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CNH Industrial America LLC
Intellectual Property Law Department
700 STATE STREET
RACINE, WI 53404

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* ALESSANDRO BENEVELLI, SERGIO MAGRINI,  
and RICCARDO MORSELLI

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Appeal 2020-001208  
Application 14/775,253  
Technology Center 3700

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Before WILLIAM A. CAPP, JEREMY M. PLENZLER, and  
ERIC C. JESCHKE, *Administrative Patent Judges*.

CAPP, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant<sup>1</sup> seeks our review under 35 U.S.C. § 134(a) of the final rejection of claims 1, 2, 5, 7, 9–16, and 19–26. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies CNH Industrial America LLC as the Applicant and real party in interest. Appeal Br. 2.

## THE INVENTION

Appellant's invention relates to variable pitch fan blades. Spec. 1.  
Claim 1, reproduced below, is illustrative of the subject matter on appeal.

1. A variable pitch fan, comprising:
  - a plurality of blades;
  - a support configured to support the plurality of blades;
  - a rotor configured to rotate the support around a rotation axis, so that the plurality of blades rotate with the support to control an air flow;
  - an adjusting device configured to adjust a pitch of the plurality of blades by tilting each blade of the plurality of blades around a respective tilt axis of a plurality of tilt axes, the adjusting device comprising a plurality of driven members each fixed relative to a respective blade of the plurality of blades, wherein the adjusting device comprises:
    - a plurality of mechanical driving members supported by the support so as to rotate with the support, each mechanical driving member of the plurality of mechanical driving members being linearly displaceable relative to the support and being coupled to a respective driven member of the plurality of driven members so that a linear motion of each mechanical driving member of the plurality of mechanical driving members is converted into a rotary motion of the respective driven member of the plurality of driven members around the respective tilt axis of the plurality of tilt axes;
    - a transmission device configured to transmit the linear motion from an actuator to each mechanical driving member of the plurality of mechanical driving members, wherein the transmission device comprises a plurality of discrete bodies contained inside a tubular guide;
    - a pin connected to the actuator and partially contained inside the tubular guide, wherein the pin is configured to transmit a thrust from the actuator to the plurality of discrete bodies,
    - wherein the tubular guide extends along a transmission path interposed between the actuator and the plurality of mechanical driving members, the transmission path having an output portion coaxial with the rotation axis and an input portion extending at an angle relative to the rotation axis.

### THE REJECTIONS

The Examiner relies upon the following as evidence in support of the rejections:

NAME	REFERENCE	DATE
Seavey	US 3,084,852	Apr. 9, 1963
Lin	US 5,488,881	Feb. 6, 1996
Wheeler	US 5,931,637	Aug. 3, 1999
Natale	EP 0 967 104 A2	Dec. 29, 1999
McCallum	US 6,942,458 B2	Sept. 13, 2005
Morrissey	US 2006/0216663 A1	Sept. 28, 2006

The following rejections are before us for review:

1. Claims 1, 2, 5, 7, 9–11, 13–16, 19 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Natale, Lin, and McCallum.
2. Claim 12 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Natale, Lin, McCallum, and Seavey.
3. Claims 21, 24, and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Natale, Wheeler, and Morrissey.
4. Claims 22 and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Natale, Wheeler, Morrissey, Lin, and McCallum.
5. Claim 26 is are rejected under 35 U.S.C. § 103(a) as being unpatentable over Natale, Wheeler, Morrissey, and McCallum.

### OPINION

*Unpatentability of Claims 1, 2, 5, 7, 9–11, 13–16, 19 and 20  
over Natale, Lin, and McCallum*

Appellant argues these claims as a group. Appeal Br. 8–13. Claim 1 is representative. *See* 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds that Natale discloses the invention substantially as claimed except for the tubular guide, pin, and input angle. Final Act. 4–5. The Examiner finds that Lin teaches the tubular guide and pin and that McCallum teaches the input angle. *Id.* at 5–6. The Examiner concludes that it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Natale by the teachings of Lin and McCallum. *Id.* at 6. According to the Examiner, a person of ordinary skill in the art would have done this to facilitate maintenance access and reduce the size of various components. *Id.*

Appellant first argues that a person of ordinary skill in the art would not have been motivated to modify Natale with the teachings of Lin and McCallum. Appeal Br. 8–9. According to Appellant, Natale already teaches an embodiment where motor 43 is disposed outside of support 121. *Id.* at 8. Appellant concludes that: “Because Natale discloses an embodiment that provides the advantages suggested by the examiner, it is unclear why one skilled in the art would be motivated to interpose the Lin balls/guide between the Natale screw 43a and Natale element 142 in the embodiment of FIG. 3 of Natale.” *Id.*

Appellant’s argument is not persuasive as it is built on a faulty premise, namely, that a person of ordinary skill in the art thinks that there is only one way to do things. To Appellant, the skilled artisan would not consider other, predictable alternatives to the specific embodiments disclosed by Natale. To the contrary, however, “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). Such an artisan is presumed to know something about the art apart from what the references disclose. *See In re Jacoby*, 309 F.2d 513, 516 (CCPA 1962). Variable pitch propellers

have been used in the aviation industry since well before the Second World War.<sup>2</sup> Over that prolonged period of time, practitioners have no doubt experimented with a wide variety of mechanisms to vary the pitch of a propeller blade. Some of such techniques are summarized, for example, in the Wheeler prior art reference. Wheeler, col. 1, l. 14 – col. 2, l. 2. It is well settled that if a person of ordinary skill can implement a predictable variation of a known work, section 103 likely bars its patentability. *KSR*, 550 U.S. at 417.

Lin teaches a mechanical transmission that features rolling bodies confined within a guide channel. Lin, Abstract, Figs. 1, 2. Lin further teaches that it was known to use a compression spring to bias the mechanism to return to its initial position after work is performed. *Id.* col. 1, ll. 15–34; col. 5, l. 66 – col. 6, l. 2. In a similar manner, Appellant uses actuator 20 to activate worm gear 21 which, in turn, causes axial movement of pin 24 that pushes spheres 22 through tubular guide 23, to cause axial movement of shaft 27 and end element 28. Spec. p. 7, l. 20 – p. 8, l. 26. This mechanism, in turn, causes movement of control element 7, which causes fan blades 2 to rotate about axis Z by means of a rack and pinion arrangement (elements 4 and 5). *Id.* p. 5, l. 24 – p. 6, l. 5. Appellant also features spring 30 that biases control element 7 against axial movement of shaft 27 and end element 28. *Id.* p. 8, ll. 30–34; Fig. 3.

Natale teaches a variable pitch fan arrangement for conveying air to vehicle radiators. Natale ¶ 57. Natale discloses embodiments where motor 43 is disposed, alternatively, inside and outside of support 21. *Id.*

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<sup>2</sup> [https://en.wikipedia.org/wiki/Variable-pitch\\_propeller#:~:text=In%201919%20L.,pitch%20at%20any%20engine%20RPM](https://en.wikipedia.org/wiki/Variable-pitch_propeller#:~:text=In%201919%20L.,pitch%20at%20any%20engine%20RPM). accessed October 5, 2020.

¶¶ 15–18, Figs 2b, 3. Appellant presents neither evidence nor persuasive technical reasoning that tends to show that modifying Natale with Lin’s rolling unit transmission is anything more than a predictable variation of Natale that requires no more than ordinary skill. *KSR*, 550 U.S. at 417. The mere fact that Natale already discloses one embodiment where the motor resides outside of support 21 does not negate the prospect that a person of ordinary skill in the art would have considered further modifications and improvements. *See Dystar Textilfarben GmbH & Co, v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006) (explaining that the desire to improve a product is universal—and even common-sensical).

Even if we were to consider Appellant’s arguments, which are based on the Figure 2b embodiment of Natale rather than the Figure 3 embodiment relied on by the Examiner (*we sustain the Examiner’s findings based on the Figure 3 embodiment*), we would, nevertheless, find such argument unpersuasive. In Natale’s Figure 2b embodiment, disk 42 is translated by means of screw 43a, operated by motor 43, which is arranged outside of support 21. Natale, ¶ 14, Fig. 2a. The Examiner could just as easily have modified the Figure 2b embodiment by substituting the sphere and tubular guide mechanism of Lin for the screw means of Natale. *See e.g.*, Natale, Figs. 1, 5. Such would have entailed nothing more than a simple substitution of one known element for another to achieve a predictable result. *KSR*, 550 U.S. at 416, *United States v. Adams*, 383 U.S. 39, 50–51 (1966) (explaining that when claiming a structure that is altered by the mere substitution of one known element for another, the combination must do more than yield a predictable result). Appellant presents neither evidence nor persuasive technical reasoning that modifying the Figure 2b embodiment of Natale entails more than such a simple substitution. In sum, whether we

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look to the Figure 2b embodiment or the Figure 3 embodiment of Natale, claim 1 is obvious over the combination of Natale, Lin, and McCallum.

Appellant criticizes the Examiner for failing to provide “objective evidence” of the reason why one skilled in the art would have been motivated to modify Natale in the manner proposed. Appeal Br. 11. Appellant provides no description of what kind of “objective evidence” Appellant believes is required. Neither does Appellant provide any legal authority that purports to require such otherwise non-descript “objective evidence.” *Id.* Contrary to Appellant’s unsubstantiated legal position, the correct legal standard is for the Examiner to supply “articulated reasoning with rational underpinning” to support combining or modifying the prior art. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), cited with approval in *KSR*, 550 U.S. at 418. The Examiner is deemed to be a person of scientific competence. *In re Berg*, 320 F.3d 1310, 1315 (Fed. Cir. 2003). As such, the Examiner makes findings, informed by scientific knowledge, as to the meaning of prior art references to persons of ordinary skill in the art and the motivation those references would provide to such persons. *Id.* Absent legal error or contrary factual evidence, those findings can establish a prima facie case of obviousness. *Id.* In the absence of contrary factual evidence from Appellant, the Examiner’s stated reason, i.e., maintenance access, constitutes articulated reasoning with rational underpinning and is sufficient to support the rejection. Final Act. 3; *Kahn*, 441 F.3d at 988.

Finally, Appellant argues that the Examiner’s proposed modification changes the principle of operation of Natale. Appeal Br. 11. Appellant believes that the “principle of operation” of Natale is to provide a motor that causes axial movement of element 142 in two directions by turning screw 43a. *Id.* Natale discloses motor 43 that actuates screw 43a and causes

axial displacement of disk 42 in either direction. Natale, ¶ 31. In the Examiner's proposed modification, bi-directional movement used to vary blade pitch is achieved in a first direction by an axial force imparted via an output and in a second, opposite direction by means of a biasing spring. Ans. 9. Thus, in each instance, axial motion is generated in two opposing directions and such axial motion is converted into rotational movement to vary the pitch of a fan blade. Natale's principle of operation is thus maintained.

The Examiner's findings of fact are supported by a preponderance of the evidence and the Examiner's legal conclusion of unpatentability is well-founded. In view thereof, we sustain the Examiner's unpatentability rejection of claims 1, 2, 5, 7, 9–11, 13–16, 19 and 20.

*Unpatentability of Claim 12  
over Natale, Lin, McCallum, and Seavey*

Claim 12 depends directly from claim 11 and indirectly from claim 1. Claims App. Appellant does not argue for the separate patentability of claim 12 apart from arguments presented with respect to claim 1, which we have previously considered. We sustain the Examiner's rejection of claim 12. *See* 37 C.F.R. § 41.37(c)(1)(iv) (failure to separately argue claims constitutes a waiver of arguments for separate patentability).

*Unpatentability of Claims 21, 24, and 25  
over Natale, Wheeler, and Morrissey.*

Appellant argues claims 21, 24, and 25 as a group. Appeal Br. 13. Claim 21 is representative. 37 C.F.R. § 41.37(c)(1)(iv). Claim 21 is an independent claim that differs from claim 1 in that it requires a control unit that is configured to perform a calibration process in response to start-up of

the vehicle. Claims App. The Examiner relies on Wheeler as disclosing a fan assembly of pitch adjustable blades with blade pitch sensors that communicate with a control unit. Final Act. 14. The Examiner relies on Morrissey as disclosing a system controller that performs a calibration process at start up. *Id.*

Appellant appears to concede that Wheeler discloses calibration of the physical pitch of aircraft propeller blades with a cockpit display of pitch angle. Appeal Br. 14. However, Appellant contends that Wheeler fails to explicitly disclose “when” calibration occurs. *Id.* “Wheeler does not appear to provide any indication that the display 432 is calibrated in response to start-up of the aircraft.” *Id.* Appellant argues that Morrissey is directed to calibrating fan speed at start-up of an explosive gas incinerator system, not a vehicle. *Id.*

Wheeler is directed to a variable pitch aircraft propeller. Wheeler, col. 1, ll. 8–11. Wheeler’s system displays the current pitch to the pilot. *Id.* col. 4, ll. 44–53. To calibrate the display to the actual pitch angle, Wheeler drives the propeller blades to an “extreme” pitch and then calibrates the display to the known pitch. *Id.* col. 4, ll. 53–56. In summary, Wheeler teaches that it was known, in the prior art, to calibrate a display to an actual pitch angle. Thus, the combination of Natale and Wheeler explicitly teach all of the elements of claim 21, except for “when” the calibration takes place. This, in a nutshell, is the focus of Appellant’s opposition to the rejection of claim 21. Appeal Br. 13–16.

The Examiner merely relies on Morrissey for an explicit teaching that it is known, in the prior art, to perform a calibration procedure upon system start-up. Final Act. 14; Ans. 12. Wheeler comes from the field of aviation. Aviation practitioners, in general, and pilots, in particular, know that a pre-

flight checklist is performed to determine if aircraft systems are functioning in a safe manner before the aircraft taxis to the runway for takeoff (i.e., shortly after “start-up” of the aircraft). Wheeler explicitly discloses that propeller pitch is calibrated using an “extreme” pitch. Wheeler, col. 4, ll. 51–56. In reading such disclosure, a pilot or other aviation practitioner would immediately recognize and understand that such calibration would typically be performed on the ground before the aircraft takes off into the air. In view of common sense, safety considerations, no reasonable, knowledgeable aviation practitioner would interpret Wheeler as suggesting that the propeller blades be driven to an “extreme” pitch in-flight in order to calibrate the actual blade pitch with a cockpit display. Thus, we are of a mind that Morrissey’s teaching on the issue at hand is somewhat superfluous, if not unnecessary. Nevertheless, the Examiner’s decision to rely on Morrissey, given the simplicity of the issue at hand (choosing start-up as the time to perform calibration), is entirely appropriate. *See Application of Heldt*, 433 F.2d 808, 812 (CCPA 1970) (explaining that, in cases involving relatively simple, everyday-type concepts, it is not unreasonable to permit inquiry into areas where one of even limited technical skill would be aware that similar problems exist).

Here, Appellant presents neither evidence nor persuasive technical reasoning to support an argument that Wheeler’s calibration would likely be performed at some time other than system start-up. Neither does Appellant convincingly explain why performing calibration upon start-up is innovative, requires more than ordinary skill, or produces unexpected results.

In view of the foregoing discussion, we determine the Examiner's findings of fact are supported by a preponderance of the evidence and that the Examiner's legal conclusion of unpatentability is well-founded.

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Accordingly, we sustain the Examiner's unpatentability rejection of claims 21, 24, and 25.

*Unpatentability of Claims 22 and 23  
over Natale, Wheeler, Morrissey, Lin, and McCallum*

These claims depend, directly or indirectly, from claim 21 and are not separately argued. Claims App., Appeal Br. 16. The Examiner's rejection is sustained. 37 C.F.R. § 41.37(c)(1)(iv).

*Unpatentability of Claim 26  
over Natale, Wheeler, Morrissey, and McCallum.*

Claim 26 depends from claim 21 and is are not separately argued. Claims App., Appeal Br. 16. The rejection thereof is sustained. 37 C.F.R. § 41.37(c)(1)(iv).

CONCLUSION

<b>Claims Rejected</b>	<b>§</b>	<b>References</b>	<b>Affirmed</b>	<b>Reversed</b>
1, 2, 5, 7, 9-11, 13-16, 19, 20	103	Natale, Lin, McCallum	1, 2, 5, 7, 9-11, 13-16, 19, 20	
12	103	Natale, Lin, McCallum, Seavey	12	
21, 24, 25	103	Natale, Wheeler, Morrissey	21, 24, 25	
22, 23	103	Natale, Wheeler, Morrissey, Lin, McCallum	22, 23	
26	103	Natale, Wheeler, Morrissey, McCallum	26	
<b>Overall Outcome</b>			1, 2, 5, 7, 9-16, 19-26	

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