UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte BERND EDENHOFER

Appeal 2008-3602
Application 10/328,555
Technology Center 1700

Decided: December 17, 2008

Before THOMAS A. WALTZ, LINDA M. GAUDETTE, and
KAREN M. HASTINGS, *Administrative Patent Judges*.

HASTINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1-13, 18, and 20-23[1]. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

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[1] An amendment, filed with the Appeal Brief, canceling claims 18 and 20-23, was entered by the Examiner.

STATEMENT OF THE CASE

The invention relates to a process for heat treating metal workpieces.

Claim 1 is illustrative of the subject matter on appeal:

1. Process for heat treating metal workpieces, the method comprising:

heating the workpieces to a first temperature under a vacuum or a neutral or reducing gas atmosphere during a heating phase;

carburizing the workpieces at the first temperature and at a first pressure reached at the end of the heating phase and for a first period of time in a gas atmosphere containing a hydrocarbon during an enrichment phase following directly upon the heating up phase;

transitioning the workpieces from the first temperature to a second temperature below or greater the first temperature under a vacuum or a gas atmosphere containing chiefly nitrogen during a first temperature transition phase following immediately upon the enrichment phase;

boriding the workpieces at the second temperature and at a second pressure reached at the end of the first temperature transition phase for a second period of time in a gas atmosphere containing boron during a boriding phase following directly upon the first temperature transition phase;

transitioning the workpieces from the second temperature to a third temperature below or greater than the second temperature under a vacuum or in a gas atmosphere containing mainly nitrogen during a second temperature transition phase following directly upon the boriding phase; and

quenching the workpieces from the third temperature to a temperature below 150ºC during a quenching phase following upon the second temperature transition phase;

such that the process creates an edge layer on the workpiece comprising an outer iron boride layer and a case hardening layer beneath the iron boride layer.

The Examiner relies on the following prior art references to show unpatentability:

Scales	4,012,238	Mar. 15, 1977
Fernihough	EP 1,078,996 A1	Feb. 28, 2001

Appellant's Admission of Prior Art (AAPA); Specification p. 5, second full paragraph

The rejections of the claims on appeal are:

1. Claims 1-7, 12, and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fernihough;

2. Claims 8 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fernihough and AAPA; and

3. Claims 1-4 and 10-11 are rejected under 35 U.S.C. § 103(a) as unpatentable over Scales.

Within the first and third grounds of rejection, Appellant has not separately argued any claim with any reasonable degree of specificity. (App. Br. 4-5). Thus, in accordance with 37 C.F.R. § 41.37(c)(1)(vii), we select claim 1 as representative for each of these grounds of rejection. With respect to the second ground of rejection, Appellant relies only on the arguments presented for the first ground of rejection.

ISSUES ON APPEAL

Appellant contends that Fernihough does not teach a process for producing the recited edge layer which "compris[es] an outer iron boride layer and a case hardening layer beneath the iron boride layer" as recited in claim 1, and that there are significant differences between the process steps of Fernihough and the claimed process steps (App. Br. 10-15). However, the Examiner contends that Fernihough renders the claimed process obvious

and that therefore it is Appellant's burden to prove that the product of Fernihough's process would not necessarily have the claimed edge layer property (Ans. 4-5).

The first issue on appeal arising from these contentions of the Appellant and the Examiner is: has the Examiner established a prima facie case of obviousness such that it is reasonable to shift the burden to Appellant to prove that the product produced in Fernihough does not have the recited edge property?

We answer this question in the negative.

With respect to the rejection based on Scales, the Appellant contends that Scales does not teach the process as recited in claim 1 because there is a finishing step in between the carburizing and boriding steps, and thus it is not reasonable to shift the burden to Appellant to prove that the edge layer property is not present in Scales (App. Br. 17). The Examiner contends that it would have been prima facie obvious to eliminate the finishing step of Scales (Ans. 9).

The second issue on appeal arising from the contentions of the Appellant and the Examiner is: would it have been prima facie obvious to eliminate the finishing step of Scales?

We answer this question in the affirmative.

PRINCIPLES OF LAW

Appellant has chosen to describe the invention, in part, in terms of certain physical characteristics of the resulting edge layer of the product produced by the claimed process. Merely choosing to describe the invention in terms of variables not present in the prior art does not render the claimed subject matter patentable. *In re Skoner,* 517 F.2d 947, 950 (CCPA 1975).

As stated in *In re Best*, 562 F.2d 1252, 1255-56 (CCPA 1977):

> Where, . . . the claimed and prior art products are identical or substantially identical, *or are produced by identical or substantially identical processes*, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. Whether the rejection is based on 'inherency' under 35 U.S.C. § 102, on 'prima facie obviousness' under 35 U.S.C. § 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products.

(*Id*.; internal citation omitted; emphasis provided)

"[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) *quoted with approval in KSR Int'l Co. v. Teleflex Inc.,* 127 S. Ct. 1727, 1741 (2007).

The Examiner's analysis supporting obviousness should be made explicit and should "identify a reason that would have prompted a person of ordinary skill in the art to combine the elements" in the manner claimed. *KSR,* 127 S. Ct. at 1731.

Appellant's attorney's arguments do not take the place of evidence in the record. *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974).

First Issue – The § 103 Rejection based on Fernihough

FINDINGS OF FACTS

Findings of fact (FF) throughout this decision are supported by a preponderance of the evidence. Additional findings of fact as necessary appear in the Analysis portion of the opinion.

1. Fernihough teaches a process for forming precipitates of carbides and/or borides along the grain boundaries of a component made from a nickel (Ni) based superalloy (col. 4, ¶ [0015]).

2. Fernihough describes that the desired effect is to introduce carbon (and/or boron) "along the grain boundaries with no regards to effects on the surface" (col. 4, ¶ [0017]

3. Fernihough describes that "after carburization a layer of carbon enriched material on the surface of the component may be chemically or mechanically removed before the component is put into service." (col. 5, ¶ [0026])

4. Fernihough does not explicitly describe all the components of the Ni-based superalloy. However, the US patents referenced in Fernihough all describe Ni-based superalloys that contain no iron (col. 2, ¶ [0008]; see, e.g., US 5,455,120, col. 1, ll. 50-65).

5. Fernihough does not explicitly teach that a boriding step will follow a carburizing step. Fernihough describes that the carbon and/or boron may be introduced "simultaneously" or "at the same time" (col. 4, ¶ [0016]; col. 5, ¶ [0024]).

6. Fernihough describes process details, including the temperature, for the carburizing step, but does **not** describes any details, including temperature, of the boriding step (col. 5, ¶ ([0021]).

ANALYSIS

Fernihough treats a Ni-based superalloy which does not contain any iron (see, e.g., FF 4). The Examiner has failed to provide any evidence or convincing line of reasoning that the process of Fernihough will create an outer layer of iron boride as required by claim 1. The Examiner apparently relies upon the fact that the preamble of claim 1 states "treating metal workpieces" (Ans. 7). However, claim 1 explicitly requires that "an outer iron boride layer" is formed.

Furthermore, Fernihough teaches that any layer of carbon enriched material on the surface of the Ni-alloy should be removed, describes that carbon and boron are added at the same time (if carbon and boron are both added to the grain boundary), and does not explicitly teach that the boriding step (when and if there is one) is carried out after the carburizing step at a different temperature as claimed (see, e.g., FF 3, 5). The Examiner's position that the first, second, and third temperatures recited in the claim, each of which is explicitly stated in claim 1 to be "below or greater than" one of the other temperatures, all "read on one temperature or no cooling" appears to be untenable (Ans. 4).

We therefore determine that the Examiner has not established a prima facie case of obviousness based on Fernihough such that it is reasonable to shift the burden to Appellant to prove that the product produced in Fernihough does not have the recited edge layer required in claim 1.

We are constrained by these circumstances to reverse the Examiner's § 103 rejection based on Fernihough of claims 1-7, 12, and 13.

The additional evidence of AAPA, as applied by the Examiner to dependent claims 8 and 9 (Ans. 5-6), does not remedy the deficiencies of Fernihough.

Thus, we also reverse the § 103 rejection based on Fernihough and AAPA of claims 8 and 9.

Issue 2 – the § 103 rejection based on Scales

ADDITIONAL FINDINGS OF FACT

7. Scales describes a process for surface treatment of steel workpieces including a carburizing step, then transitioning to a boronizing (i.e., a boriding) step at a different temperature (e.g., 1650°F or 1292°F) than the carburizing step (e.g., 1700°F), then transitioning to a quenching step at a different temperature (e.g., 1390°F) than the boronizing step (Scales, col. 2, ll. 40-50; col. 3, ll. 27-48 and ll. 60-65).

8. Scales describes that the invention is an "improved method" that includes a finishing step between the carburizing step and the boronizing step (col. 1, ll. 45-50).

9. One of ordinary skill in the art would have known that the finishing step (i.e., "the invention" in Scales) between the carburizing step and the boronizing step is optional, noting that Scales teaches a prior art process without such a step (see Scales, Description of the Prior Art section, col. 1, ll. 20-24).

10. Scales describes that the boronizing time may range from 15 minutes to 36 hours (Scales col. 3, ll. 36-38 and 58-59). Appellant's claim

7 recites that the second period of time (for the boriding step) is between 30 and 360 minutes.

ANALYSIS

The Examiner found that Scales describes a process substantially as claimed (see, e.g., Ans. 6; FF 7-10 above). Appellant contends that Scales does not teach the process as recited in claim 1 because of the presence of the finishing step before the boronizing step (App. Br. 17). This is not persuasive since Scales describes that the prior art to his invention did not include such a finishing step. Therefore, it would have been prima facie obvious to eliminate that step and its function as it was previously known to do so. *See also, e.g., In re Thompson,* 545 F.2d 1290, 1294 (CCPA 1976)*; In reKuhle,* 526 F.2d 553, 555 (CCPA 1975) (It is obvious for one of ordinary skill in the art to eliminate a feature of the prior art along with its attendant advantage).

Appellant's contentions that the steel articles (i.e., the workpieces) of Scales are "cooled to room temperature" after every process step of Scales is not well taken (Ans. 18). Appellant did not specifically point out any disclosure in Scales that states this, and we can not find any. Furthermore, one of ordinary skill in the art is also a person of ordinary creativity, not an automaton. *KSR*, 127 S. Ct. at 1742. One of ordinary skill in the art would have appreciated that substantial energy losses would occur if the articles were brought down to room temperature in between sequential high temperature process steps. We determine that one of ordinary skill in the art would have transitioned the steel articles from a carburizing temperature of, e.g., 1700°F, to a boriding temperature of, e.g., 1650°F, and then to a

quenching temperature as taught in Scales in order to be energy efficient and economical.

Appellant contends that there was no equipment available in 1977 (the publication year of Scales) to allow articles with such a duplex layer structure as recited in claim 1 to be produced by the Scales process "in one single heat treatment process (using only one single piece of equipment)" (App. Br. 19; *see also* Reply Br. 2). This argument is not well taken since the claims are not limited to one single heat treatment process in one single piece of equipment.

Appellant's contention that "boronizing is not the equivalent of boriding" is also not well taken, since Appellant stated in the Appeal Brief that " 'boronizing' and 'boriding' are two terms describing basically the same thing" (compare, App. Br. 21; Reply Br. 2).

Thus, we are in agreement with the Examiner that Scales renders the claimed process obvious under 35 U.S.C. § 103. The process of Scales, modified to eliminate the finishing step between the carburizing and boronizing steps in accordance with the prior art method described in Scales, appears to be substantially identical to the claimed process such that it would have been reasonable to expect the creation of an edge layer as claimed.

Thus, the burden was properly shifted to Appellant to prove that the product edge layer as claimed is patentably different than the prior art product. The PTO has no reasonable ability to manufacture and determine whether there is, in fact, a patentable difference between the prior art product and the claimed product. Under the circumstances, it is reasonable to shift the burden to Appellant to show that the claimed product created by

the claimed process is, in fact, patentably different from the prior art product. *In re Best*, 562 F.2d at 1255-56.

Appellant has not presented any evidence sufficient to refute the Examiner's finding that the process of Scales would have created the claimed edge layer. Instead, Appellant provides unsupported attorney argument as to a skilled artisan's conclusions regarding the teachings of Scales (App. Br. 18-19; Reply Br. 2). Attorney argument is no substitute for objective evidence against the Examiner's finding. *Pearson*, 494 F.2d at 1405.

Thus, we agree with the Examiner's determination that Scales is evidence of a prima facie case of obviousness for claims 1-4 and 10-11.

CONCLUSION

Appellant has shown that the Examiner reversibly erred in failing to establish a prima facie case of obviousness over Fernihough. Thus, it is **not** reasonable to shift the burden to Appellant to prove that the product produced in Fernihough does not have the recited edge property.

On the other hand, Appellant has not shown that the Examiner reversibly erred in determining that it would have been prima facie obvious to eliminate the finishing step before the boronizing step of Scales. Accordingly, it is reasonable to shift the burden to Appellant to prove that the product produced in Scales, without such a finishing step, does not have the recited edge property.

ORDER

The Examiner's rejection of claims 1-7, 12, and 13 under 35 U.S.C. § 103(a) as being unpatentable over Fernihough is reversed.

The Examiner's rejection of claims 8 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Fernihough and AAPA is reversed.

The Examiner's rejection of claims 1-4 and 10-11 under 35 U.S.C. § 103(a) as unpatentable over Scales is affirmed.

The Examiner's decision is affirmed-in-part.

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

AFFIRMED-IN-PART

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