

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KENG NAM CHEN and SHIH-TUNG NGIAM

Appeal 2007-2453
Application 10/638,581
Technology Center 1700

Decided: December 4, 2007

Before RICHARD E. SCHAFER, SALLY G. LANE and JAMES T. MOORE, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

DECISION ON APPEAL

1

2 STATEMENT OF CASE

3 The Appellants appeal under 35 U.S.C. § 134 (2002) from a final
4 rejection of claims 1, 3-9, 11-16, 18, and 20-22.¹ We have jurisdiction
5 under 35 U.S.C. § 6(b) (2002).

¹ Claims 2, 10, 17, and 19 have been canceled. Claims 23-30, although pending, have been withdrawn from consideration as directed to a non-elected invention. See the restriction requirement of March 14, 2005.

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1 The Appellants' claims are directed to a method for upgrading an
2 aluminide coating on a used turbine engine component to a platinum
3 aluminide coating.

4 Claims 1 and 12 are the only independent claims in the application.
5 The Appellants do not argue any claims or rejections separately. Therefore,
6 we select independent claim 1 to decide the appeal. 37 C.F.R.
7 § 41.37(c)(1)(vii)(2006). Accordingly, the remaining claims stand or fall
8 with claim 1.

9 Claim 1 reads as follows:

10 1. A method for upgrading an aluminide coating on a used
11 turbine engine component to a platinum aluminide coating, said
12 method comprising:

13 a) cleaning at least one surface of the component to
14 remove hot corrosion products from the surface without
15 damaging the aluminide coating by immersing the component
16 in a solution comprising acetic acid, wherein the solution has a
17 temperature of from about 120°F to about 200°F;

18 b) depositing a layer of platinum having a thickness of
19 from about 2 to about 20 microns onto the cleaned surface of
20 the component; and then

21 c) forming a second aluminide coating having a
22 thickness of from about 25 to about 75 microns on the surface
23 of the component.

THE REJECTION

Claims 1, 3-9, 11-16, 18, and 20-22 stand rejected under 35 U.S.C. § 103(a) (2004) over the combination of Conner (EP 1 013 787 A1) and Bowden, Jr. (US 5,938,855).

29 We AFFIRM.

1 ISSUE

2 Have the Appellants established that the Examiner erred in
3 determining that it would have been obvious to one of ordinary skill in the
4 art at the time the invention was made to combine the known elements of the
5 prior art for their known functions to arrive at the claimed subject matter?

6 FINDINGS OF FACT

7 The record supports the following findings of fact by a preponderance
8 of the evidence:

9 1. Diffusion aluminide coatings have found wide use in the art for
10 protecting the surfaces of used turbine engine components from oxidation
11 and hot corrosion. (Conner 1:23-29; Bowden, Jr., 1:20-24).

12 2. Platinum aluminum coatings are known in the art to further
13 improve resistance to corrosion and oxidation damage. (Conner 5:33-41;
14 Bowden 2:49).

15 3. Conner describes a method for restoring or enhancing a protective
16 aluminide coating on the component of a gas turbine engine. (1:1-9; 5:8-10;
17 8:3-6).

18 4. Conner describes selectively removing, by chemical means,
19 oxidation and corrosion products from the outer portion of the component
20 coating and retaining the inner portion of the coating. (5:11-22; 6:47-48).

21 5. Conner describes that removal of degraded surfaces can be
22 accomplished by a variety of published processes. (7:50-53).

23 6. Conner describes that after removing the oxidation and corrosion
24 products, a restoration metal (such as platinum) is deposited selectively on
25 the existing coating. (5:28-32).

1 7. Conner describes that the platinum is deposited to a thickness
2 which, when the metal is diffused with the inner coating portion, will be
3 within a “coating design thickness range of the original coating.” (5:33-36).

4 8. Conner describes that the coating design thickness for
5 diffusion aluminide is in the range of about 1-5 mils (25.4-127 microns).
6 (3:50-54; 5:37-41).

7 9. Conner describes that the deposited platinum thickness is
8 typically in the range of about 2.5-10 microns for gas turbine engine
9 components. (5:41-44).

10 10. Conner describes that after the platinum is deposited, an
11 aluminide coating is applied to the surface. (6:13-17).

12 11. Conner describes that the aluminide is applied using coating
13 parameters selected to maintain the “coating total thickness” within the
14 “coating design thickness range.” (2:34-38; 2:48-50; 6:17-23).

15 12. Conner describes that the new, aluminum enhanced outer coating
16 portion does not substantially increase the coating thickness, within the
17 coating design thickness range. (6:27-30).

18 13. One difference between Conner and the claimed invention is that
19 Conner does not expressly describe using acetic acid to clean the turbine
20 engine component.

21 14. Another difference between Conner and the claimed invention
22 is that Conner does not expressly describe the specific thickness of the
23 second aluminide coating.

24 15. Bowden, Jr. describes a process for removing dirt, contaminants

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1 and other foreign matter from components of gas turbine engines. (1:6-9;
2 2:23-26; 4:25-27).

3 16. Bowden, Jr. describes that the claimed process includes soaking
4 the component in a solution containing acetic acid. (2:29-31).

5 17. Bowden, Jr. describes that acetic acid solutions of the invention
6 are compatible with aluminide coatings, including platinum aluminides.
7 (2:47-50).

8 18. Bowden, Jr. describes that using acetic acid solution at room
9 temperature is preferred. (3:25-27).

19. Bowden, Jr. describes that using acetic acid solution having
temperatures as high as the boiling temperature of the acetic acid solution is
possible. (3:25-28).

PRINCIPLES OF LAW

“Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007).

20 “[I]n a section 103 inquiry, ‘the fact that a specific [embodiment] is
21 taught to be preferred is not controlling, since all disclosures of the prior art,
22 including unpreferred embodiments, must be considered.’” *Merck & Co.,*
23 *Inc. v. Biocraft Laboratories, Inc.*, 874 F.2d 804, 807 (Fed. Cir.
24 1989)(quoting *In re Lamberti*, 545 F.2d 747, 750 (C.C.P.A. 1976)).

1 ANALYSIS

2 Connor - Cleaning and Depositing a New Layer

3 The Examiner found that Conner describes a method for upgrading an
4 aluminide coating on a used turbine engine component to a platinum
5 aluminide coating. (Final Rejection, Apr. 18, 2006, p. 4, ll. 1-2). The
6 Examiner found that the method in Conner included cleaning at least one
7 surface of the component to remove hot corrosion products without
8 damaging the aluminide coating, depositing onto the cleaned surface a layer
9 of platinum having a thickness “of from about 2.5 to 10 microns,” and then
10 forming a second aluminide coating on the surface of the component. (*Id.* ll.
11 2-6).

12 The Examiner additionally found that Conner teaches a total coating
13 thickness in the range of about 1-5 mils (25-127 microns). The Examiner
14 found that Conner teaches a range for the platinum layer of 2.5-10 microns
15 and that this anticipates the applicant’s claimed ranges of 2-20 and 5-10
16 microns. (Final Rejection, Apr. 18, 2006, p. 4, ll. 6-9). From this, the
17 Examiner reasoned that Conner teaches a range for the aluminide coating
18 without the platinum layer of 15-124.5 microns and that this range
19 anticipates the applicant’s claimed ranges of 25-75 or 10-100 microns. (*Id.*
20 ll. 9-11). The Examiner also found that Conner teaches a production range
21 of 2-3 mils (approximately 50-75 microns). (*Id.* ll. 11-12).

22 The presently argued differences between Conner and the claimed
23 invention principally reside in the use of acetic acid as a specifically
24 identified chemical cleaner, and the precise thickness of the final aluminide
25 coating.

1

2 Bowden- Cleaning with Acid

3 The Examiner found that Bowden, Jr. teaches the use of an acetic acid
4 solution to remove corrosion products from a used turbine engine
5 component without damaging the aluminide coating. (Final Rejection, Apr.
6 18, 2006, p. 4, ll. 14-15). The Examiner also found that Bowden, Jr. teaches
7 that the acetic acid solution may have a temperature from about room
8 temperature up to the boiling point of the solution. (*Id.* p. 5, ll. 1-2).

9 The Examiner then concluded that one of ordinary skill in the art
10 would have been motivated at the time of invention to combine the process
11 of Conner with the use of acetic acid disclosed in Bowden, Jr. for its
12 damage-free removal of corrosion and ease of disposal. As a consequence,
13 the Examiner concluded that the claimed subject matter would have been
14 obvious. (Final Rejection, Apr. 18, 2006, p. 5, ll. 18-21).

15 The Appellants assert that a person of ordinary skill would have no
16 motivation to combine Conner and Bowden, Jr. to obtain the Applicant's
17 invention. Specifically, the Appellants challenge the Examiner's finding
18 that it would have been obvious to a person of ordinary skill in the art at the
19 time of the invention to chemically clean the engine component with acetic
20 acid as disclosed in Bowden, Jr. (Br. 10, ll. 8-20).

21 This argument is without merit. Conner teaches that the first step in
22 upgrading an aluminide coating is the use of a chemical process to remove
23 oxidation and corrosion products from the turbine engine component.
24 (Conner, 5:15-19; Br. 9, ll. 6-11). Conner further teaches that this cleaning
25 step can be achieved by a variety of published processes. (Conner, 7:50-53).

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1 The use of acetic acid as a chemical means of cleaning a turbine engine was
2 known to those of ordinary skill in the art at the time the invention was
3 made. (Bowden, Jr., 2:23-34). Thus, we see no error in the Examiner's
4 conclusion that the combination of Connor and Bowden, Jr. renders the
5 invention of claim 1 obvious.

6 The Appellants also urge that the Conner inventors should have
7 known of, and specified, the Bowden, Jr. application. Their reasoning is that
8 Bowden, Jr. was filed almost 11 months earlier than Conner and the two
9 references are commonly assigned. (Br. 10, ll. 14-15, 19-20). The
10 Appellants point to no legal basis for this novel assertion.

11 However, we observe that evidence of a motivation to combine
12 references may be found in a reference without the reference identifying a
13 specific example or reference by name. *In re Kahn*, 441 F.3d 977, 989 (Fed.
14 Cir. 2006)(motivation to combine teachings need not be expressly stated in
15 the prior art reference). We are also not persuaded of error.

16 The Appellants further argue that "a person of ordinary skill would
17 have no reason to apply" Bowden, Jr.'s process for removing surface dirt
18 and contaminants to the "more difficult problem" of removing hot corrosion
19 products addressed in Conner. (Br. p.10, ll. 21-27).

20 This argument is likewise not persuasive. First, it is attorney
21 argument, and not evidence. As the Examiner explained, the Appellants
22 have not provided any evidence that the hot corrosion products addressed in
23 Conner are more difficult to remove from a component of a turbine engine
24 than dirt and other contaminants. Nor have the Appellants argued or

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1 established that hot corrosion products cannot be considered “other
2 contaminants,” as referenced in Bowden, Jr.

3 Next, the Appellants argue that combining Conner and Bowden, Jr.
4 does not provide the claimed invention because Bowden, Jr. discloses a
5 preference for using acetic acid solution at room temperature and the
6 claimed invention calls for a temperature from about 120 to 200°F. (*Id.* p.
7 11, ll. 5-7).

8 This argument is also unconvincing. Bowden, Jr. teaches using acetic
9 acid solution at temperatures *as high as* the boiling temperature of the
10 solution. (Bowden, Jr., col. 3, ll. 25-28). Thus, the reference describes
11 using a range of acetic acid that includes the temperature set forth in the
12 claimed invention, 120 to 200°F. The teaching of a preferred temperature
13 does not constitute a teaching away from another disclosed temperature. As
14 the Federal Circuit has explained, “[I]n a section 103 inquiry, ‘the fact that a
15 specific [embodiment] is taught to be preferred is not controlling, since all
16 disclosures of the prior art, including unpreferred embodiments, must be
17 considered.’” *Merck & Co., Inc. v. Biocraft Laboratories, Inc.*, 874 F.2d
18 804, 807 (Fed. Cir. 1989)(quoting *In re Lamberti*, 545 F.2d 747, 750
19 (C.C.P.A. 1976)).

20 The Appellants additionally challenge the Examiner’s reliance on
21 Bowden, Jr. because the reference does not suggest “depositing a layer of
22 platinum after cleaning the surface … or thereafter forming a second
23 aluminide coating on the surface of the component.” (*Id.* p. 11, ll. 13-15).
24 While dismissing that Conner discloses these steps, the Appellants assert

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1 that combining the two references to form an obviousness rejection
2 inappropriately employs hindsight. (*Id.* ll. 16-20).

3 This argument is without merit. The Appellants cannot overcome an
4 obviousness rejection “by attacking references individually where the
5 rejection is based upon the teachings of a combination of references.” *In re*
6 *Merck & Co. Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). It is the cited
7 combination of references which discloses all of the limitations of claim 1.

8 Furthermore, as explained in *In re McLaughlin*, 443 F.2d 1392, 1395
9 (C.C.P.A. 1971), “Any judgment on obviousness is in a sense necessarily a
10 reconstruction based upon hindsight reasoning” Reconstruction is
11 proper if it relies on ordinary skill at the time of the invention and not on
12 knowledge gained solely from the applicant’s disclosure. *Id.*

13 Here, Conner teaches cleaning the surface of the engine component
14 and thereafter applying a layer of platinum followed by an aluminizing step.
15 The only reconstruction performed relies upon an ordinary skill in the art at
16 the time of the invention to use acetic acid to clean the surface of the engine
17 component.

18 Therefore, we conclude that the examiner did not err in determining
19 that it would have been obvious to one of ordinary skill in the art at the time
20 of the invention to combine the references to arrive at the claimed invention.
21 Such a conclusion is not the result of inappropriate hindsight.

22 Lastly, the Appellants challenge the Examiner’s finding that Conner
23 teaches a range for the aluminide coating without the platinum layer which
24 anticipates the second aluminide coating thickness “of from about 25 to
25 about 75 microns” claimed in the Appellants’ invention. (*Id.* ll. 27-29). In

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1 raising this challenge, the Appellants do not dispute the Examiner's finding
2 that Conner teaches a range of 2.5-10 microns for the thickness of the
3 platinum layer that anticipates the range claimed by the Appellants. Nor do
4 the Appellants disagree that Conner discloses a total coating design
5 thickness of 1-5 mils (about 25-127 microns).

6 Instead, the Appellants assert that the difference between these
7 thickness ranges set forth in Conner does not teach the thickness of the
8 claimed second aluminide coating because the disclosed total coating
9 thickness also includes the thickness of the inner coating portion.

10 Additionally, the Appellants assert that the production range disclosed in
11 Conner "also refers to the thickness of the entire coating." (*Id.* ll. 23-26).

12 This argument is also not persuasive.

13 First, the difference between the claimed invention and the prior art
14 relates not to the existence of a second aluminide coating, but the thickness
15 of the coating. One of ordinary skill in the art at the time of the invention
16 would have been capable of making this simple calculation based on known
17 thickness ranges. Consequently, we find no error in the Examiner's finding
18 that Conner teaches that the second aluminide coating is less than 15-124.5
19 microns.

20 The Appellants have not shown by any argument or persuasive
21 evidence why this thickness range of the second aluminide coating in the
22 prior art and that of claim 1 are not "close enough...such that one skilled in
23 the art would expect them to have the same properties." *See In re Peterson*,
24 315 F.3d 1325, 1329 (Fed. Cir. 2003).

25 Accordingly, we affirm the Examiner's rejections.

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1 CONCLUSION OF LAW

2 On the record before us, the Appellants have not shown error on the
3 part of the Examiner. It would have been obvious to one of ordinary skill in
4 the art at the time the invention was made to combine the known elements of
5 the prior art for their known functions.

6 DECISION

7 The Rejection of claims 1, 3-9, 11-16, 18, and 20-22 under 35 U.S.C.
8 § 103(a) as being unpatentable over Conner (EP 1 013 787 A1) in view of
9 Bowden, Jr. (US 5,938,855) is AFFIRMED.

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11 No time period for taking any subsequent action in connection with
12 this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2006).

AFFIRMED

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cc: (via U.S. Mail)

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