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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SEAN A. WHITEHURST

Appeal 2020-000256
Application 15/023,294
Technology Center 3700

Before JENNIFER D. BAHR, BRETT C. MARTIN, and
MICHELLE R. OSINSKI, *Administrative Patent Judges*.

BAHR, *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 1–8, 10–17, 19, and 20. 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. Appellant identifies the real party in interest as United Technologies Corporation. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Appellant’s invention is directed to “rotating assemblies for turbomachinery and, more specifically, to a fan blade assembly.” Spec. 1. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A fan blade assembly, comprising:
 - an electrically conductive airfoil including a sheath receiving surface, the sheath receiving surface coated with an electrically nonconductive material;
 - an electrically conductive sheath; and
 - an adhesive disposed on at least a portion of the electrically nonconductive material to bond the electrically conductive sheath to the electrically conductive airfoil at the sheath receiving surface, wherein the adhesive does not directly contact the sheath receiving surface, wherein the electrically nonconductive material is applied to the sheath receiving surface prior to the bonding of the sheath to the airfoil and wherein the electrically conductive airfoil comprises a first metal and the electrically conductive sheath comprises a second metal, wherein the first metal is different than the second metal.

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Bosselmann	US 2006/0012377 A1	Jan. 19, 2006
Deal	US 2011/0211967 A1	Sept. 1, 2011
Guglielmin	US 2012/0082559 A1	Apr. 5, 2012
Parkos	US 2012/0152893 A1	June 21, 2012
Murdock	US 2013/0156588 A1	June 20, 2013

REJECTIONS

Claims 1–6, 8, 10–15, 17, 19, and 20 stand rejected under 35 U.S.C. § 103 as unpatentable over Parkos.

Claim 3 stands rejected under 35 U.S.C. § 103 as unpatentable over Parkos and Guglielmin.

Claims 7 and 16 stand rejected under 35 U.S.C. § 103 as unpatentable over Parkos and Bosselmann.

Claims 1–6, 8, 10–15, 17, 19, and 20 stand rejected under 35 U.S.C. § 103 as unpatentable over Deal.

Claim 3 stands rejected under 35 U.S.C. § 103 as unpatentable over Deal and Guglielmin.

Claims 7 and 16 stand rejected under 35 U.S.C. § 103 as unpatentable over Deal and Bosselmann.

Claims 1–6, 8, 10–15, 17, 19, and 20 stand rejected under 35 U.S.C. § 103 as unpatentable over Murdock and Deal.

Claim 3 stands rejected under 35 U.S.C. § 103 as unpatentable over Murdock, Deal,² and Guglielmin.

Claims 7 and 16 stand rejected under 35 U.S.C. § 103 as unpatentable over Murdock, Deal,³ and Bosselmann.

OPINION

Claim Construction

Independent claims 1 and 12 recite “an adhesive disposed on at least a portion of the electrically nonconductive material to bond the electrically conductive sheath to the electrically conductive airfoil at the sheath receiving surface, wherein the adhesive does not directly contact the sheath receiving surface.” Appeal Br. 15, 17 (Claims App.). Consistent with

² We understand “Murdock as applied to claim 1 above” in the Examiner’s statement of the rejection to mean Murdock in view of Deal. Final Act. 18 (boldface omitted).

³ We understand “Murdock as applied to claim 1,12 above” in the Examiner’s statement of the rejection to mean Murdock in view of Deal. Final Act. 19 (boldface omitted).

Appellant’s underlying disclosure and the surrounding claim language, we construe the “sheath receiving surface” to be the surface of the electrically conductive airfoil beneath the electrically nonconductive material coated thereon (i.e., the surface of the electrically conductive airfoil beneath any coatings), and we construe the limitation “at the sheath receiving surface” to be merely a positional reference denoting the portion of the electrically conductive airfoil that is bonded, indirectly via the electrically conductive material coated onto the sheath receiving surface, to the sheath. If we were to construe “sheath receiving surface” as the surface of the “electrically nonconductive material,” this would conflict with the limitation that “the adhesive[, which is disposed on at least a portion of the electrically nonconductive material,] does not directly contact the sheath receiving surface.” If we were to construe “an adhesive . . . to bond the electrically conductive sheath to the electrically conductive airfoil at the sheath receiving surface” as requiring the adhesive to form a bond directly with “the sheath receiving surface,” then this would conflict with the limitation “the adhesive does not directly contact the sheath receiving surface.” It would be impossible for the adhesive to form a bond directly with “the sheath receiving surface” without directly contacting “the sheath receiving surface.”

Obviousness—Parkos

Appellant addresses claim 1 and claim 12 separately in contesting the rejection based on Parkos, but presents the same arguments for claim 12 as for claim 1. *See* Appeal Br. 6, 10. Thus, we address claims 1 and 12 together in reviewing this rejection. Appellant does not present any separate arguments for the dependent claims aside from relying on their dependence

from either claim 1 or claim 12. *Id.* at 8–10, 12–13. Accordingly, dependent claims 2–6, 8, 10, and 11 stand or fall with claim 1, from which they depend, and dependent claims 13–15, 17, 19, and 20 stand or fall with claim 12, from which they depend. *See* 37 C.F.R. § 41.37(c)(1)(iv) (permitting the Board to select a single claim to decide the appeal as to a single ground of rejection of a group of claims argued together).

Parkos discloses a fan blade comprising sheath 36 made of titanium alloy or other strong, protective material and airfoil 32 made of aluminum alloy or similar lightweight material. Parkos ¶ 19. Sheath receiving surface 58 of Parkos’s airfoil 32 has a thin layer of epoxy primer 56B applied thereto. *Id.*, Fig. 4A; ¶¶ 26, 31, 32. Parkos’s sheath 36 is secured to airfoil 32 by adhesive 59, with scrim sheet 60 embedded in adhesive 59 to provide “dielectric separation between airfoil 32 and sheath 36, preventing galvanic corrosion between the two different metal surfaces of airfoil 32 and sheath 36.” *Id.* ¶¶ 33–34; Fig. 4A. The Examiner reads the “electrically nonconductive material” of claims 1 and 12 on Parkos’s scrim sheet 60. *See* Ans. 3 (stating that “in Parkos the adhesive is disposed on at least a portion of the electrically nonconductive material, as it is embedded in the adhesive (59,60)”).

The Examiner, correctly, construes “wherein the electrically nonconductive material is applied to the sheath receiving surface prior to the bonding of the sheath to the airfoil” in claims 1 and 12 to be a product-by-process limitation that does not patentably distinguish claims 1 and 12 from Parkos’s fan blade. Final Act. 2–3, 6–7. The Examiner reaches this determination for two reasons. First, the Examiner finds that Parkos’s fan blade is the same as the claimed fan blade, regardless of whether the

electrically nonconductive material is applied to the sheath receiving surface prior to the bonding of the sheath to the airfoil. *Id.* at 3, 6. Second, the Examiner reasons that there are only a limited number of ways in which Parkos's fan blade could be assembled. *Id.* at 3, 6–7. Specifically, according to the Examiner, scrim sheet 60 embedded in adhesive 59 could first be applied to airfoil 32, and then sheath 36 could be bonded to airfoil 32 with scrim sheet 60 already adhered to airfoil 32; or scrim sheet 60 embedded in adhesive 59 could first be applied to sheath 36, and then airfoil 32 could be bonded to sheath 36 with scrim sheet 60 adhered to sheath 36. *See id.*

The patentability of a product does not depend on its method of production. If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process. *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985). Once the PTO has made out a prima facie case that the applicant's claimed product and the product of the prior art reasonably appear to be the same, the burden shifts to the applicant to prove otherwise. *Id.* The burden of proof on the PTO in making out a case of prima facie obviousness for product-by-process claims is less than when a product is claimed in the more conventional fashion. *In re Fessman*, 489 F.2d 742, 744 (CCPA 1974).

Appellant's fan blade, assembled as set forth in claims 1 and 12, comprises an electrically conductive sheath bonded to an electrically conductive airfoil, with adhesive and a nonconductive material between the sheath and the airfoil, and with the adhesive not in direct contact with the sheath receiving surface of the airfoil. Notably, claims 1 and 12 do not

exclude the presence of additional coatings or material between the electrically nonconductive material and the sheath receiving surface.

As is evident from Figures 4A and 4B of Parkos, Parkos's fan blade comprises electrically conductive sheath 36 bonded to electrically conductive airfoil 32, with adhesive 59 and electrically nonconductive scrim sheet 60 between sheath 36 and airfoil 32. Further, with Parkos's fan blade, adhesive 59 is not in direct contact with sheath receiving surface 58 of airfoil 32 because a thin layer of epoxy primer 56B separates adhesive 59 from sheath receiving surface 58. This structure results whether scrim sheet 60 is applied first to airfoil 32, first to sheath 36, or essentially simultaneously to both, in assembling Parkos's fan blade. Moreover, the Examiner's reasoning that the selection of any one of this finite number of ways to assemble Parkos's fan blade would have been obvious to a person having ordinary skill in the art is well founded. As stated by the Supreme Court:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 421 (2007).

Appellant argues that Parkos does not disclose or teach a fan blade "wherein the adhesive does not directly contact the sheath receiving surface," as recited in claims 1 and 12. Appeal Br. 6, 10. Appellant submits that "adhesive 59 of Parkos bonds directly to the sheath receiving surface and[,] thus, does indeed directly contact the sheath receiving surface." *Id.*

This argument is not persuasive because, as explained above, a thin layer of epoxy primer 56B separates adhesive 59 from sheath receiving surface 58 of Parkos's airfoil 32.

Appellant also argues that Parkos's primer 56B contains chromium (a metal) and, thus, is not a nonconductive material. Reply Br. 2. This argument is not persuasive because, as discussed above, the Examiner relies on Parkos's scrim sheet 60, not primer 56B, as the nonconductive material.

Additionally, Appellant submits that

the limitation of "wherein the electrically nonconductive material is applied to the sheath receiving surface prior to the bonding of the sheath to the airfoil" should be given patentable weight as claim 1 recites that "the adhesive does not directly contact the sheath receiving surface" thus, the limitation of "the electrically nonconductive material [being] applied to the sheath receiving surface prior to the bonding of the sheath to the airfoil" must occur first in order so that the aforementioned structural limitation of "the adhesive does not directly contact the sheath receiving surface" can occur.

Appeal Br. 6, 10.

This argument is not persuasive. Regardless of the order of assembly or application of the various components or layers of the fan blade, it is the presence of an intervening layer or material between the sheath receiving surface and the adhesive that prevents the adhesive from directly contacting the sheath receiving surface. As discussed above, Parkos's primer 56B serves this function so as to satisfy this limitation of claims 1 and 12.

For the above reasons, Appellant's arguments do not apprise us of error in the rejection of claims 1 and 12 as unpatentable over Parkos. Accordingly, we sustain the rejection of claims 1 and 12, as well as dependent claims 2-6, 8, 10, and 11, which fall with claim 1, and dependent

claims 13–15, 17, 19, and 20, which fall with claim 12, as unpatentable over Parkos.

Obviousness—Parkos in view of Guglielmin or Bosselmann

Appellant relies solely on the arguments presented for claims 1 and 12 in contesting the rejection of claim 3 as unpatentable over Parkos and Guglielmin and the rejection of claims 7 and 16 as unpatentable over Parkos and Bosselmann. *See* Appeal Br. 8–9, 13. For the reasons discussed above, these arguments do not apprise us of error in the rejection of claims 1 and 12 as unpatentable over Parkos and, likewise, fail to apprise us of error in the rejections of claims 3, 7, and 16. Accordingly, we sustain these rejections.

Obviousness—Deal

Appellant addresses claim 1 and claim 12 separately in contesting the rejection based on Deal, but presents the same arguments for claim 12 as for claim 1. *See* Appeal Br. 7, 11. Thus, we address claims 1 and 12 together in reviewing this rejection. Appellant does not present any separate arguments for the dependent claims aside from relying on their dependence from either claim 1 or claim 12. *Id.* at 8–10, 12–13. Accordingly, dependent claims 2–6, 8, 10, and 11 stand or fall with claim 1, from which they depend, and dependent claims 13–15, 17, 19, and 20 stand or fall with claim 12, from which they depend. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Deal discloses a fan blade comprising scrim sheet 62 adhered between sheath 34 and airfoil 32 by two layers of adhesive 60. *See* Deal, Fig. 3B; ¶¶ 58–59. “Scrim sheet 62 provides dielectric separation between airfoil 32 and sheath 34,” and, thus, comprises an electrically nonconductive material. *Id.* ¶ 65. Deal’s fan blade comprises adhesive 60 on sheath receiving surface 58 of airfoil 32 and adhesive 60 on the inside surface of sheath 34. *Id.*,

Fig. 3B; ¶¶ 58, 63. The Examiner reads the claimed “adhesive” on adhesive 60 on the inside surface of sheath 34. Final Act. 9 (stating that “adhesive in this broad interpretation is 60 as applied to the sheath bonding surface” (underlining omitted)), 12 (relying on the same findings and claim construction for claim 12).

The Examiner’s analysis regarding the product-by-process limitation “wherein the electrically nonconductive material is applied to the sheath receiving surface prior to the bonding of the sheath to the airfoil” in claims 1 and 12 in the rejection based on Deal is substantially similar to that discussed above in regard to the rejection based on Parkos. *See* Final Act. 9–10, 12.

Appellant points out that, in Deal’s fan blade, “adhesive 60 is disposed on both the sheath and the sheath receiving surface,” and submits that, thus, “Deal does not teach or disclose ‘an adhesive disposed on at least a portion of the electrically nonconductive material to bond the electrically conductive sheath to the electrically conductive airfoil at the sheath receiving surface, wherein the adhesive does not directly contact the sheath receiving surface.’” Appeal Br. 7, 11. This argument is not persuasive. As the Examiner explains, adhesive 60 on the inside surface of sheath 34 is disposed on scrim sheet 62 (the electrically nonconductive material), once the fan blade is assembled, and does not directly contact sheath receiving surface 58. *See* Ans. 5. We appreciate that the other layer of adhesive 60 on sheath receiving surface 58 directly contacts sheath receiving surface 58, but this is not the adhesive on which the Examiner reads the “adhesive” recited in claims 1 and 12. Further, as the Examiner observes, Appellant “does not claim that no adhesive is applied to the airfoil,” nor do claims 1 and 12 recite

“that the adhesive is applied to the [electrically nonconductive material] prior to bonding of the sheath to the airfoil.” *Id.*

Appellant also reiterates the argument, discussed above, that the limitation that the electrically nonconductive material is applied to the sheath receiving surface prior to bonding the sheath to the airfoil should be given patentable weight. Appeal Br. 7, 11. For essentially the same reasons discussed above in regard to the rejection based on Parkos, this argument is not persuasive. As is evident from Figure 3B of Deal, Deal’s fan blade comprises electrically conductive sheath 34 bonded to electrically conductive airfoil 32, with adhesive 60 on the inside surface of sheath 34, nonconductive scrim sheet 62, and adhesive 60 on sheath receiving surface 58 all disposed between sheath 34 and airfoil 32. Further, with Deal’s fan blade, adhesive 60 on the inside surface of sheath 34 (the adhesive on which the Examiner reads the claimed “adhesive”) is not in direct contact with sheath receiving surface 58 of airfoil 32 because scrim sheet 62 separates this adhesive 60 from sheath receiving surface 58. This structure results whether scrim sheet 62 is applied first to adhesive 60 on sheath receiving surface 58 of airfoil 32, first to adhesive 60 on the inside surface of sheath 34, or essentially simultaneously to both, in assembling Deal’s fan blade. Moreover, the Examiner’s reasoning that the selection of any one of this finite number of ways to assemble Deal’s fan blade would have been obvious to a person having ordinary skill in the art (Final Act. 10, 12) is well founded.

For the above reasons, Appellant does not apprise us of error in the rejection of claims 1 and 12 as unpatentable over Deal. Accordingly, we sustain the rejection of claims 1 and 12, as well as dependent claims 2–6, 8,

10, and 11, which fall with claim 1, and dependent claims 13–15, 17, 19, and 20, which fall with claim 12, as unpatentable over Deal.

Obviousness—Deal in view of Guglielmin or Bosselmann

Appellant relies solely on the arguments presented for claims 1 and 12 in contesting the rejection of claim 3 as unpatentable over Deal and Guglielmin and the rejection of claims 7 and 16 as unpatentable over Deal and Bosselmann. *See* Appeal Br. 8–9, 13. For the reasons discussed above, these arguments do not apprise us of error in the rejection of claims 1 and 12 as unpatentable over Deal and, likewise, fail to apprise us of error in the rejections of claims 3, 7, and 16. Accordingly, we sustain these rejections.

Obviousness—Murdock in view of Deal

Appellant addresses claim 1 and claim 12 separately in contesting the rejection based on Murdock and Deal, but presents the same arguments for claim 12 as for claim 1. *See* Appeal Br. 8, 12. Thus, we address claims 1 and 12 together in reviewing this rejection. Appellant does not present any separate arguments for the dependent claims aside from relying on their dependence from either claim 1 or claim 12. *Id.* at 8–10, 12–13.

Accordingly, dependent claims 2–6, 8, 10, and 11 stand or fall with claim 1, from which they depend, and dependent claims 13–15, 17, 19, and 20 stand or fall with claim 12, from which they depend. *See* 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds that Murdock discloses a fan blade assembly comprising an electrically conductive airfoil of a first metal including a sheath receiving surface coated with an electrically nonconductive material (polyurethane coating) and an electrically conductive sheath of a second metal different from the first metal, wherein the electrically nonconductive

material is applied to the sheath receiving surface prior to the sheath being bonded to the airfoil. Final Act. 14 (citing Murdock, Fig. 2; ¶¶ 37, 39–40). The Examiner finds that Murdock discloses using adhesive in other portions of the system for grounding purposes but does not expressly disclose an adhesive disposed on at least a portion of the electrically nonconductive material to bond the sheath to the airfoil. *Id.*

The Examiner finds that Deal teaches an adhesive disposed on at least a portion of an electrically nonconductive material to bond the sheath to the airfoil at the sheath receiving surface and determines it would have been obvious “to use an adhesive to bond the sheath to the receiving surface [of Murdock’s fan blade as taught by Deal] as this would allow for a strong connection between elements to prevent separation during use” and that “since the blade has a protective coating initially applied that the adhesive does not directly contact the sheath receiving surface as the protective coating would already have been in place.” Final Act. 15.

Appellant reiterates the argument, discussed above, that “Deal does not teach or disclose ‘an adhesive disposed on at least a portion of the electrically nonconductive material to bond the electrically conductive sheath to the electrically conductive airfoil at the sheath receiving surface, wherein the adhesive does not directly contact the sheath receiving surface’” as recited in claims 1 and 12, and, thus, does not cure the acknowledged deficiency in Murdock. Appeal Br. 8, 12. Appellant also repeats the argument that the limitation that the electrically nonconductive material is applied to the sheath receiving surface prior to bonding the sheath to the airfoil should be given patentable weight. *Id.* For the reasons discussed above, these arguments are not persuasive with respect to Deal. Moreover,

the argument attacks Deal individually, rather than the combination. As the Examiner points out, the rejection based on Murdock and Deal does not rely on Deal for either the electrically nonconductive material being applied to the sheath receiving surface prior to bonding the sheath to the airfoil or for the adhesive not directly contacting the sheath receiving surface. *See* Ans. 7. Rather,

Deal is specifically relied upon to teach “an adhesive disposed on at least a portion of the electrically nonconductive material to bond the electrically conductive sheath to the electrically conductive airfoil at the sheath receiving surface” specifically (60) on sheath 34 will be applied to the non-conductive material at time of bonding. Murdock teaches that there is an initial coating applied to the airfoil (28 Par 0037) where Murdock does not disclose how the sheath (37) is bonded to the airfoil and Deal is relied upon to cure this deficiency by teaching an adhesive disposed between the sheath and the non-conductive coating (Murdock: Par 0037) and thus in this combination the adhesive does not directly contact the sheath receiving surface due to the initial protective coating of Murdock.

Ans. 7–8. Appellant does not persuasively refute the Examiner’s findings or reasoning in this regard and, thus, does not apprise us of error in the rejection of claims 1 and 12 as unpatentable over Murdock and Deal. Accordingly, we sustain the rejection of claims 1 and 12, as well as dependent claims 2–6, 8, 10 and 11, which fall with claim 1, and dependent claims 13–15, 17, 19, and 20, which fall with claim 12, as unpatentable over Murdock and Deal.

Obviousness—Murdock and Deal in view of Guglielmin or Bosselmann

Appellant relies solely on the arguments presented for claims 1 and 12 in contesting the rejection of claim 3 as unpatentable over Murdock, Deal, and Guglielmin and the rejection of claims 7 and 16 as unpatentable over

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Murdock, Deal, and Bosselmann. *See* Appeal Br. 8–9, 13. For the reasons discussed above, these arguments do not apprise us of error in the rejection of claims 1 and 12 as unpatentable over Murdock and Deal and, likewise, fail to apprise us of error in the rejections of claims 3, 7, and 16.

Accordingly, we sustain these rejections.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-6, 8, 10-15, 17, 19, 20	103	Parkos	1-6, 8, 10-15, 17, 19, 20	
3	103	Parkos, Guglielmin	3	
7, 16	103	Parkos, Bosselmann	7, 16	
1-6, 8, 10-15, 17, 19, 20	103	Deal	1-6, 8, 10-15, 17, 19, 20	
3	103	Deal, Guglielmin	3	
7, 16	103	Deal, Bosselmann	7, 16	
1-6, 8, 10-15, 17, 19, 20	103	Murdock, Deal	1-6, 8, 10-15, 17, 19, 20	
3	103	Murdock, Deal, Guglielmin	3	
7, 16	103	Murdock, Deal, Bosselmann	7, 16	
Overall Outcome			1-8, 10-17, 19, 20	

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