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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ZAFFIR A. CHAUDHRY

Appeal 2018-004181
Application 14/315,396
Technology Center 3700

Before PHILLIP J. KAUFFMAN, TARA L. HUTCHINGS, and
ALYSSA A. FINAMORE, *Administrative Patent Judges*.

HUTCHINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1–14 and 16–22. We have jurisdiction under § 6(b). We REVERSE.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Our Decision references Appellant's Appeal Brief (“Appeal Br.,” filed Oct. 13, 2017), Reply Brief (“Reply Br.,” filed Mar. 13, 2018), and Specification (“Spec.,” filed June 26, 2014), and the Examiner's Answer (“Ans.,” mailed Jan. 25, 2018), Advisory Action (“Adv. Act.,” mailed June 30, 2017), and Final Office Action (“Final Act.,” mailed Apr. 19, 2017). Appellant identifies the applicant, United Technologies Corporation as the real party in interest. Appeal Br. 1.

CLAIMED INVENTION

Appellant's claimed invention relates to "provid[ing] an effective, lightweight fan variable area nozzle for a gas turbine engine" for an aircraft. Spec. ¶ 7.

Claims 1, 14, and 17 are the independent claims on appeal. Claim 1, reproduced below, is illustrative of the claimed subject matter.

1. A nacelle assembly for a gas turbine engine comprising:

a core nacelle defined about an axis for allowing core flow to pass therethrough;

a fan nacelle mounted at least partially around said core nacelle, said fan nacelle having a fan variable area nozzle that defines a fan exit area between said fan nacelle and said core nacelle, said nozzle having a plurality of pivotable flaps pivotable about a pivot defined by each one of said plurality of pivotable flaps;

a cable passing through an orifice defined by at least one of said plurality of pivotable flaps; and

an actuator system operable to mechanically retract said cable therein pivoting at least one of said flaps about said pivot to lessen said fan exit area and mechanically extend said cable to enable bypass flow to pivot at least one of said flaps about said pivot and increase said fan exit area, wherein said actuator system is engaged with said cable, and a segment of said cable, opposite said actuator system, is attached to a fixed structure of the fan nacelle.

REJECTIONS²

Claims 14, 16, and 21 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with written description requirement.

² The Examiner has withdrawn the rejection of claim 17 as indefinite. *See* Adv. Act. 2.

Claims 1–10 and 21 are rejected under 35 U.S.C. § 103(a) as unpatentable over Rey (US 6,318,070 B1, iss. Nov. 20, 2001), Arnold (US 7,458,221 B1, iss. Dec. 2, 2008), Kallal (US 2,634,578, iss. Apr. 14, 1953), Rozmus (US 5,295,645, iss. Mar. 22, 1994), Barooah (US 6,543,224 B1, iss. Apr. 8, 2003), and Stevenson (US 2,515,274, iss. July 18, 1950).

Claims 1–10 and 21 are rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, Ivie (US 4,850,535, iss. July 25, 1989), and Aalto (US 5,829,464, iss. Nov. 3, 1998).

Claim 11 is rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, Stevenson, and Adamson (US 4,251,987, iss. Feb. 24, 1981).

Claim 11 is rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, Ivie, Aalto, and Adamson.

Claims 12 and 13 are rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, Stevenson, and Webb (US 5,110,069, iss. May 5, 1992).

Claims 12 and 13 are rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, Ivie, Aalto, and Webb.

Claims 14 and 16 are rejected under 35 U.S.C. § 103(a) as unpatentable over Rozmus, Kallal, and Rey.

Claims 17, 18, and 22 are rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Kallal, Arnold, and Rozmus.

Claim 19 is rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Kallal, Arnold, Rozmus, Barooah, and Stevenson.

Claim 19 is rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Kallal, Arnold, Rozmus, Barooah, Ivie, and Aalto.

Claim 20 is rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Kallal, Arnold, Rozmus, and Webb.

Claim 20 is rejected under 35 U.S.C. § 103(a) as unpatentable over Rey, Kallal, Arnold, Rozmus, and Devaud (US 4,825,754, iss. May 2, 1989).

ANALYSIS

Written Description

We are persuaded by Appellant’s argument that the Examiner erred in rejecting independent claim 14 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. *See* Appeal Br. 9–10; *see also* Reply Br. 8. The Examiner finds that there is no written description support for the limitation “a segment of said cable, opposite said actuator, is attached to a fixed structure,” as recited in independent claim 14. *See* Final Act. 3. Appellant argues that the Specification at Figure 2C and paragraph 49 provides support for this claim limitation. Appeal Br. 9–10; *see also* Spec. ¶ 49, Fig. 2C.

The Examiner acknowledges that Appellant’s Specification describes with reference to Figure 2C that “cable 58 is wound around a spool 66 at one end segment 58A while the other end segment 58B is attached to a fixed attachment[,], such as one of the fixed structure[s] 34R.” Final Act. 3 (quoting Spec. ¶ 49). However, the Examiner takes the position that the claimed “fixed engagement point” (i.e., “second end [of the cable is] engaged with a first engagement point of said structure”) and the claimed

“fixed structure” (i.e., “a segment of said cable . . . is attached to a fixed cable”) refer to the same structure. *See* Adv. Act. 2 (“Appellant’s argument misses the point. . . . Claim 14 cannot use two different claim limitations to describe the same structure.”); *see also* Ans. 54 (“**Claim 14** cannot use two different claim limitations to describe the same structure.”).

However, we agree with Appellant (*see* Reply Br. 8) that the Specification discloses a plurality of fixed fan nacelle structures 34R, individual ones of which could correspond to the claimed “fixed engagement point” and the claimed “fixed structure,” respectively. That is, one fixed fan nacelle structure 34R can constitute the claimed “fixed engagement point” and another fixed fan nacelle structure 34R can constitute the claimed fixed “structure,” but a single fixed fan nacelle structure cannot and does not constitute both claim elements.

For example, the Specification at Figure 2A shows cable 58 passing through eyelets in fixed fan nacelle structures 34R. The Specification describes that cable 58 “engages each flap 50 at a flap engagement point 60 and a multiple of fixed fan nacelle structures 34R or such like at a fixed engagement point 62.” Spec. ¶ 46. Cable 58 preferably passes through one fixed engagement point 62, a flap engagement point 60, and a second fixed engagement point 62, such that the flap engagement point 60 is intermediate the fixed engagement points 62. *Id.* ¶ 47 (citing Fig. 2C). The fixed engagement point 62 and flap engagement point 60 “are generally eyelets or [the] like[,] which permit the cable to be strung therethrough.” *Id.* ¶ 47. Referring to Figure 2C, the actuator engages an end segment 58A of the cable 58 that is wound around spool 66, “while the other end segment is attached to a fixed attachment[,] such as one of the fixed structure[s] 34R.”

Id. ¶ 49. Cable 58 is spooled or unspooled to decrease or increase its circumferential length, thereby adjusting flaps 50 to decrease or increase the fan nozzle exit area. *Id.* ¶¶ 48–49.

We find that the Specification at Figures 2A and 2C and paragraphs 44 through 49 conveys with reasonable clarity to those skilled in the art that Appellant, as of the filing date, was in possession of the claimed invention. Therefore, we do not sustain the rejection of independent claim 14 and dependent claim 16 under 35 U.S.C. § 112, first paragraph, for failure to comply with the written description requirement.

The Examiner finds that claim 21 recites claim language similar to claim 14, and rejects claim 21 under 35 U.S.C. § 112, first paragraph, for reasons similar to those set forth in the rejection of claim 14. *See* Ans. 54 (finding that claim 21 also uses two different claim limitations to describe the same structure); *see also* Final Act. 4–5. Therefore, we do not sustain the rejection of claim 21 under 35 U.S.C. § 112, first paragraph, for failure to comply with the written description requirement for the same reasons described above with respect to claim 14.

Obviousness

Independent Claim 1 and Dependent Claims 2–10 and 21

We are persuaded by Appellant’s arguments that the Examiner erred in rejecting independent claim 1 under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, and Stevenson, because the combination does not teach or suggest that “a segment of said cable, opposite said actuator system, is attached to a fixed structure of the fan nacelle,” as recited in claim 1. *See* Reply Br. 2–7, *see also* Appeal Br. 3–6.

In rejecting claim 1, the Examiner finds that Rey describes a variable area nozzle that uses a shape memory alloy (“SMA”) cable to pivot the flaps of a variable area nozzle based on an application of heat. Ans. 3 (citing Rey, Figs. 1–3), 7 (citing Rey 4:10–20, 32–43, 64–67, 6:40–52, Figs. 2, 3, 9). The Examiner applies Arnold for teaching that SMA ropes or strands can be replaced with an ordinary cable driven by a motor. Ans. 24; *see also* Final Act. 13 (citing Arnold 4:41–43, 9:56–61). Additionally, the Examiner applies Kallal to teach mechanically retracting an ordinary cable 7 using a motor 8 and spool 9. Ans. 25.

The Examiner acknowledges that a combination of Rey, Arnold, and Kallal does not teach that a segment of the cable opposite the actuator system is attached to a fixed structure of the fan nacelle, as required by claim 1. Final Act. 13; *see also* Ans. 10 (finding that Rey’s figures do not show how SMA cable 68, opposite actuator system 81, terminates). However, the Examiner finds that Rey teaches that cable 68 “may be terminated in a variety of conventional mechanical terminations that are typically used in conventional wire rope making art.” *Id.* (citing Rey 4:10–20, Fig. 6). The Examiner additionally finds that Rozmus teaches “a cable end termination opposite said actuator system (35) attached to a fixed structure (51 or 23, 25, 26 or 83) within a variable area nozzle (15).” Final Act. 13 (citing Rozmus 4:64–5:52); *see also* Ans. 13. In the Answer, the Examiner annotates Figure 11 of Rozmus to indicate a cable end engaged with a “first fixed engagement” point 83, a segment of cable attached to a “fixed structure” as eyelet 84, and a second “fixed engagement point” at sheath 23. Ans. 25. The Examiner, however, has not established that the cited portions of Rey and Rozmus teach the argued limitation.

Rey describes that “SMA actuators 68 formed from substantially flexible SMA strands, can be terminated in a variety of different arrangements.” Rey 6:65–7:3 (emphasis omitted). In particular, “the SMA strands 70 formed into arrays 72 can be also terminated in a variety of conventional mechanical terminations that are typically used in conventional wire rope making art.” *Id.* at 6:67–7:3. To the extent that the Examiner finds this portion of Rey suggests attaching an end segment of SMA cable 68 to a fixed structure of a fan nacelle, we disagree. The cited portion of Rey refers to the process of forming the SMA cable, e.g., treating the end comprising a plurality of ends in the manner similar to a rope comprising a plurality structure. The cited portion of Rey does not adequately describe or suggest attaching cable 68 to any fixed structure.

Also, we agree with Appellant (*see* Reply Br. 5) that Rozmus does not teach the argued claim limitation. Rozmus describes, with reference to Figures 2A, 2B, 3, and 4, a nozzle actuation system for a scale model aircraft that uses push-pull wire 35 threaded through eyelets that are attached to each blade 40 of nozzle 15 by rivet 42.³ Rozmus 4:57–66. Rozmus teaches that wire 35 first enters through entry eyelets 50 and 51, then passes through each eyelet 45 to completely circumscribe the inside periphery of nozzle 15, and finally reenters first and second entry eyelets 50, 51, anchoring wire 35 to second entry eyelet 51. *Id.* at 6:67–7:12, Figs. 2A–2B. Because activation wire 35 is anchored to eyelet 51, when push-pull wire 35 is withdrawn (pulled) from entry eyelet 50, the circumscribed diameter of wire

³ Rozmus describes that wire is used in the scale model, but in a full scale, operational aircraft, an actuation rod appropriate for the application would be used. *See* Rozmus 3:45–57.

loop decreases, closing the nozzle exit opening. *Id.* at 5:6–12. In contrast, when wire 35 is pushed or advanced into entry eyelet 50, the diameter of the wire loop within eyelets 45 increases, opening the nozzle. *Id.* at 5:12–18. With respect to Figures 7, 10, and 11, Rozmus describes a similar embodiment in which eyelets 70 are incorporated into hinge plates instead of rivets. *Id.* at 5:28–30, 39–40. In that embodiment, actuation wire 35 enters entry eyelet 86 of plate 55, eyelet 71, and proceeds circumferentially around the nozzle until reentering entry eyelets and being rigidly affixed to anchor eyelet 83 of plate 53.

Thus, Rozmus teaches terminating wire 35 at anchor eyelet 51 (embodiment shown in Fig. 2A), and terminating wire 35 at anchor eyelet 83 (embodiment shown in Fig. 11). But neither of these anchor eyelets is “a fixed structure of the fan nacelle,” as required by claim 1. *See* Final Act. 13 (identifying anchor eyelet 51 and 83 as a fixed structure). Instead, anchor eyelets 51, 83 are disposed on a blade 40 of the nozzle 15 by a rivet and hinge plate, respectively. Thus, we disagree with the Examiner’s finding that Rozmus’s anchor eyelet 51 of the embodiment shown in Figure 2A or anchor eyelet 83 of the embodiment shown in Figure 11 teaches that a segment of the cable opposite the actuator system 35 is attached to a fixed structure of the fan nacelle, as require by claim 1. *See* Final Act. 13.

We also disagree with the Examiner’s alternative finding that Rozmus’s elements 23, 25, and 26 teach the claimed fixed structure. *See id.* (identifying sheath 23, push-pull rod 25, and stud 26 as a fixed structure). Rozmus describes that sheath 23 extends from an anchoring bracket 21 on attachment ring 20 to within close proximity of entry eyelet 51. *See* Rozmus 5:19–23, Fig. 2A. Rozmus provides that in scale model aircraft it is

desirable to replace a traditional metal bowden cable comprising a wire passing through a flexible metal sheath with a flexible plastic bowden cable comprising a hollow plastic sheath having a plastic push-pull rod 25. *See id.* at 5:66–6:5. However, plastic push-pull rod 25 requires a transition piece to metal wire 35. *Id.* at 6:8–11. To this end, Rozmus describes extending wire 35 through a central bore of stud 26, such that an end of wire 35 is fixed at an axial end of stud 26 by a globule of solder. *Id.* at 6:16–22, Fig. 9. At the opposite end of stud 26, another globule of solder secures the wire, and stud 26 is threaded into an inside diameter of push-pull rod 28. *Id.* at 6:23–31. The combination of elements 23, 25, and 26, thus, teaches an actuator system, attached to a fixed structure 20, engaged with wire 35. But elements 23, 25, 26 do not teach a segment of the cable, opposite the actuator, being attached to a fixed structure of the fan nacelle, as required by claim 1.

In the Answer, the Examiner reasons that a person of ordinary skill in the art would have understood that Rey's SMA cable 68 was terminated/attached to a fan nacelle rib 83 because Rey's ribs 83 "were the only structural members in the downstream end portion of the fan nacelle capable of carrying the structural load of the SMA cable (68)." Ans. 10. Here, the Examiner ostensibly speculates that Rey inherently discloses attaching the SMA cable to a fan nacelle rib. However, to establish inherency, more than speculation is required. In particular, the Examiner must provide evidence and/or technical reasoning that makes "clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268

(Fed.Cir.1991). “Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Id.* at 1269 (quoting *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981)).

The Examiner’s reliance on the remaining references does not cure these deficiencies. Therefore, we do not sustain the rejection of independent claim 1, and dependent claims 2–10 and 21 under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, and Stevenson.

The Examiner rejects claim 1 under 35 U.S.C. §103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, Ivie, and Aalto based on the same erroneous findings described above with respect to the rejection of claim 1 under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, and Stevenson. Therefore, we do not sustain the rejection of independent claim 1, and dependent claims 2–10 and 21 under 35 U.S.C. § 103(a) as unpatentable over Rey, Arnold, Kallal, Rozmus, Barooah, Ivie, and Aalto for the same reasons.

Dependent Claims 11–13

None of the Examiner’s rejections of claims 11–13 under 35 U.S.C. § 103(a) remedy the deficiencies set forth above with respect to the rejections of independent claim 1 under 35 U.S.C. § 103(a). Therefore, we do not sustain the rejections of claims 11–13 for the same reasons set forth above with respect to the rejections of independent claim 1.

Independent Claim 14 and Dependent Claim 16

We are persuaded that the Examiner erred in rejecting independent claim 14 under 35 U.S.C. § 103(a) as unpatentable over Rozmus, Kallal, and Rey, because the Examiner improperly interprets the claimed phrases

“second end engaged with a first fixed engagement point of said structure” and “a segment of said cable . . . is attached to a fixed structure” as describing the same structure, and then applies this erroneous interpretation to find that Rozmus teaches these claim limitations. *See* Final Act. 25–27; *see also id.* at 54 (rejecting claim 14 for failing to comply with the written description because “[c]laim 14 cannot use two different claim limitations to describe the same structure.”)

For example, with respect to the limitation regarding a first fixed engagement point, the Examiner identifies an end of Rozmus’s cable 35 located at anchor eyelet 83 of Figure 11 as the claimed second end of a cable engaged with a first fixed engagement point. Final Act. 25 (“a second end (83 – Fig. 11)”). Then, the Examiner finds that Rozmus’s anchor 83 teaches a fixed engagement point attached to structure 20 via hinge plate 53 and hinge 41, as required by claim 14. *See id.* (“[f]ixed engagement point (83 - eyelet) . . . [is] attached to structure (20)”).

Turning to the limitation regarding a fixed structure, the Examiner identifies the same end of the cable (namely, the end of the cable 35 positioned at anchor 83 of Figure 11) as the claimed segment of the cable. *Id.* The Examiner then finds that the same attachment of cable 35 at anchor 83 that is relied upon for teaching the claimed “second end engaged with a first fixed engagement point” also teaches the claimed “segment of cable . . . attached to a fixed structure.” *Id.* at 25–26 (“a segment of said cable, opposite (opposite end of cable from the end of the cable engaged with said actuator system) said actuator system, is attached to a fixed structure (83 – Fig. 11)”).

To the extent the Examiner determines that Rey, alone or in combination with Rozmus, suggests the limitation at issue (*see* Final Ans. 7 (citing Rey 7:1–3)), we disagree for the same reasons set forth above with respect to the rejections under 35 U.S.C. § 103(a) of independent claim 1.

Therefore, we reverse the Examiner’s rejection of independent claim 14 and dependent claim 16 under 35 U.S.C. § 103(a).

Independent Claim 17 and Dependent Claims 18 and 22

Independent claim 17 recites similar language to claim 1. The Examiner’s rejection of claim 17 under 35 U.S.C. § 103(a) as unpatentable over Rey, Kallal, Arnold, and Rozmus suffers the same deficiencies described with respect to the claim 1. Therefore, we do not sustain the rejection of independent claims 17, and claims 18 and 22 depending therefrom, under 35 U.S.C. § 103(a) as unpatentable over Rey, Kallal, Arnold, and Rozmus.

Dependent Claims 19 and 20

Claims 19 and 20 depend from independent claim 17. The Examiner’s rejections of claims 19 and 20 under 35 U.S.C. § 103(a) do not remedy the deficiencies set forth above with respect to the rejection of independent claim 17 under 35 U.S.C. § 103(a). Therefore, we do not sustain the rejections of claims 19 and 20 for the same reasons set forth above with respect to the rejections of independent claim 17.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
14, 16, 21	112, first paragraph	written description		14, 16, 21
1-10, 21	103(a)	Rey, Arnold, Kallal, Rozmus, Barooah, Stevenson		1-10, 21
1-10, 21	103(a)	Rey, Arnold, Kallal, Rozmus, Barooah, Ivie, Aalto		1-10, 21
11	103(a)	Rey, Arnold, Kallal, Rozmus, Barooah, Stevenson, Adamson		11
11	103(a)	Rey, Arnold, Kallal, Rozmus, Barooah, Ivie, Aalto, Adamson		11
12, 13	103(a)	Rey, Arnold, Kallal, Rozmus, Barooah, Stevenson, Webb		12, 13
12, 13	103(a)	Rey, Arnold, Kallal, Rozmus, Barooah, Ivie, Aalto, Webb		12, 13
14, 16	103(a)	Rozmus, Kallal, Rey		14, 16
17, 18, 22	103(a)	Rey, Kallal, Arnold, Rozmus		17, 18, 22
19	103(a)	Rey, Kallal, Arnold, Rozmus,		19

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19	103(a)	Rey, Kallal, Arnold, Rozmus, Barooah, Ivie, Aalto		19
20	103(a)	Rey, Kallal, Arnold, Rozmus, Webb		20
20	103(a)	Rey, Kallal, Arnold, Rozmus, Devaud		20
Overall Outcome				1-14, 16- 22

REVERSED