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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DANIEL ROBERT DRISCALL and
ROBERT WALTER GREENE

Appeal 2020-000721
Application 15/183,002
Technology Center 3600

Before BENJAMIN D. M. WOOD, CARL M. DEFRANCO, and
GEORGE R. HOSKINS, *Administrative Patent Judges.*

DEFRANCO, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1, 3, 5–11, 13–15, and 18. Claims 2, 4, 12, 16, and 17 have been cancelled. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as The Raymond Corporation. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Of the claims on appeal, claims 1 and 13 are independent. Claim 1 is directed to a "material handling vehicle" equipped with a processor configured to "execute a real time weight calculation program to account for non-linearity of the [vehicle's] lift system" and "control a speed of the material handling vehicle based on at least the real time weight value." Claim 13 is directed to a "method" of using a processor that performs essentially the same steps. Claim 1 is illustrative and reproduced below.

> 1. A material handling vehicle comprising:
>
> a lift system configured to manipulate a load, the lift system including:
>
> a pair of forks; and
>
> a linkage coupled to the pair of forks and associated with operation thereof;
>
> a pressure sensor coupled to the linkage and configured to measure a pressure associated with a weight on the pair of forks;
>
> a height sensor configured to measure a height of the pair of forks;
>
> a data collection system; and
>
> a processor having a memory, *the processor configured to execute a real time weight calculation program to account for non-linearity of the lift system*, the weight calculation program comprising the steps of:
>
> receiving data from the pressure sensor and the height sensor; and
>
> combining the data from the pressure sensor and the height sensor to continuously determine a real time weight value of the load being manipulated by the lift system;
>
> wherein *the processor is configured to control a speed of the material handling vehicle based on at least the real time weight value.*

Appeal Br. 13 (Claims App.) (emphases added).

EVIDENCE OF RECORD

Name	Basis	Date
Avitan	US 4,942,529	July 17, 1990
Nagai	US 6,611,746 B1	Aug. 26, 2003
Abels	US 7,216,024 B1	May 8, 2007
Anson	US 2006/0208893 A1	Sept. 21, 2006
Akaki	US 2010/0063682 A1	Mar. 11, 2010
Santi	US 2014/0262551 A1	Sept. 18, 2014
Yoon	US 2016/0264387 A1	Sept. 15, 2016

EXAMINER'S REJECTIONS

Claims Rejected	35 U.S.C. §	Basis
1, 3, 5–11, 13–15, 18	112(a)	Written Description
1, 3, 5–11, 13–15, 18	112(b)	Indefiniteness
1, 9–11, 13–15[2]	103	Akaki, Avitan, Santi
3	103	Akaki, Avitan, Santi, Nagai
5	103	Akaki, Avitan, Santi, Anson
6–8	103	Akaki, Avitan, Santi, Yoon
18	103	Akaki, Avitan, Santi, Abels

ANALYSIS

A. Lack of Written Description

In the Non-Final Office Action, the Examiner rejected all the pending claims as failing to comply with the written description requirement of 35 U.S.C. § 112(a). Non-Final Act. 2–3. Specifically, the Examiner contends that the limitation "to account for non-linearity of the lift system" lacks sufficient written description support in Appellant's Specification. *See id.* We disagree. The Specification clearly states, in part, "[u]sing data from a

[2] Although the Examiner omits claim 11 from the listing of claims rejected under 35 U.S.C. § 103, the Examiner nonetheless includes claim 11 in the rejection. *Compare* Non-Final Act. 4, *with id.* at 6.

plurality of sensors, including height sensor 102 and pressure sensor 104, a real time calculated weight of the load can be determined whether the material handing vehicle is stopped or moving, while taking the *non-linearity of the lift system into account*." Spec. ¶ 37 (emphasis added). To the extent a skilled artisan would have understood the meaning of "non-linearity," as discussed below, we are of the view that the Specification provides adequate support for the "non-linearity" limitation.

B. Indefiniteness

The Examiner also rejected all the pending claims as being indefinite under 35 U.S.C. § 112(b). Non-Final Act. 3–4; *see also* Ans. 5–6. In particular, the Examiner again takes issue with the claim limitation requiring that the processor be configured "to account for non-linearity of the lift system." Non-Final Act. 3–4. According to the Examiner, because the only occurrence of the term "non-linearity" in the Specification lacks sufficient definition and description, "it is not clear how the real time calculated weight of the load can be determined while taking the *non-linearity* of the lift system into account." *Id.* (citing Spec. ¶ 37); *see also* Ans. 5–6. Explaining further, the Examiner notes that the term could be construed to encompass "any non-linear behavior in the lift system (e.g., including load position variation during system movement) causing the weight calculation to be skewed from a straight line response in the context of the lift system." Ans. 6. Thus, the Examiner finds that "non-linearity," as used in the claims, "is open to multiple interpretations thus rendering it *indefinite*." *Id.* at 5–6.

We agree with the Examiner's finding that the term "non-linearity" lacks sufficient definition in the context of the claims. In refuting the Examiner's rejection, Appellant contends that a skilled artisan would have "known . . . that non-linearity exists in lift systems on material handling vehicles." Appeal Br. 6. But nowhere does Appellant cite any supporting evidence for this purported knowledge. *See id.* And although Appellant contends that the claims "do not attempt to claim every way of accounting for non-linearity in a lift system," Appellant fails to explain the scope of the "one specific solution" that the term purportedly encompasses. *Id.*

More specifically, in our view, the term "non-linearity" as used in the claims could be construed to mean any non-linear variation relative to the longitudinal (front-to-rear) axis, lateral (side-to-side) axis, or vertical (height) axis of the forklift vehicle's center of gravity. It could also be construed to mean non-linearity in the electronic operation of components in "the lift system" of the claims, such as the pressure sensor, the height sensor, or a motor operating the lift system. *See, e.g.*, Spec. ¶¶ 34–38. That a skilled artisan would need to make arbitrary assumptions in order to ascertain what might cause the load weight calculation to depart from a straight-linear response supports a finding of indefiniteness. The dependent claims do not cure the deficiencies of claims 1 and 13, as they provide no further clarity for the term "non-linearity."

In the end, one is left to speculate as to whether the lift system accounts for non-linearity in the longitudinal, lateral, and/or vertical directions of the lift, or in the system components themselves. As presently worded, the claim language does not provide the answer. Thus, we sustain the Examiner's rejection of claims 1, 3, 5–11, 13–15, and 18 for indefiniteness under 35 U.S.C. § 112(b).

C. Obviousness

1. Claims 1, 9–11, 13–15

The Examiner rejected claims 1, 9–11, and 13–15 under 35 U.S.C. § 103 as unpatentable over the combined teachings of Akaki, Avitan, and Santi. *See* Non-Final Act. 4–6; Ans. 3, 7–10. Although Appellant argues independent claims 1 and 13 separately, we treat them together given that Appellant relies on the same arguments for claim 13 as it does for claim 1. *See* Appeal Br. 9, 11. Appellant does not argue dependent claims 9–11, 14, and 15 separately, so we presume they are argued solely on the basis of their dependency from their respective base claims 1 and 13.

As explained by the Examiner (*see* Non-Final Act. 4–5), Akaki indisputably discloses a forklift vehicle including:

> (1) a pair of forks (*see* ¶ 70, Fig. 1A, "fork 13");
>
> (2) a linkage coupled to the pair of forks for operation thereof (*see* ¶¶ 70–71, Fig. 1A, "mast 11," "mast 12," "tilt device 18");
>
> (3) a pressure sensor configured to measure a pressure associated with a weight on the pair of forks (*see* ¶¶ 73–74, Figs. 1A, 1B, "pressure sensor 22");
>
> (4) a height sensor configured to measure a height of the pair of forks (*see* ¶¶ 73–74, Figs. 1A, 1B, "displacement sensor 21");
>
> (5) a data collection system (*see* ¶¶ 73–78, Figs. 1A, 1B, "controller 20");
>
> (6) a processor and memory configured to execute a real time weight calculation program based on data from the pressure sensor and control the speed of the forklift vehicle based on the calculated real time weight value (*see* ¶¶ 76–81, Fig. 2, computer C1–C5, steps S11–15 where "[i]n a step S12, load weight W is calculated by inputting lift cylinder pressure P into computer C2 for outputting load weight W based on lift

> cylinder pressure P" and "[i]n a step S13, . . . [a] computer C3b which memori[z]es the cargo height H output in the step S11 and a limit velocity V2 in the case of a specified load (= maximum load), inputs the cargo height H and outputs a limit velocity V2 in the case of the specified load (=nonload) condition"; *see also* ¶ 96, Fig. 7, steps S21–25, and claim 8's recitation of "controlling output of said internal combustion engine in order to maintain vehicle velocity less than said limit velocity").

The Examiner concedes, however, that Akaki does not expressly disclose the claim limitation of "combining the data from the pressure sensor and the height sensor to continuously determine a real time weight value of the load being manipulated by the lift system." Non-Final Act. 5. For that limitation, the Examiner points to Avitan's express teaching of using "instantaneous data representing lift cylinder pressure, and carriage height, to determine the instantaneous payload on the load carriage." *See id.* (citing Avitan, 3:10–20); *see also* Ans. 8 (same). According to the Examiner, a skilled artisan would have been led to use inputs from both a pressure sensor *and a height sensor*, as taught by Avitan, in the calculation of Akaki's load weight "in order to more precisely and reliably measure the instantaneous payload of the lifter in the [forklift] vehicle thus improving the overall system sensitivity and stability." Non-Final Act. 5.

Appellant raises two arguments in response to the Examiner's combination of Avitan with Akaki. Appeal Br. 6–11. First, Appellant contends that Avitan does not provide "sufficient clarity as to how the cylinder pressure and carriage height values are used" in the calculation of load weight. *Id.* at 7. We do not find this argument persuasive for the simple reason that Avitan describes the use of separate inputs from a pressure sensor and a height sensor to the same extent as Appellant's

Specification. *See* Spec. ¶ 37 (stating generally that "[t]he software 108 can use the operational and state data, in combination with the data from the height sensor 102 and pressure sensor 104 to calculate a weight of a load."). In our view, the breadth of Appellant's disclosure is no different than that of Avitan's disclosure. *See* Avitan, 3:1–20 (disclosing that "logged data is used, *together with instantaneous data representing lift cylinder pressure, and carriage height,* to determine the instantaneous payload on the load carriage") (emphasis added). In any event, because it is the claims, not the Specification, that define the claimed invention, we are not persuaded that Avitan lacks sufficient clarity in teaching that inputs from both a pressure sensor and a height sensor maybe used to more accurately calculate the load weight of a forklift system.

We also are not moved by Appellant's characterization that the Examiner relies on Avitan's "learn mode" to calculate load weight. Appeal Br. 8. As explained by the Examiner, Avitan is not relied on for teaching a "learn mode" but is relied on for its express teaching of using "instantaneous data *representing lift cylinder pressure, and carriage height,* to determine the instantaneous payload on the load carriage." Ans. 8–9 (citing Avitan, 3:17–20). That teaching by Avitan clearly supports the soundness of adding a height sensor input to the pressure sensor input used in Akaki's load weight calculation program in order to provide a more precise and reliable measurement of the instantaneous payload of the forklift.

Finally, Appellant takes issue with the Examiner's conclusion that a skilled artisan would have used Santi's teaching of load sensors to compensate for a "non-linear" load position on the forks of the modified Akaki/Avitan forklift system. Appeal Br. 9–11. At the outset, we note that the Examiner concedes that Akaki does not disclose that the real time weight calculation program "accounts for non-linearity of the lift system," as called for by the claims. Non-Final Act. 5–6. To meet that limitation, the Examiner points to Santi's teaching of equipping a forklift with "load cells" to derive "a correction factor or other adjustments to the readings based on load position *to compensate for the non-linear response* and obtain greater accuracy of load measurements." *Id.* (citing Santi ¶ 34). According to the Examiner, a skilled artisan would have been led to incorporate Santi's correction factor as another input for Akaki's load weight calculation "in order to more precisely and reliably measure the instantaneous load weight [by] compensating for non-linear response based on load position thus improving the overall system accuracy, sensitivity and stability." *Id.*

In response, Appellant contends that, if Santi's load cells were incorporated into the modified Akaki/Avitan forklift system, "the principle of operation of the load weight measurement performed by the pressure sensors of Akaki and Avitan would be changed in an undesirable way." Appeal Br. 10. We disagree. First, we note that Appellant never explains the "undesirable" change that would occur with the addition of a "non-linear" correction factor to Akaki's load-weight calculation program if Santi's load cells were placed along the forks of the modified Akaki/Avitan lift system. *See id.* at 10–11.

Moreover, we note that both Akaki and Santi share the same objective of calculating accurate load measurements based on knowing the load's center of gravity on the fork. *Compare* Akaki ¶ 77 ("[a] height of a center of a gravity point of load on the fork 13 is varied depending on actual load"), *with* Santi ¶ 34 ("[k]nowing the center of gravity or approximate center of gravity of the load, it is then possible to adjust or correct the . . . non-linear response based on said load position”). That shared objective persuades us that adding load sensors directly to the forks of the modified Akaki/Avitan system to derive a correction factor for a load weight calculation, as taught by Santi, would not improperly alter the operation of the pressure and height sensors on the linkage of the modified Akaki/Avitan system but rather would further enhance the accuracy of Akaki’s load weight calculation program by compensating for any non-linearity of the load’s center of gravity. That is all the claims require—“account for non-linearity of the lift system.”

In sum, under a broad reasonable interpretation of “non-linearity,” Appellant does not persuade us of error in the Examiner’s reason for combining the respective teachings of Akaki, Avitan, and Santi—“to more precisely and reliably measure the instantaneous payload of the lifter.” *See* Non-Final Act. 5; *see also id.* at 6 (same reasoning). Thus, we sustain the Examiner’s rejection of claims 1 and 13, as well as the dependent claims not argued separately.

2. Dependent Claims 3, 5–8, and 18

The Examiner rejected dependent claims 3, 5–8, and 18 under 35 U.S.C. § 103(a) as unpatentable over Akaki, Avitan, Santi, and additional prior art that includes Nagai, Anson, Yoon, and Abels. Non-Final Act. 6–9. Appellant does not argue these dependent claims separately from claims 1 and 13, and we presume they are argued based solely on their dependency from their respective base claims 1 and 13. For the same reasons provided above in our analysis of claims 1 and 13, we sustain the Examiner’s rejection of dependent claims 3, 5–8, and 18.

CONCLUSION

We sustain the Examiner's rejections of the claims as indefinite under 35 U.S.C. § 112(b) and as obvious under 35 U.S.C. § 103, but reverse the Examiner's rejection of the claims for lacking written description support under 35 U.S.C. § 112(a).

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1, 3, 5–11, 13–15, 18	112(a)	Written Description		1, 3, 5–11, 13–15, 18
1, 3, 5–11, 13–15, 18	112(b)	Indefiniteness	1, 3, 5–11, 13–15, 18	
1, 9–11, 13–15	103(a)	Akaki, Avitan, Santi	1, 9–11, 13–15	
3	103(a)	Akaki, Avitan, Santi, Nagai	3	
5	103(a)	Akaki, Avitan, Santi, Anson	5	
6–8	103(a)	Akaki, Avitan, Santi, Yoon	6–8	
18	103(a)	Akaki, Avitan, Santi, Abels	18	
Overall Outcome			1, 3, 5–11, 13–15, 18	

TIME PERIOD FOR RESPONSE

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).

AFFIRMED