UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMAXTEC INC. and
SMAXTEC ANIMAL CARE GMBH,
Petitioners,

v.

ST REPRODUCTIVE TECHNOLOGIES, LLC,
Patent Owner.

Case No. IPR2024-00875
U.S. Patent No. 9,844,206

RESPONSE TO REQUEST FOR DIRECTOR REVIEW

TABLE OF CONTENTS

Page

Petitioners' Exhibit List ii

I. INTRODUCTION 1

II. ARGUMENT 3

A. The Board Did Not Err in Finding Claims 4 and 18 Obvious 3

1. Trevarthen Grounds: The Board's Decision on Claims 4 and 18 Is Well Supported 3

2. Laitinen Grounds: The Board's Decision on Claims 4 and 18 Is Well Supported 6

a. The Board Did Not Err in Its Analysis of "Health Information" and "Occurrence of an Illness" 6

b. The Board Did Not Advance a Theory Not Raised by Petitioners 8

B. The Board Did Not Err in Finding Claims 6 and 19–20 Obvious 11

1. Laitinen Grounds: The Board's Decision on Claims 6, 19, and 20 Is Well Supported 11

C. Issues for Limited Remand 11

1. All Grounds: Petitioners Do Not Oppose a Limited Remand to Clarify the Board Considered and Rejected Patent Owner's Arguments for Claim 18 11

2. Petitioners Do Not Oppose a Limited Remand to Reconcile the Findings on Claims 6, 19, and 20 for the Trevarthen Grounds 12

III. CONCLUSION 13

PETITIONERS' EXHIBIT LIST

Exhibit	Description
1001	U.S. Patent No. 9,844,206
1002	Prosecution History of U.S. Patent No. 9,844,206
1003	Declaration of Dr. Tami Brown-Brandl ("Brown-Brandl")
1004	CV of Dr. Tami Brown-Brandl
1005	Trevarthen, *The Importance of Utilising Electronic Identification for Total Farm Management: A Case Study of Dairy Farms on the South Coast of NSW* (Oct. 24, 2005) (Bachelor Thesis, University of Wollongong) ("Trevarthen")
1006	U.S. Patent No. 7,059,275 to Laitinen et al. ("Laitinen")
1007	[Reserved]
1008	U.S. Patent No. 6,059,733 to Brune et al. ("Brune")
1009	US Patent App. Pub. No. 2006/0267767 to Pohlkamp et al. ("Pohlkamp")
1010	International Patent Pub. No. WO2007/089184 to Liao ("Liao")
1011	International Patent Pub. No. WO 2006/059916 to Buchanan et al. ("Buchanan")
1012	[Reserved]
1013	International Patent Pub. No. WO 2004/066720 to Cross et al. ("Cross")
1014	U.S. Patent App. Pub. No. US 2004/0233971 to Meads et al. ("Meads")
1015	J.M. Bewley et al., *Comparison of Reticular and Rectal Core Body Temperature in Lactating Dairy Cows*, 91 J. Dairy Sci. 4661 (2008)
1016	L.C. Hicks et al., *Comparison of Methods of Measuring Deep Body Temperatures of Dairy Cows*, Livestock Environment VI: Proceedings of the 6th International Symposium 432 (May 2001)
1017	K.T. Higgins, *Temperature Readings by Remote Control*, Food Engineering 63 (May 2003)

Exhibit	Description
1018	T. Mottram et al., *Technical Note: A Wireless Telemetric Method of Monitoring Clinical Acidosis in Dairy Cows*, 64 Computers and Electronics in Agriculture 45 (November 2008)
1019	[Reserved]
1020	T.M. Brown-Brandl et al., *Telemetry System for Measuring Core Body Temperature in Livestock and Poultry*, 2001 ASAE International Meeting Sacramento, California, USA, Paper No. 01-4032 (July 30-Aug 1, 2001)
1021	D.J. Prendiville et al., *Radiotelemetry Systems for Measuring Body Temperature*, Beef Production Series No. 57 (June 2002)
1022	Amended Complaint, D.I. 25, *ST Reproductive Technologies, LLC d/b/a STinsight v. Smaxtec Inc. et al.*, No. 3:24-cv-00037 (W.D. Wis. Apr. 23, 2024)
1023	U.S. Patent No. 5,568,788 to van den Berg et al. ("van den Berg")
1024	U.S. Patent App. Pub. No. 2006/0185605 to Renz et al. ("Renz")
1025	U.S. Patent App. Pub. No. 2007/0271320 to Tsuyuzaki ("Tsuyuzaki").
1026	U.S. Patent App. Pub. No. 2005/0145187 to Gray ("Gray")
1027	R. Daly & M. Organ, *Research Online: Digital Commons as a Publishing Platform at the University of Wollongong, Australia*, 35 Serials Review 149-53 (2009).
1028	International Application No. PCT/NZ2007/000286, International Search Report (March 18, 2008)
1029	International Application No. PCT/NZ2007/000286, Written Opinion of the International Search Authority (March 18, 2008)
1030	Affidavit of Nathaniel E. Frank-White
1031	Declaration of June Munford
1032	R.M. de Mol et al., *Results of a Multivariate Approach to Automated Oestrus and Mastitis Detection*, 48 Livestock Production Science 219-227 (1997)

Exhibit	Description
1033	R.M. de Mol et al., *Description of a Detection Model for Oestrus and Diseases in Dairy Cattle Based on Time Series Analysis Combined with a Kalman Filter*, 22 Computers and Electronics in Agriculture 171–185 (1999) ("de Mol")
1034	J.E. Hillerton, *Detecting Mastitis Cow-Side*, National Mastitis Council Annual Meeting Proceedings 48-53 (2000)
1035	G.M. Hyde, *Milk Yield as a Factor in Dairy Herd Management* (1979) (Ph.D. dissertation, University of Illinois at Urbana-Champaign)
1036	U.S. Patent No. 5,724,316 to Brunts
1037	Deposition Transcript of Timothy J. Bowser, Ph.D.
1038	Deposition Transcript of Meredith Knoff
1039	S. Bagley et al., *Logistic regression in the medical literature: Standards for use and reporting, with particular attention to one medical domain*, Journal of Clinical Epidemiology 54 (2001)
1040	Neter et al., APPLIED LINEAR STATISTIC MODELS (4th ed. 1996)
1041	Hair et al., MULTIVARIATE DATA ANALYSIS (5th ed. 1998)
1042	D. Schlünsen et al., *Automatic Health and Oestrus Control in Dairy Husbandry through Computer Aided Systems*, J. Agric. Engng. Res. 38 (1987)
1043	U.S. Patent Appl. Publ. No. 2003/0121972A1 to Lee et al.
1044	Help Google Search know the best date for your web page, *available at* https://developers.google.com/search/blog/2019/03/help-google-search-know-best-date-for
1045	U.S. Patent No. 6,342,242 to Allen et al.
1046	U.S. Patent No. 5,069,160 to Street et al.
1047	U.S. Patent No. 3,624,218 to Regelson
1048	J.H. Britt et al., *Determinants of Estrous Behavior in Lactating Holstein Cows*, J. Dairy Sci. 69 (1986)
1049	H. Lopez et al., *Relationship Between Level of Milk Production and Multiple Ovulations in Lactating Dairy Cows*, J. Dairy Sci. 88 (2005)

Exhibit	Description
1050	E.H. Shim, *Milk Loss and Treatment Costs Associated with Two Treatment Protocols for Clinical Mastitis in Dairy Cows*, J. Dairy Sci. 87 (2004)
1051	A. Jamaludin, *Economics of feeding pasteurized colostrum and pasteurized waste milk to dairy calves*, Food Animal Economics Vol. 209, No. 4 (1996)
1052	A. Oresnik, *Effect of Health and Reproductive Disorders on Milk Yield and Fertility in Dairy Cows* (Sept. 1995)
1053	J.L. Edwards et al., *Using Activity and Milk Yield as Predictors of Fresh Cow Disorders*, J. Dairy Sci. 87 (2004)
1054	U.S. Patent No. 7,905,832 to Lau et al.
1055	Reply Declaration of Dr. Tami Brown-Brandl ("Brown-Brandl Reply")

I. INTRODUCTION

Patent Owner's Request for Director Review ("the Request") primarily attempts to relitigate the merits of the Board's decision under the guise of Director Review but fails to identify any erroneous finding of material fact or law to warrant review in the arguments presented in Sections A.2, A.3, and B.2. The Board's analysis as to the issues challenged by Patent Owner in those Sections is thorough, well-reasoned, and firmly grounded in record evidence. Patent Owner's disagreement with the Board's weighing of the evidence and expert testimony does not establish erroneous findings of material fact or law, much less an abuse of discretion. The Final Written Decision repeatedly and expressly addressed (and rejected) the arguments Patent Owner now repackages, and its conclusions are well supported. Director Review is therefore unwarranted as to Patent Owner's merits challenges.

Patent Owner then identifies two narrow issues concerning the wording and internal consistency of the Final Written Decision for which Petitioner does not oppose a limited remand.

First, in Section A.1, Patent Owner argues that with respect to the patentability of claim 18 the Final Written Decision incorrectly states that "Patent Owner does not separately argue claim 18, instead relying on its prior argument against claim 1." Request, 5–6 (quoting FWD, 48, 81). While Patent Owner is correct that it cross-

referenced its arguments with respect to claim 4 in its discussion of claim 18 (*see* POR, 45–46, 63–64), the Board expressly addressed and rejected those arguments on the merits, and Patent Owner failed to show any errors in the Board's analysis. *See* FWD, 38–40. In any event, Petitioners do not oppose a limited remand for the Board to clarify the Final Written Decision to state that Patent Owner's arguments for patentability for claim 18 were the same as those raised for claim 4 and were rejected for the same reasons as the arguments with respect to claim 4.

Second, in Section B.1, Patent Owner argues that the Board's conclusion that claims 19 and 20 are unpatentable based on the combination of Trevarthen and Brune "is facially inconsistent with its finding that Trevarthen did not render claim 6 obvious." Request, 14–15. Given the commonalities in claim 19 and 20 of the '206 patent as compared to claim 6, Petitioners do not oppose a limited remand for the Board to update the Final Written Decision to reconcile its findings with respect to claims 6, 19, and 20 with respect only to the Trevarthen/Brune combination. Ultimately, however, any such correction should not affect the Board's ultimate determination that claims 1–4, 6, and 17–20 of the '206 patent were proven to be unpatentable.

II. ARGUMENT

A. The Board Did Not Err in Finding Claims 4 and 18 Obvious

1. Trevarthen Grounds: The Board's Decision on Claims 4 and 18 Is Well Supported

In Section A.2, Patent Owner challenges the Board's determination that the Trevarthen-based prior art combinations disclose or render obvious the "health information" and "occurrence of an illness" limitations in claims 4 and 18. Request, 7–9. Patent Owner's arguments mischaracterize both the Final Written Decision and the evidence supporting the Board's finding.

Patent Owner first challenges the Board's determination that Trevarthen's log of past animal treatments is "health information" within the meaning of the '206 patent. Request, 7–8 (citing FWD, 39–40). The Board's conclusion is well supported. As the Board explained, "Trevarthen teaches farmers using herd management system 'to easily and immediately view information on individual cattle, view an entire cow[']s history (calving date, artificial insemination dates, treatments etc.), produce reports on individual cows, selected cows or the herd as a whole.'" FWD, 40 (citing Ex1005, 93, 101). The Board reasonably determined, consistent with the testimony of Petitioners' expert (*see* Ex1003, ¶¶132–34; Ex1055, ¶21), that a person of ordinary skill in the art would understand records of past treatments to constitute "health information" associated with the animal, as recited

in claims 4 and 18. FWD, 40. The Board was not required to adopt Patent Owner's narrower, and unsupported, view of "health information."

Patent Owner next disputes that the identified "health information" would be used in a "logical expression," as required by claims 4 and 18. Request, 8–9 (citing FWD, 40). This argument likewise mischaracterizes the Board's analysis. The Board did not find that Trevarthen relied on treatment history in isolation, but instead concluded that Trevarthen's herd management system integrates stored animal information—including health-related data such as treatments—with sensed physiological information to evaluate animal health. FWD, 39–40. In that context, the Board properly relied on its detailed analysis of limitations 1[E] and 1[F], which explains how Trevarthen teaches entering stored and sensed animal information into logical expressions to assess animal illness. *Id.*, 31–38.

Critically, in connection with limitations 1[E] and 1[F], the Board explained that the record as a whole supports that one skilled in the art would "assess[] multiple parameters for identifying illness." FWD, 37 (citing Ex1023, 4:13–44). It was in view of that evidence and knowledge of those skilled in the art that the Board concluded, with respect to claim 4, that "one skilled in the art would include stored animal health information in the logical expression for identifying animal illness." FWD, 40. Whether Petitioners' expert was aware of specific livestock management software that uses treatment history to indicate illness is irrelevant. *See* Request, 9

(citing Ex2010, 83:17–84:1). The Board reasonably determined—based on the integrated operation of Trevarthen's system and the state of the art—that it would have been obvious to those skilled in the art to incorporate "health information" (such as treatment history) in a logical expression for identifying illness. Nothing in claims 4 or 18 requires that "health information" be the sole or exclusive input to the logical expression.

Finally, the Board correctly rejected Patent Owner's argument that Trevarthen fails to disclose logical expressions that "indicate an occurrence of an illness." Request, 9–10 (citing FWD, 40). As the Board explained, Trevarthen teaches evaluating physiological and health data to identify abnormal conditions and generate alerts indicative of illness. FWD, 40 (citing Ex1003, ¶¶133–35; Ex1005, 115, 121). That claim 1 itself does not contain an "occurrence of an illness" limitation is irrelevant. *See* Request, 9–10. Petitioners explained, and the Board agreed, that the result of solving the "logical expression" in claim 1 in the prior art was detection of illness. *See* FWD, 34–38. Accordingly, the Board appropriately relied on its claim 1 analysis to conclude that Trevarthen's logical expressions satisfy the additional limitation of claim 4.

The Board therefore correctly determined that the Trevarthen-based grounds disclose and/or render obvious claims 4 and 18 of the '206 patent.

2. Laitinen Grounds: The Board's Decision on Claims 4 and 18 Is Well Supported

a. The Board Did Not Err in Its Analysis of "Health Information" and "Occurrence of an Illness"

In Section A.3, Patent Owner challenges the Board's conclusions on claims 4 and 18 with respect to the Laitinen grounds. Patent Owner first argues, without identifying any specific error, that "[t]he Board's analysis of the 'health information' and 'occurrence of an illness' limitations under the Laitinen-based grounds mirrors the deficient analysis it provided for the Trevarthen grounds." Request, 10–11. Petitioners therefore incorporate by reference their explanations above of how the Board's analysis of claims 4 and 18 is fully supported and far from erroneous. *See supra* Section II.A.1. In any event, none of the purported "multiple errors" in the Board's analysis of Laitinen and Liao are errors at all.

Patent Owner argues that "the Board abused its discretion by disposing of claim 4 by reference to claim 1, without addressing or resolving whether the identified 'health information' is entered into a logical expression that indicates an illness." Request, 11–12. Patent Owner mischaracterizes the Board's analysis of claim 4. The Board first examined the specific disclosures of Laitinen, including that "Laitinen teaches a local system that gathers, assesses and presents 'data concerning the animals' health,'" and that "[w]ith this 'collected historical data . . . the system enables individual health surveillance and the creation of remote health

care services.'" FWD, 73 (citing Ex1006, 4:12–15, 5:4–6). In view of those disclosures, the Board reasonably referred back to its detailed discussion of limitations 1[E] and 1[F] concerning logical expressions in Laitinen and Liao, and concluded that "one skilled in the art would have included stored animal health data in the logical expression for identifying animal illness, thereby providing remote health care services." *Id.* The Board therefore did *exactly* what Patent Owner accuses it of not doing—addressed whether the identified health information is entered into the logical expression.

Patent Owner further argues that "the Board's conclusion based on expert testimony is an erroneous finding of material fact because the cited paragraphs do not in any way support it." Request, 12. Patent Owner is incorrect. The cited paragraphs of Petitioners' expert declaration (¶¶198–199) expressly refer back to the expert's detailed explanation for limitations 1[E] and 1[F], including how Laitinen and Liao render obvious the use of multiple variables in a logical expression for identifying animal illness. *See* Ex1003, ¶199 ("As explained for 1[E]-1[F] . . ."). Moreover, the Board's conclusion was not based on expert testimony alone; it was grounded in—and expressly supported by—Laitinen's and Liao's disclosures describing the use of stored animal health data and physiological parameters to evaluate animal illness. *See* FWD, 73 (citing Ex1006, 4:60–64, 7:4–13, 7:35–55; Ex1010, 6:31–7:6).

b. The Board Did Not Advance a Theory Not Raised by Petitioners

Patent Owner separately argues that the Board "substitute[ed] its own arguments for Petitioners'" by finding claim 4 unpatentable over Laitinen based on a theory allegedly "never advanced in the Petition." Request, 12–13. According to Patent Owner, Petitioners relied solely on Laitinen's "second logical expression" (*i.e.*, the "inverse function") to address claim 4, whereas the Board purportedly went beyond the Petition by relying on a "new expression" that was raised with respect to claim 1 (and not claim 4). *Id.*, 12–13 (citing Pet., 54). Patent Owner misreads both the Petition and the Final Written Decision.

As the Petition explains, Petitioners relied in part on Laitinen's second logical expression—which has been referred to as the "inverse function" that determines medical treatment—as the foundation for the obviousness analysis. Pet., 49 (citing Ex1006, 7:6–13, 7:35–37; Ex1003, ¶186). Petitioners further explained that a person of ordinary skill in the art would have understood that this expression could be modified, or implemented in a new but equivalent form, to identify animal illness by incorporating additional variables such as milk production alongside temperature. Pet., 49–50 (citing Ex1003, ¶187). The Petition thus expressly contemplated modification of Laitinen's inverse function to identify illness, consistent with well-established obviousness principles.

For claim 1, the Board agreed with this analysis. In its Final Written Decision, the Board expressly referenced Laitinen's "logical expression for identifying medical treatment of illness"—*i.e.*, the inverse function—and concluded that it could be adapted to identify animal illness. FWD, 63–65. The Board's observation that "[t]he resulting logical expression need not rely on Laitinen's inverse function for monitoring medical treatment" does not reflect reliance on a different theory. *Id.*, 65. Rather, it reflects the unremarkable conclusion that the inverse function could be modified or implemented more broadly to identify illness, as Petitioners argued. *Id.* (citing Ex1003, ¶189; Ex1055, ¶¶31–33).

Nor did the Board rely on a completely "new expression" in its analysis of claim 4. For claim 4, the Board found that "one skilled in the art would have included stored animal health data in the logical expression for identifying animal illness." FWD, 73. The "logical expression" referenced in that discussion is the same expression analyzed under limitations 1[E] and 1[F]—grounded in Laitinen's inverse function and its obvious modification to evaluate animal illness. Nothing in the Final Written Decision reflects reliance on a theory untethered from the Petition or from Laitinen's disclosed logical expression.

Patent Owner is also incorrect that the Board did not "address Patent Owner's well-supported arguments showing why a POSA would *not* make such a

modification." Request, 13. Patent Owner, again, simply disagrees with the Board's conclusion, which is a far cry from showing an erroneous finding of fact or law.

Moreover, for claim 4, Patent Owner did not present any claim-specific arguments that the Board failed to address. *See* Request, 13. On claim 4, Patent Owner argued in its Response that "Petitioners merely provide a conclusory challenge to claim 1 that refers back to the 'second logical expression' in their claim 1 argument, and do not specifically address the additional limitations of claim 4." POR, 62. The Board expressly recognized that contention and rejected it, explaining that Petitioners' analysis of the logical expression and illness-identification limitations applied equally to claim 4 and supported a finding of unpatentability. FWD, 72–73.

Patent Owner now suggests that the Board failed to engage with specific arguments directed to claim 4, but the record shows otherwise. Patent Owner did not advance any distinct substantive challenge to claim 4 beyond its assertion that Petitioners' analysis improperly relied on arguments made for claim 1. And Patent Owner's citation to "POR, 54–57" (*see* Request, 13) does not support its position, as those pages address Patent Owner's arguments concerning claim 1, not claim 4. The Board was not required to reiterate its rebuttal of Patent Owner's claim 1 arguments a second time in its analysis of claim 4, and its failure to do so does not constitute error.

The Board therefore correctly determined that the Laitinen-based grounds disclose and/or render obvious claims 4 and 18 of the ’206 patent.

B. The Board Did Not Err in Finding Claims 6 and 19–20 Obvious

1. Laitinen Grounds: The Board’s Decision on Claims 6, 19, and 20 Is Well Supported

In Section B.2, Patent Owner’s challenge to the Board’s findings on claims 6, 19, and 20 under the Laitinen-based grounds rests entirely on its contention that the Board erred in its analysis of claim 4. Request, 15. As explained above (*see supra* Section II.A.2), the Board’s determinations with respect to claim 4 are fully supported by the record and free of error. Because claims 6, 19, and 20 depend from claims 4 and 18 and rise or fall with the same analysis, Patent Owner’s challenge to those claims necessarily fails.

C. Issues for Limited Remand

1. All Grounds: Petitioners Do Not Oppose a Limited Remand to Clarify the Board Considered and Rejected Patent Owner’s Arguments for Claim 18

In Section A.1, Patent Owner argues that the Board erroneously characterized Patent Owner as not separately arguing claim 18 but, instead, as having relied solely on its arguments supporting patentability of independent claim 1. Request, 5–6. Petitioners do not dispute that Patent Owner cross-referenced its arguments regarding claim 4 in addressing claim 18. *See, e.g.*, POR, 45–46, 63–64. At the same time, the Board expressly considered and rejected those arguments on the

merits in its analysis of claim 4 (*see* FWD, 38–40), and that analysis applies equally to claim 18. Moreover, as explained in the subsequent subsections, Patent Owner has not identified any substantive error in that analysis or demonstrated that the Board's outcome would differ if the Final Written Decision had more precisely described the manner in which Patent Owner presented its arguments. Accordingly, Patent Owner's challenge does not warrant Director Review on the merits of the Board's determination on claims 4 or 18. Nevertheless, to the extent the Director deems it appropriate, Petitioners do not oppose a limited remand for the narrow, purely ministerial purpose of clarifying that Patent Owner's arguments as to claim 18 mirrored those raised for claim 4 and were rejected for the same reasons.

2. Petitioners Do Not Oppose a Limited Remand to Reconcile the Findings on Claims 6, 19, and 20 for the Trevarthen Grounds

In Section B.1, Patent Owner argues that the Board's finding that claims 19 and 20 are unpatentable based on Trevarthen in combination with Brune is inconsistent with the Board's determination that Trevarthen did not render claim 6 obvious. Request, 14–15. Petitioners do not dispute that claims 19 and 20 include limitations similar to those of claim 6, or that Patent Owner argued patentability of claims 19 and 20 on the same grounds as claim 6. *See* POR, 46–47. Accordingly, to the extent the Director deems it appropriate, Petitioners do not oppose a limited

remand for the Board to reconcile its findings with respect to claims 6, 19, and 20 for the Trevarthen-based grounds.

III. CONCLUSION

For the foregoing reasons, Petitioners do not oppose a limited remand to the Board for the sole purposes of (1) clarifying the Final Written Decision to state that Patent Owner's arguments for patentability for claim 18 were the same as those raised for claim 4 and were rejected for the same reasons as the arguments on claim 4, and (2) reconciling the findings in the Final Written Decision on claims 6, 19, and 20 in the Trevarthen-based grounds. Otherwise, Patent Owner fails to show any errors on the merits of the Board's determinations in its Final Written Decision.

DATED: January 5, 2026

Respectfully Submitted,

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CERTIFICATE OF SERVICE

A copy of the foregoing document and the accompanying exhibits were served via electronic mail on Patent Owner's counsel of record at the email addresses dmoffett@akingump.com, mmahoney@akingump.com, twlanders@akingump.com, jhernandez@akingump.com, and AG-ST-SMAXTEC@akingump.com, as indicated in Patent Owner's Amended Mandatory Notices, dated October 16, 2024.

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