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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MING CHANG, SERGEY MACHERET, and JOSEPH VADYAK

Appeal 2014-005197
Application 13/156,317
Technology Center 3600

Before JENNIFER D. BAHR, EDWARD A. BROWN, and JILL D. HILL, *Administrative Patent Judges*.

BAHR, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Ming Chang et al. (Appellants) appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1–24. We have jurisdiction under 35 U.S.C. § 6(b). An oral hearing in accordance with 37 C.F.R. § 41.47 was held on October 13, 2016.

We REVERSE and enter NEW GROUNDS OF REJECTION pursuant to 37 C.F.R. § 41.50(b).

THE CLAIMED SUBJECT MATTER

Claim 1, reproduced below, is illustrative of the claimed subject matter.

> 1. A system for enhancing operations of an aircraft, comprising:
> a plasma generator on an exterior of the aircraft;
> a sensor configured to sense and transmit information that indicates that the aircraft is approaching a transonic flight condition;
> a controller configured to activate the plasma generator in response to information transmitted from the sensor regarding the transonic flight condition, so as to mitigate a transonic shock wave.

REJECTIONS[1]

I. Claims 1–20, 23, and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Drouin (US 2010/0004799 A1, pub. Jan. 7, 2010).

II. Claims 21 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Drouin.

DISCUSSION

Rejections I and II

With respect to independent claim 1, we agree with the Examiner, and Appellants do not appear to dispute, that Drouin discloses a system for enhancing operations of an aircraft, the system comprising a plasma generator, at least one sensor configured to sense and transmit information to a controller, and a controller configured to activate the plasma generator in

[1] The Examiner withdrew a rejection of claims 3, 6–8, and 15–20 under 35 U.S.C. § 112, second paragraph. Adv. Act. 2; *see* Final Act. 2.

response to the information transmitted from the sensor to mitigate a shock wave. Ans. 2–3; Appeal Br. 10–12; *see* Drouin, paras. 6, 15–19, 29. Similarly, with respect to independent claim 12, we agree with the Examiner that Drouin also discloses a method for enhancing operations of an aircraft comprising the steps of sensing, with a sensor, information; providing the information to a controller to determine how to activate a plasma generator to mitigate a shock wave; and activating the plasma generator upon determining the type of actuation that will mitigate the shock wave. Ans. 8–9; Appeal Br. 13–14; Drouin, paras. 6, 15–19, 29–40; Figs. 5A–5E, 6A–6C.

The central issue in this appeal is whether Drouin's sensors are "configured to sense and transmit information *that indicates that the aircraft is approaching a transonic flight condition*" and, similarly, whether Drouin discloses sensing, with those sensors, "information *that indicates that the aircraft is approaching a transonic flight condition*," as required in claims 1 and 12, respectively. Appeal Br. 10–14; *see id.* at 16, 18 (emphasis added) (Claims App.). For the reasons set forth below in the new ground of rejection under 35 U.S.C. § 112, second paragraph, the meaning of this language is not clear, rendering claims 1 and 12, as well as claims 2–11 and 13–24 depending therefrom, indefinite. Accordingly, we cannot sustain the rejections of these claims under 35 U.S.C. §§ 102(b) and 103(a), because to do so would require speculation as to the scope of the claims. *See In re Aoyama*, 656 F.3d 1293, 1300 (Fed. Cir. 2011) (holding that the Board erred in affirming an anticipation rejection of indefinite claims); *In re Steele*, 305 F.2d 859, 862–63 (CCPA 1962) (holding that the Board erred in affirming a rejection of indefinite claims under 35 U.S.C. § 103(a), because the rejection was based on speculative assumptions as to the meaning of the claims). It

should be understood, however, that our decision in this regard is based solely on the indefiniteness of the claimed subject matter, and does not reflect on the adequacy of the prior art evidence applied in support of the rejection.

NEW GROUNDS OF REJECTION

Findings of Fact Pertinent to the New Grounds of Rejection

Independent claim 1 recites "a sensor configured to sense and transmit information that indicates that the aircraft is approaching a transonic flight condition" and "a controller configured to activate the plasma generator in response to information transmitted from the sensor regarding the transonic flight condition, so as to mitigate a transonic shock wave." Appeal Br. 16 (Claims App.). Independent claim 12 recites "sensing, with a sensor, information that indicates that the aircraft is approaching a transonic flight condition"; "providing the information . . . from the sensor to a controller that is configured to use the information . . . to determine whether activation of the plasma generator will mitigate a transonic shock wave"; and "activating a plasma generator upon determining that activation of the plasma generator will mitigate a transonic shock wave." *Id.* at 18 (Claims App.). Neither independent claim 1 nor independent claim 12, nor any of dependent claims 2–11 and 13–24, expressly discloses a structure for, or step of, determining from the information sensed and transmitted by the sensor, that the aircraft is approaching a transonic flight condition. *Id.* at 16–21 (Claims App.).

In describing the sensor, Appellants' Specification states that "[t]he sensor may be configured to sense and transmit a variety of information

regarding a transonic flight condition such as speed to the controller" and that "[t]he controller may be configured to activate the plasma generator in response to information from the sensor, so as to mitigate a transonic shock wave through localized heating." Spec., para. 5. The Specification also discloses that "[t]he information sensed by the sensor . . . may include *any number of variables*, such as speed, altitude, temperature, angle of attack, attitude, *or any other indicator that the aircraft . . . is approaching transonic or supersonic flight*." *Id.*, para. 18 (emphasis added); *see also id.*, para. 24 (describing a method in which, "[a]t step S2, the sensor . . . may sense the information regarding the transonic flight condition, such as speed, altitude, temperature, angle of attack, attitude, etc." and, "[a]t step S3, the sensor . . . may transmit the information . . . to the controller"). The Specification describes that "[t]he sensor . . . may be configured to sense and transmit information regarding at least one transonic flight condition, such as speed, altitude, temperature, angle of attack, attitude, etc." *Id.*, para. 20. The Specification sets forth that "[i]n some aspects, the sensor . . . may be configured to sense multiple transonic flight conditions, either simultaneously, or in turn," while "[i]n other aspects, the sensor . . . may sense only a single unique transonic flight condition." *Id.* The Specification adds that, "[i]n some aspects, one or more additional sensors may be used in conjunction with the sensor." *Id.* Thus, according to the Specification, "any number of sensors may be used to sense and transmit any of a number of flight variables useful in enhancing operations of the aircraft." *Id.*

Appellants' Specification provides no limitations as to placement of the sensor. *Id.* In particular, the Specification discloses that "[t]he sensor

. . . may be inside the aircraft . . ., outside or on the exterior . . . of the aircraft . . ., or elsewhere." *Id.*

Appellants' Specification discloses that "[u]pon *determination that a transonic flight condition is present*, the controller . . . may activate the plasma generator . . . in response to the information transmitted from the sensor . . . regarding the transonic flight condition." Spec., para. 18 (emphasis added). Notably, however, the Specification does not disclose any algorithm, methodology, or other details as to how the "determination that a transonic flight condition is present" is made, nor does the Specification provide any indication that a methodology for making such a determination was known in the art at the time the present application was filed.

Written Description

Pursuant to our authority under 37 C.F.R. § 41.50(b), we reject claims 1–24 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

In order to satisfy the written description requirement of 35 U.S.C. § 112, first paragraph, "the description must 'clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.'" *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (citing *Vas–Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed.Cir.1991)). "[T]he test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Id.* This test "requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the

art." *Id.* "Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed." *Id.* This inquiry is a question of fact. *Id.* (*citing Ralston Purina Co. v. Far-Mar-Co, Inc.*, 772 F.2d 1570, 1575 (Fed. Cir. 1985)).

As noted in our findings above, Appellants' Specification alludes to a non-exhaustive list of variables, such as speed, altitude, temperature, angle of attack, attitude, or other indicators that the aircraft is approaching a transonic flight condition. However, the Specification does not disclose which combination of such variables are required to be sensed in order to indicate that the aircraft is approaching a transonic flight condition. In fact, to the contrary, the Specification suggests that the sensor may be configured to sense and transmit only a single unique variable, or, in some aspects, any number of variables. Further, the Specification does not disclose whether there are particular threshold values for any such sensed variables, which, when reached or exceeded, would indicate that the aircraft is approaching a transonic flight condition, and, if so, what those threshold values are. Along those same lines, the Specification is silent as to particular combinations of variables for which the sensed values of multiple variables must be considered in conjunction with one another to determine whether the aircraft is approaching a transonic flight condition, or the conditions, if any, under which the sensed values of such multiple variables must be considered together. Likewise, the Specification does not specify for which particular variable(s), or under which particular conditions, the value of one variable alone is sufficient to make such a determination. Moreover, the Specification fails to specify at what locations of an aircraft (or elsewhere)

any particular combination of such variables must be sensed. As also noted above, Appellants' Specification does not provide any algorithm or methodology for determining from the information sensed by the one or more sensors that the aircraft is approaching a transonic flight condition, nor does the Specification give any indication that an algorithm or methodology was known in the art at the time the present application was filed.

In essence, Appellants attempt to claim any and all means or steps of sensing/detecting that an aircraft is approaching a transonic flight condition without disclosing sufficient means or steps to accomplish that function, thus running afoul of the written description requirement. *See Ariad*, 598 F.3d at 1352 ("The written description requirement also ensures that when a patent claims a genus by its function or result, the specification recites sufficient materials to accomplish that function."). Appellants' claims "merely recite a description of the problem to be solved while claiming all solutions to it," leaving the industry to "complete an unfinished invention." *See id.* at 1353. Thus, Appellants' disclosure fails to convey that, at the time the present application was filed, Appellants had possession of a system comprising "a sensor configured to sense and transmit information that indicates that the aircraft is approaching a transonic flight condition" or a method comprising "sensing, with a sensor, information that indicates that the aircraft is approaching a transonic flight condition." Accordingly, claims 1–24 fail to comply with the written description requirement of 35 U.S.C. § 112, first paragraph.

Enablement

Pursuant to our authority under 37 C.F.R. § 41.50(b), we reject claims 1–24 under 35 U.S.C. § 112, first paragraph, as failing to satisfy the enablement requirement.

Insofar as the enablement requirement is concerned, the dispositive issue is whether an applicant's disclosure, considering the level of ordinary skill in the art as of the date of the application, would have enabled a person of such skill to make and use the applicant's invention without undue experimentation. *In re Strahilevitz*, 668 F.2d 1229, 1232 (CCPA 1982). In calling into question the enablement of an applicant's disclosure, the USPTO has the initial burden of advancing acceptable reasoning inconsistent with enablement so as to shift the burden to the applicant to show that one of ordinary skill in the art could have practiced the claimed invention without undue experimentation. *Id.*

Factors to be considered in determining whether a disclosure would require undue experimentation 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. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

As indicated in our findings above, Appellants' Specification provides no discernible guidance as to which variable(s) or combinations of variables must be sensed, or the locations (on the aircraft or elsewhere) at which those variables must be sensed, in order to indicate that the aircraft is approaching a transonic flight condition. Further, despite alluding broadly to

"determination that a transonic flight condition is present" (Spec., para. 18), the Specification provides no algorithm, methodology, or other details as to how such a determination would be made from the information sensed and transmitted by the nonspecific sensors, nor do we discern in this record any evidence showing that such an algorithm or methodology was known to those of ordinary skill in the art at the time the present application was filed.

The Specification enumerates several variables that may be sensed by the sensor, but provides no working examples of a particular variable or combination of variables sensed by the sensor, or the requisite threshold values thereof, if any, that indicate the aircraft is approaching a transonic flight condition. Further, the Specification is silent as to how, if at all, the sensed value of one variable might impact the significance of another sensed variable in indicating whether the aircraft is approaching a transonic flight condition.

Additionally, the claims are broad in scope, in that they do not recite a structure for, or step of, determining that the aircraft is approaching a transonic flight condition, much less set forth any operative connection between the sensed information and a structure for, or step of, determining that the aircraft is approaching a transonic flight condition. As such, the claims seek to cover any and all means of sensing/detecting that an aircraft is approaching a transonic flight condition without disclosing sufficient means or steps to accomplish that function.

For the above reasons, the subject matter of claims 1–24 is not disclosed in the present application so as to enable one skilled in the art to make and/or use the claimed invention. Accordingly, claims 1–24 fail to satisfy the enablement requirement of 35 U.S.C. § 112, first paragraph.

Indefiniteness

Pursuant to our authority under 37 C.F.R. § 41.50(b), we reject claims 1–24 under 35 U.S.C. § 112, second paragraph, as being indefinite.

For the above reasons, persons having ordinary skill in the art would not be able to ascertain whether a particular sensor or combination of sensors is "configured to sense and transmit information that indicates that the aircraft is approaching a transonic flight condition," as called for in independent claim 1 and its dependent claims 2–11 and 23, or whether sensing and transmitting information from a particular sensor or combination of sensors is performed in such a manner that the sensed information "indicates that the aircraft is approaching a transonic flight condition," as called for in independent claim 12 and its dependent claims 13–22 and 24. Without sufficient understanding of the methodology of determining that an aircraft is approaching a transonic flight condition, one of ordinary skill in the art would not be able to ascertain the scope of "information that indicates that the aircraft is approaching a transonic flight condition," as called for in independent claims 1 and 12. Merely by way of example, it is not clear whether "information that indicates that the aircraft is approaching a transonic flight condition" requires information denoting that a variable has reached or exceeded a certain threshold value indicating the aircraft is approaching a transonic flight condition. In the case of a speed sensor, for example, it is not clear whether the presence and operation of a speed sensor is sufficient, without more, to satisfy the "information that indicates that the aircraft is approaching a transonic flight condition" limitations of independent claims 1 and 12, or whether sensing a speed having a value meeting or exceeding a predetermined threshold level is required.

Moreover, as noted above, none of the claims contains an explicit recitation of a structure for, or step of, determining from the information sensed and transmitted by the sensor that the aircraft is approaching a transonic flight condition. Without such a structure or step, it is not clear how information sensed by a sensor indicates that the aircraft is approaching a transonic flight condition, as recited in claims 1 and 12. In contesting the anticipation rejection, Appellants argue that Drouin's sensors "do not necessarily determine whether the aircraft is approaching a transonic condition" (Appeal Br. 13), which suggests that Appellants might be advocating that we construe the "information that indicates that the aircraft is approaching a transonic flight condition" limitation as requiring the function of determining whether the aircraft is approaching a transonic flight condition to be a function performed by the sensor. To the extent that this may be the case, one of ordinary skill in the art would not be able to ascertain, for the reasons set forth above, what is required for the sensors to perform this function, the details of which are not disclosed in the present application.

For the above reasons, claims 1–24 are indefinite.

DECISION

The Examiner's decision rejecting claims 1–20, 23, and 24 under 35 U.S.C. § 102(b) and rejecting claims 21 and 22 under 35 U.S.C. § 103(a) is REVERSED.

Pursuant to our authority under 37 C.F.R. § 41.50(b), we reject claims 1–24 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement; we reject claims 1–24 under 35 U.S.C.

§ 112, first paragraph, as failing to comply with the enablement requirement; and we reject claims 1–24 under 35 U.S.C. § 112, second paragraph, as being indefinite.

FINALITY OF DECISION

This decision contains new grounds of rejection pursuant to 37 C.F.R. § 41.50(b). 37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review." 37 C.F.R. § 41.50(b) also provides:

> When the Board enters such a non-final decision, the appellant, within two months from the date of the decision, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:
>
> (1) *Reopen prosecution.* Submit an appropriate amendment of the claims so rejected or new Evidence relating to the claims so rejected, or both, and have the matter reconsidered by the Examiner, in which event the prosecution will be remanded to the Examiner. The new ground of rejection is binding upon the examiner unless an amendment or new Evidence not previously of Record is made which, in the opinion of the examiner, overcomes the new ground of rejection designated in the decision. Should the examiner reject the claims, appellant may again appeal to the Board pursuant to this subpart.
>
> (2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same Record. The request for rehearing must address any new ground of rejection and state with particularity the points believed to have been misapprehended or overlooked in entering the new ground of rejection and also state all other grounds upon which rehearing is sought.

Further guidance on responding to a new ground of rejection can be found in the Manual of Patent Examining Procedure § 1214.01.

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).

REVERSED; 37 C.F.R. § 41.50(b)