmed**.

The rejection of claim 14 under 35 U.S.C. § 103 as being unpatentable for obviousness over Kidston and Zittlau WO is **reversed**.

The rejection of claims 3-4, and 12-13 under 35 U.S.C. § 103 as being unpatentable for unobviousness over Kidston, Zittlau WO, and Kade is **affirmed**.

The rejection of claim 15 under 35 U.S.C. § 103 as being unpatentable for unobviousness over Kidston, Zittlau WO, and Kade is **reversed**.

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

/s/ Jameson Lee JAMESON LEE Administrative Patent Judge	
/s/ Richard Torczon RICHARD TORCZON Administrative Patent Judge	BOARD OF PATENT APPEALS AND INTERFERENCES
/s/ Sally C. Medley SALLY C. MEDLEY Administrative Patent Judge	

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