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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RICHARD A. HIMMELMANN

Appeal 2019-006100
Application 15/631,151
Technology Center 2800

Before JEFFREY B. ROBERTSON, JULIA HEANEY and JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant[1] requests review under 35 U.S.C. § 134(a) of the Examiner's final rejection of claims 1–7 and 9–23.[2] We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] We use the word "Appellant" to refer to the "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies United Technologies Corp. as the real party in interest. Appeal Brief filed May 17, 2019 ("Appeal Br.") at 1.
[2] Final Office Action entered November 15, 2018 ("Final Act.") at 1.

CLAIMED SUBJECT MATTER

Appellant claims a propulsion system for an unmanned underwater vehicle (independent claim 1), a method for propelling an unmanned underwater vehicle (independent claim 13), and an unmanned underwater vehicle (independent claim 19). Appeal Br. 2–3. Claim 1 illustrates the subject matter on appeal and reads as follows:

> 1. A propulsion system for an unmanned underwater vehicle comprising:
>
> a turbine engine including a combustor, a turbine, and a mechanical output shaft;
>
> an electrical generator including a rotational input connected to the mechanical output shaft, and a poly phase electrical output;
>
> a direct current (DC) bus connected to the poly phase electrical output via a rectifier/inverter;
>
> a DC to alternating current (AC) motor drive including a DC input and a poly phase motor drive output;
>
> a motor connected to the poly phase motor drive output; and
>
> a controller controllably coupled to the electrical generator, the rectifier/inverter, and the DC to AC motor drive,
>
> wherein the controller is configured to cause the propulsion system to operate in a range mode by providing direct current (DC) power to the DC bus from an electrical energy storage system, providing DC power from the DC bus to the DC to alternating current (AC) motor drive, and driving the motor in the range mode and
>
> configured to cause the propulsion system to enter a sprint mode of operations by *initiating operations of the turbine engine* providing a rotational output to the electrical generator, thereby providing poly phase AC power to the rectifier/inverter from the electrical generator, converting AC power to DC power using the rectifier/inverter, providing DC power to the DC to AC motor drive, and driving the motor.

Appeal Br. 7 (Claims Appendix) (emphasis and indentation added).

REJECTIONS

The Examiner maintains the following rejections in the Examiner's Answer entered June 14, 2019 ("Ans."):

I. Claims 1–18 and 21–23 under 35 U.S.C. § 112(b) as indefinite for failing to particularly point out and distinctly claim the subject matter that the inventor regards as the invention;

II. Claims 1–7, 10–14, 16–18, and 21–23 under 35 U.S.C. § 103 as unpatentable over Barrett[3] in view of Herbek;[4]

III. Claim 9 under 35 U.S.C. § 103 as unpatentable over Barrett in view of Herbek and Raju;[5]

IV. Claim 15 under 35 U.S.C. § 103 as unpatentable over Barrett in view of Herbek and Levedahl;[6] and

V. Claims 19 and 20 under 35 U.S.C. § 103 as unpatentable over Benavidas[7] in view of Herbek.

FACTUAL FINDINGS AND ANALYSIS

Upon consideration of the evidence relied upon in this appeal and each of Appellant's contentions, we affirm the Examiner's rejections of claims 1–7, 9–18, and 21–23 under 35 U.S.C. § 103 (Rejections II, III, and IV), for the reasons set forth in the Final Action, the Answer, and below. We summarily affirm the Examiner's rejection of claims 1–18 and 21–23 under 35 U.S.C. § 112(b) (Rejection I), and rejection of claims 19 and 20 under 35 U.S.C. § 103 (Rejection V), because Appellant does not contest

[3] Barrett et al., US 2009/0156068 A1, published June 18, 2009.
[4] Herbek et al., US 2012/0015567 A1, published January 19, 2012.
[5] Raju, US 2008/0143182 A1, published June 19, 2008.
[6] Levedahl, US 5,684,690, issued November 4, 1997.
[7] Benavides et al., US 9,764,727 B1, issued September 19, 2017.

these rejections.

We review appealed rejections for reversible error based on the arguments and evidence the Appellant provides for each issue the Appellant identifies. 37 C.F.R. § 41.37(c)(1)(iv); *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (cited with approval in *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (explaining that even if the Examiner had failed to make a prima facie case, "it has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections")).

Rejection II

We first address the Examiner's rejection of claims 1–7, 10–14, 16–18, and 21–23 under 35 U.S.C. § 103 as unpatentable over Barrett in view of Herbek.

Appellant presents arguments directed to independent claims 1 and 13, which Appellant argues together, and to claim 6, which depends from claim 1. Appeal Br. 4–6. We, therefore, select claim 1 as representative of claims 1–7, 10–14, 16–18, and 21–23, which stand or fall with claim 1, and address claim 6 separately. 37 C.F.R. § 41.37(c)(1)(iv).

Claims 1–5, 7, 10–14, 16–18, and 21–23

Barrett discloses a hybrid propulsion system for a marine vessel comprising main propulsion engines 10, 10', auxiliary generators 34, 34' (electrical generators), motor-generator units 14, 14' (motors), batteries 24, 24' (electrical energy storage system), DC bus 20, and energy management system (controller). Barrett ¶¶ 2, 31, 35, 36, 37, 44; Fig. 1. Barrett discloses that main propulsion engines 10, 10' have output shafts (mechanical output shafts) connected to inputs (rotational inputs) for auxiliary generators 34, 34'

(electrical generators), and the output shafts includes clutches 15, 15' that permit main engines 10, 10' to be connected or disconnected. Barrett ¶¶ 31, 33, 34, 35, 36; Fig. 1. Barrett discloses that motor-generator units 14, 14' (motors) have output shafts that include clutches 16, 16', and Barrett explains that when clutches 16, 16' are engaged, motor-generator units 14, 14' (motors) operate as motors, and when clutches 16, 16' are not engaged, motor-generator units 14, 14' (motors) operate as generators that supply energy to the system. Barrett ¶ 34; Fig. 1.

Barrett discloses that AC buses 30, 30' (poly phase electrical output) link auxiliary generators 34, 34' (electrical generators) to direct current (DC) bus 20 through DC/AC converters 32, 32' (rectifier/inverters). Barrett ¶ 37; Fig. 1. Barrett discloses that drivers 22, 22' (motor drives including inputs and outputs) connect motor-generator units 14, 14' (motors) to direct current (DC) bus 20. Barrett ¶ 35; Fig. 1.

Barrett discloses that the energy management system (controller) "controls many aspects of operation of the propulsion system . . . to operate the various propulsion sources, and distribute energy throughout the system." Barrett ¶ 63. Barrett discloses that the energy management system (controller) responds to varying load demands by changing operation states and outputs of main engines 10, 10', motor-generator units 14, 14', auxiliary generators 34, 34', and batteries 24, 24'. *Id.* Barrett describes a "low propulsive power mode of operation" in which "[m]ain propulsive engines 110 and 110' are not activated," "energy is shuttled from battery bank 124 [electrical energy storage system] to bus 120," and motor-generators 114, 114' (motors) "in a drive motor mode." Barrett ¶ 49; Fig 2B. Barrett describes "full power operating mode" in which "both main engines 110,

110' provide full power output," auxiliary generators 134, 134' (electrical generators) operate "to provide energy to main energy distribution bus 120", and motor-generator units 114, 114' (motors) operate and draw energy from bus 120 to provide propulsive power. Barrett ¶¶ 61–62; Fig. 5B.

Barrett does not explicitly disclose that main propulsion engines 10, 10' are turbine engines, but Barrett discloses that main propulsion engines 10, 10' may be diesel engines "or other types of prime mover engines." Barrett ¶¶ 7, 31. Barrett further discloses that gas turbine engines are used conventionally as power sources for propulsion systems. Barrett ¶ 4.

The Examiner finds that Barrett does not disclose that marine vessels in which Barrett's hybrid propulsion system may be used include unmanned underwater vehicles. Final Act. 5. The Examiner relies on Herbek's disclosure of a propulsion system for an unmanned underwater vehicle for suggesting use of Barrett's hybrid propulsion system in an unmanned underwater vehicle. Final Act. 5–6 (citing Herbek ¶ 3).

Appellant argues that "at no point does Barrett describe entering the full power mode illustrated in Figure 5B by initiating a turbine, nor is there any disclosure within Barrett that would have rendered this operation obvious." Appeal Br. 4–5. Appellant argues that Herbek also "would not have rendered this feature obvious." Appeal Br. 5.

We point out initially that the Examiner does not rely on Herbek for any disclosure that teaches or would have suggested entering a full power mode by initiating a turbine. Final Act. 5–6. Appellant's argument directed to the asserted lack of disclosure of this feature in Herbek, therefore, does not identify reversible error in the Examiner's rejection, because it does not address the basis for the Examiner's reliance on Herbek.

As discussed above, Barrett discloses that the main propulsion engines in Barrett's hybrid propulsion system may be diesel engines "or other types of prime mover engines," and Barrett discloses that gas turbine engines are conventional power sources used for propulsion systems. Barrett ¶¶ 4, 7, 31. One of ordinary skill in the art would have understood from these disclosures that gas turbine engines could be used as the main propulsion engines in Barrett's system. *In re Baird*, 16 F.3d 380, 383 (Fed. Cir. 1994) (when analyzing obviousness, a prior art reference must be considered "not only for what it expressly teaches, but also for what it fairly suggests.")

As also discussed above, Barrett discloses that in the "low propulsive power mode of operation" of Barrett's system, battery bank 124 provides energy to bus 120 to power motor-generators 114, 114' (motors). Barrett ¶ 49; Fig 2B. As the Examiner finds in the Answer, Barrett discloses that "[m]ain propulsive engines 110 and 110' are not activated in this operating mode and are thus shown in a light typeface [in Figure 2B], with main engine clutches 115, 115' disengaged." Ans. 4 (citing Barrett ¶ 29; Fig. 2B). Barrett also discloses a full power mode of operation (discussed above) in which turbine engines 110, 110' are connected to Barrett's system via clutches 115, 115'. Barrett ¶ 61; Fig. 5B. The Examiner finds that Barrett discloses that "[i]n the full power operating mode illustrated in FIG. 5B, both main engines 110, 110' provide full power output, through appropriate clutch mechanisms." Ans. 4 (citing Barrett ¶ 61; Fig. 5B).

In view of these disclosures in Barrett—particularly Barrett's statement in paragraph 49 that the main propulsive engines are not "activated" in the low power mode, and statement in paragraph 61 that the main propulsive engines are "connected" in the full power mode—the

Examiner determines that a distinction does not exist between "activating" main propulsive engines as disclosed in Barrett, and "initiating operations of" a turbine engine, as recited in claim 1. Ans. 4.

Appellant argues in the Reply Brief that paragraph 38 of Appellant's Specification "defines initiation of the turbine as beginning turbine operations and not merely engaging an already operating turbine via a clutch." Reply Br. 2. Appellant argues that the Examiner's finding that Barrett discloses entering a full power mode by "activating" main propulsive engines relies on an "overly broad equivocation of initiating and engaging." *Id.*

Appellant's Specification, however, explicitly indicates that paragraph 38 describes an ***exemplary*** process for initiating operations of a turbine. Spec. ¶¶ 37, 38. Contrary to Appellant's arguments, the process described in this paragraph, therefore, does not constitute a definition of "initiating operations of a turbine" that limits the scope of this phrase as it is used in claim 1. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) ("[L]imitations are not to be read into the claims from the specification."); *E-Pass Techs., Inc. v. 3Com Corp*., 343 F.3d 1364, 1369 (Fed. Cir. 2003) (claims must be interpreted "'in view of the specification'" without importing limitations from the specification into the claims unnecessarily (citation omitted)). Appellant does not direct us to any actual definition or limiting description of "initiating operations of a turbine" in the Specification, and we find no such disclosure. We, accordingly, interpret "initiating operations of a turbine" according to its plain and ordinary meaning. *In re ICON Health and Fitness, Inc*., 496 F.3d 1374, 1379 (Fed. Cir. 2007) (During prosecution of patent applications, "the PTO must give

claims their broadest reasonable construction consistent with the specification. . . . Therefore, we look to the specification to see if it provides a definition for claim terms, but otherwise apply a broad interpretation."); *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989) (the words of a claim must be given their plain meaning unless the plain meaning is inconsistent with the specification.).

"Initiate" is defined as "to cause or facilitate the beginning of; set going." Merriam-Webster.com (accessed September 27, 2020), https://www.merriam-webster.com/dictionary/initiate. Accordingly, under a broadest reasonable interpretation consistent with Appellant's Specification, "initiating operations of a turbine" as recited in claim 1 refers to any process that causes or facilitates the beginning of, or sets going, operations of a turbine.

As discussed above, one of ordinary skill in the art would have understood that gas turbine engines could be used as the main propulsion engines in Barrett's hybrid propulsion system. Engaging clutches 115, 115' to *activate* main propulsive engines 110, 110' (gas turbine engines) as disclosed in Barrett is a process that causes or facilitates the beginning of, or sets going, operation of main propulsive engines 110, 110' (gas turbine engines), corresponding to "initiating operations of a turbine" as recited in claim 1.

Appellant's arguments to the contrary, therefore, do not identify reversible error in the Examiner's rejection of claims 1–5, 7, 10–14, 16–18, and 21–23 under 35 U.S.C. § 103, which we accordingly sustain.

Claim 6

Claim 6 depends from claim 2, which depends from claim 1. Claim 2

recites that the electrical energy storage system (battery) is connected to the DC bus and configured to provide electrical power to the DC bus. Claim 6 recites that a magnitude of power provided by the electrical energy storage system (battery) to the DC bus is at least one order of magnitude less than a magnitude of power provided to the DC bus from the electrical generator.

The Examiner finds that Barrett discloses that in the full power operating mode of Barrett's hybrid propulsion system, the magnitude of power provided by battery bank 24 (electrical energy storage system) to DC bus 20 is less than the magnitude of power provided by auxiliary generators 34, 34' (electrical generators) to DC bus 20. Final Act. 6. The Examiner finds that Barrett, however, does not explicitly disclose providing a magnitude of power by battery bank 24 (electrical energy storage) to DC bus 20 that is at least one order of magnitude less than the magnitude of power provided by auxiliary generators 34, 34' (electrical generators) to DC bus 20. *Id.* The Examiner explains that "it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. Final Act. 6 (citing *In re Antonie*, 559 F.2d 618 (Fed. Cir. 1977)). The Examiner concludes that it would have been obvious to one of ordinary skill in the art to find the optimum magnitude of power provided by each of Barrett's battery bank 24 (electrical energy storage system) and auxiliary generators 34, 34' (electrical generators) to DC bus 20 "to adequately design the system, based on [power] requirements." Final Act. 6–7.

Appellant argues that the Examiner does not provide "any evidence establishing that the ratio between the magnitude of power provided by the electrical energy storage system and the electrical generator is a result effective variable." Appeal Br. 5. Appellant argues that "the examiner's

assertion that the claimed ratio is a result-effective variable is not sufficient to establish that the ratio is a result effective variable." Appeal Br. 5–6.

Barrett discloses, however, that during the full power operating mode of Barrett's hybrid propulsion system, auxiliary generators 134, 134' (electrical generators) operate "to provide energy to main energy distribution bus 120," and excess energy available on DC bus 20 is returned to battery bank 124, which "operates in a charging mode." Barrett ¶ 61; Fig. 5B. Barrett's Figure 5B depicts this operating mode, and uses arrows to show energy flowing from auxiliary generators 134, 134' (electrical generators) to DC bus 120, and from DC bus 120 to battery bank 124. Notably, when describing this operating mode, Barrett does not indicate that any energy flows from battery bank 124 to DC bus 120, and Figure 5B does not include arrows that would indicate any such energy flow. Barrett ¶ 61; Fig. 5B. Rather, as discussed above, Barrett explicitly discloses that during this operating mode energy flows from DC bus 120 to battery bank 124. *Id.*

Barrett thus discloses that during the full power mode of operating Barrett's system, energy flows from auxiliary generators 134, 134' (electrical generators) to DC bus 120, and energy does not flow from battery bank 124 to DC bus 120, but, rather, flows from DC bus 120 to battery bank 124. Based on this disclosure, one of ordinary skill in the art reasonably would have understood that the amount of power provided by battery bank 124 to DC bus 120 during this operating mode is at least one order of magnitude less than the amount of power provided by auxiliary generators 134, 134' (electrical generators) to DC bus 120, due to the fact that no energy flows from battery bank 124 to DC bus 120. *KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 418 (2007) ([A]n obviousness analysis "need not

seek out precise teachings directed to the specific subject matter of the challenged claim, for [an examiner] can take account of the inferences and creative steps that a person of ordinary skill in the art would employ."); *see also In re Preda*, 401 F.2d 825, 826 (CCPA 1968) ("[I]t is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.").

Barrett's disclosures thus support the position the Examiner takes in rejecting claim 6. We, accordingly, sustain the Examiner's rejection of claim 6 under 35 U.S.C. § 103.

Rejections III and IV

To address the Examiner's rejection of claim 9 under 35 U.S.C. § 103 as unpatentable over Barrett in view of Herbek and Raju (Rejection III), and rejection of claim 15 under 35 U.S.C. § 103 as unpatentable over Barrett in view of Herbek and Levedahl, Appellant relies on the arguments Appellant presents for Rejection II (discussed above), and argues that the additional references applied in these rejections fail to cure the deficiencies of Barrett and Herbek. Appeal Br. 6. Because Appellant's arguments do not identify reversible error in the Examiner's rejection of claim 1 for the reasons discussed above, Appellant's arguments also do not identify reversible error in the Examiner's rejection of claims 9 and 15, which we accordingly sustain.

Rejections I and V

We summarily sustain the Examiner's rejection of claims 1–18 and 21–23 under 35 U.S.C. § 112(b) (Rejection I), and rejection of claims 19 and

20 under 35 U.S.C. § 103 (Rejection V), without further comment because Appellant does not contest these rejections. Appeal Br. 3–4; 37 C.F.R. § 41.37(c)(1)(iv); *see also* Manual of Patent Examining Procedure (MPEP) § 1205.02 (9th ed. Jan. 2018) ("If a ground of rejection stated by the examiner is not addressed in the appellant's brief, appellant has waived any challenge to that ground of rejection and the Board may summarily sustain it, unless the examiner subsequently withdrew the rejection in the examiner's answer.").

CONCLUSION

Claims	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–18, 21–23	112(b)	Indefiniteness	1–18, 21–23	
1–7, 10–14, 16–18, 21–23	103	Barrett, Herbek	1–7, 10–14, 16–18, 21–23	
9	103	Barrett, Herbek, Raju	9	
15	103	Barrett, Herbek, Levedahl	15	
19, 20	103	Benavidas, Herbek	19, 20	
Overall Outcome			1–7, 9–23	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED