Paper No. 47

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte MOTONOBU ONODA, KATSUAKI OGAWA
and KAZUO SHIMIZU

Appeal No. 2003-0208
Application No. 08/578,996[1]

HEARD: April 1, 2003

Before COHEN, STAAB, and NASE, Administrative Patent Judges.

NASE, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 3, 6, 8 and 10, which are all of the claims pending in this application.[2]

We REVERSE.

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[1] This application was previously before the Board of Patent Appeals and Interferences in Appeal No. 1998-2154 (decided July 27, 2000). In that appeal, the decision of the examiner to reject claims 1-4 under 35 U.S.C. § 103 was affirmed.

[2] Claim 3 was amended subsequent to the final rejection.

BACKGROUND

The appellants' invention relates to a surface treatment for a piston ring for use in internal combustion engines (specification, p. 1). A copy of the claims under appeal is set forth in the appendix to the appellants' brief.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Ishida et al. (Ishida)	5,316,321	May 31, 1994
Komuro et al. (Komuro)	5,851,659	Dec. 22, 1998
Takiguchi et al. (Takiguchi)	GB 2 243 262 A	Oct. 23, 1991

Claims 3, 6, 8 and 10 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the appellants, at the time the application was filed, had possession of the claimed invention.

Claims 3, 6, 8 and 10 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the appellants regard as the invention.

Claims 3, 6 and 8 stand rejected under 35 U.S.C. § 103 as being unpatentable over Takiguchi in view of Komuro.

Claim 10 stands rejected under 35 U.S.C. § 103 as being unpatentable over Takiguchi in view of Komuro and Ishida.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the above-noted rejections, we make reference to the final rejection (Paper No. 33, mailed October 5, 2001) and the answer (Paper No. 39, mailed July 11, 2002) for the examiner's complete reasoning in support of the rejections, and to the brief (Paper No. 38, filed June 5, 2002) and reply brief (Paper No. 41, filed September 9, 2002) for the appellants' arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims, to the applied prior art references, to the declaration of Motonubu Onoda (Paper No. 26, filed November 14, 2000) and to the respective positions articulated by the appellants and the examiner. As a consequence of our review, we make the determinations which follow.

The written description rejection

We will not sustain the rejection of claims 3, 6, 8 and 10 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the appellants, at the time the application was filed, had possession of the claimed invention.[3]

The written description requirement serves "to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him; how the specification accomplishes this is not material." In re Wertheim, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976). In order to meet the written description requirement, the appellants does not have to utilize any particular form of disclosure to describe the subject matter claimed, but "the description must clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed." In re Gosteli, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989). Put another way, "the applicant must . . . convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the

[3] The description requirement exists in the first paragraph of 35 U.S.C. § 112 independent of the enablement (how to make and how to use) requirement and the description and enablement requirements are separate and distinct from one another and have different tests. See In re Wilder, 736 F.2d 1516, 1520, 222 USPQ 369, 372 (Fed. Cir. 1984), cert. denied, 469 U.S. 1209 (1985); In re Barker, 559 F.2d 588, 591, 194 USPQ 470, 472 (CCPA 1977); and In re Moore, 439 F.2d 1232, 1235-36, 169 USPQ 236, 239 (CCPA 1971).

invention." Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991). Finally, "[p]recisely how close the original description must come to comply with the description requirement of section 112 must be determined on a case-by-case basis." Eiselstein v. Frank, 52 F.3d 1035, 1039, 34 USPQ2d 1467, 1470 (Fed. Cir. 1995) (quoting Vas-Cath, 935 F.2d at 1561, 19 USPQ2d at 1116).

The examiner ascertained (answer, p. 3) that claim 3 has been amended to recite that metallic chromium is caused to be in "an intercrystal grain boundary of the CrN and Cr_2N." The examiner then stated that the specification does not adequately disclose what structure comprises an intercrystal grain boundary. Lastly, the examiner asserted that the specification does not clearly disclose whether this structure is inherent when Cr is to be more than 0.5 and not more than 15.0 weight percent in the ion-plating deposition layer.

The appellants argue (brief, p. 5) that page 5, lines 23-31, of the specification clearly shows that the appellants had possession of the presently claimed invention at the time the application was filed.[4] We agree. Additionally, we agree with the

[4] Page 5, lines 23-31, of the specification teaches that by causing Cr to be contained by more than 0.5 and less than 15.0 weight percent in the ion-plating deposition layer made of the mixture of the two kinds of nitride (CrN and Cr2N), (i.e., by causing the metallic Cr to be in the intercrystal grain boundary of the ceramic) the intercrystal adhesive strength is reinforced so that the toughness of the ion-plating deposition layer is improved.

appellants (brief, pp. 4-5) that one skilled in this art would understand what an intercrystal grain boundary is and how to produce it in a ceramic. Lastly, whether or not this structure would be inherent is of no moment in determining if the original disclosure shows that the appellants had possession of the presently claimed invention at the time the application was filed.

With regard to the possibility that this rejection is based upon the enablement requirement[5] and not the written description requirement, we note only that the examiner has not met the initial burden of establishing a reasonable basis to question the enablement provided for the claimed invention. See In re Wright, 999 F.2d 1557, 1561-62, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993) (examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure). A disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as being in compliance with the enablement requirement of 35 U.S.C. § 112, first paragraph, unless there is a reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. Assuming

[5] The test for enablement is whether one skilled in the art could make and use the claimed invention from the disclosure coupled with information known in the art without undue experimentation. See United States v. Telectronics, Inc., 857 F.2d 778, 785, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988), cert. denied, 109 S.Ct. 1954 (1989); In re Stephens, 529 F.2d 1343, 1345, 188 USPQ 659, 661 (CCPA 1976).

that sufficient reason for such doubt exists, a rejection for failure to teach how to make and/or use will be proper on that basis. See In re Marzocchi, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971). As stated by the court,

> it is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. Otherwise, there would be no need for the applicant to go to the trouble and expense of supporting his presumptively accurate disclosure.

In re Marzocchi, 439 F.2d at 224, 169 USPQ at 370.

In this case, the examiner has not ascertained that one skilled in the art could not make and use the claimed invention from the disclosure coupled with information known in the art without undue experimentation. In fact, the examiner has not even weighed the factors to be considered in determining whether a disclosure would require undue experimentation.[6]

For the reasons set forth above, the decision of the examiner to reject claims 3, 6, 8 and 10 under 35 U.S.C. § 112, first paragraph, is reversed.

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[6] These factors include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. See In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988) citing Ex parte Forman, 230 USPQ 546, 547 (Bd. Pat. App. & Int. 1986).

The indefiniteness rejection

We will not sustain the rejection of claims 3, 6, 8 and 10 under 35 U.S.C. § 112, second paragraph.

Claims are considered to be definite, as required by the second paragraph of 35 U.S.C. § 112, when they define the metes and bounds of a claimed invention with a reasonable degree of precision and particularity. See In re Venezia, 530 F.2d 956, 958, 189 USPQ 149, 151 (CCPA 1976).

The examiner's rejection (answer, p. 4) is that in view of the 35 U.S.C. § 112, first paragraph, rejection, the recitation of the intercrystal grain boundary is vague and indefinite.

In view of the fact the examiner has not explained why the metes and bounds of the claimed invention would not be understood with a reasonable degree of precision and particularity and our reversal of the examiner's rejection under 35 U.S.C. § 112, first paragraph, the decision of the examiner to reject claims 3, 6, 8 and 10 under 35 U.S.C. § 112, second paragraph, is reversed.

The obviousness rejections

We will not sustain the rejection of claims 3, 6, 8 and 10 under 35 U.S.C. § 103.

Claim 3, the only independent claim on appeal, reads as follows:

> A piston ring for internal combustion engines for use with a piston and a cylinder, having an external circumferential sliding surface adapted to slide against the internal wall of said cylinder, said piston ring having an ion-plating deposition layer formed over said external circumferential sliding surface thereof, said deposition layer having pores and being made of a mixture of a first chromium nitride of CrN, a second chromium nitride of Cr_2N, and metallic chromium, the mixing ratios in said mixture being more than 45.0 and less than 98.0 weight percent for said first chromium nitride, more than 0.5 and not more than 15.0 weight percent for said metallic chromium, and the balance portion for said second chromium nitride, and wherein the porosity for said pores in said deposition layer made of said mixture is more than 0.5 and not more than 20.0 percent, and wherein the metallic chromium is caused to be in an intercrystal grain boundary of the CrN and Cr_2N.

Takiguchi discloses a coating that may be used as the sliding surface of a piston ring of an internal combustion engine. Takiguchi teaches that the coating comprises a layer adjacent to the base material consisting substantially of chromium, while the layer adjacent the outer surface may consist substantially of a mixture of Cr_2N and CrN (abstract). Takiguchi does not disclose the mixing ratios for these alloys. Takiguchi does teach that the Cr, Cr_2N and CrN alloys are combined to obtain a high wear resistant piston ring coating with a high resistance to peeling off (pp. 1 and 3).

Takiguchi teaches (page 5, line 16, to page 6, line 17) that

> According the method of the present invention, deposition of chromium is started without introducing nitrogen into the chamber so that a layer of metal chromium is at first formed on the surface of the base material. The layer of chromium which may be referred as the base layer has a thermal expansion coefficient which is close to that of the base material. Therefore, there will be least possibility that the coating is peeled off the base material under a thermal effect. Thus, an improved adhesive power can be obtained. Further, the chromium rich layer adjacent to the base material has an excellent resiliency. This will further improve the anti-peel-off property of the coating.
>
> The nitrogen concentration is gradually and continuously increased while the chromium is being deposited to form the coating on the sliding surface of the base material. A part of the vaporized chromium is then nitrided and deposited on the base material forming a part of the coating. The layer of the coating thus formed which may be referred as the second layer contains a mixture of chromium and chromium nitride[7] and is of a greater hardness as compared with the base layer of chromium adjacent to the base material so that it possesses a higher wear resistant property than the base layer. Further, the second layer has .a sufficient resiliency so that the adhesive property of the base layer will not be adversely affected by the second layer.
>
> The coating in accordance with the present invention can be used in any type of sliding member such as a piston ring and an oil ring of an internal combustion engine and a rail on which a rolling or sliding member is moved.

Komuro discloses a sliding member, such as a piston ring, in which the surface of a substrate is coated with a compound containing at least chromium nitride, wherein a columnar crystal structure is present in a tension fracture surface of the coating, the

[7] We understand chromium nitride as used by Takiguchi as meaning either CrN, Cr_2N or a mixture of Cr_2N and CrN.

columns being aligned toward the coating surface from the substrate surface. The coating is formed on the substrate by contacting the substrate with a gas phase mixture containing chromium and nitrogen in a PVD process. In a preferred embodiment the PVD process is an ion plating process. The composition of the coating is preferably CrN, Cr_2N or a mixture thereof in a uniform phase. A foundation layer of chromium may be present between the substrate and the coating. Preferred characteristics of the coating are a porosity of from 1.5% to 20% and a microhardness of from 600 HmV to 1000 HmV. The crystals of the coating may be oriented with the (111) face parallel to the surface. The coating is typically between 1 μm and 80 μm thick. Komuro teaches that the coating has superior resistance to peeling, abrasion and baking.

The examiner determined (answer, p. 4) that "Takiguchi does not disclose the mixing ratios, however, as determined by the previous Board Decision (Paper No. 22), it would have been obvious to one of ordinary skill in the art 'to have optimized the mixing percentages of these materials [Cr, CrN and Cr_2N] to obtain the high wear resistant coating with high resistance to peeling off taught by Takiguchi' (Decision, page 10)." The examiner also determined (answer, p. 5) that Takiguchi "does not specifically disclose the claimed broad porosity range." The examiner then determined that it would have been obvious to produce a coating having the claimed porosity for the benefits disclosed by Komuro. Lastly, the examiner ascertained (answer, p. 5) that the

recitation in claim 3 that the metallic chromium is caused to be in an intercrystal grain boundary of the CrN and Cr_2N is inherent in the coating suggested by the combined teachings of Takiguchi and Komuro.

The appellants argue (brief, pp. 14-16) that causing the metallic chromium to be in the intercrystal grain boundary of the CrN and Cr_2N in the amount required (i.e., more than 0.5 and not more than 15.0 weight percent) is not inherent in the coating taught by Takiguchi or the coating suggested by the combined teachings of Takiguchi and Komuro. The appellants also argue (brief, pp. 6-8 and 13-14; reply brief, pp. 2-5) that the declaration of Motonubu Onoda establishes unexpected results for the subject matter of claim 3. We agree with the appellants that when the examiner's evidence of obviousness and the declaration of Motonubu Onoda are properly weighed, the subject matter of claim 3 would not have been obvious under 35 U.S.C. § 103.

In that regard, we note that while the above-quoted method of Takiguchi would appear to provide some metallic chromium to be in the intercrystal grain boundary of the chromium nitride when the chromium nitride is a mixture of Cr_2N and CrN, the amount of chromium in that mixture is not specified. The examiner has not set forth any scientific basis as to why the wear resistant plated deposition coating mixture suggested by the combined teachings of Takiguchi and Komuro would inherently cause

metallic chromium to be in an intercrystal grain boundary of the CrN and Cr_2N in the amount claimed (i.e., more than 0.5 and not more than 15.0 weight percent).

In any event, the declaration of Motonubu Onoda establishes unexpected results for the claimed subject matter, and in our view, is sufficient to rebut any case that the claimed subject matter was prima facie obvious from the combined teachings of the applied prior art. That is, when we weigh the examiner's evidence of obviousness and the declaration of Motonubu Onoda, we conclude that the subject matter of claim 3 would not have been obvious under 35 U.S.C. § 103.

For the reasons set forth above, the decision of the examiner to reject claim 3 and claims 6, 8 and 10 dependent thereon, under 35 U.S.C. § 103 is reversed.[8]

CONCLUSION

To summarize, the decision of the examiner to reject claims 3, 6, 8 and 10 under 35 U.S.C. § 112, first paragraph, is reversed; the decision of the examiner to reject claims 3, 6, 8 and 10 under 35 U.S.C. § 112, second paragraph, is reversed; and the

[8] We have also reviewed the reference to Ishida additionally applied in the rejection of claim 10 but find nothing therein which makes up for the deficiencies of Takiguchi and Komuro discussed above.

decision of the examiner to reject claims 3, 6, 8 and 10 under 35 U.S.C. § 103 is reversed.

REVERSED

IRWIN CHARLES COHEN Administrative Patent Judge	)
LAWRENCE J. STAAB Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
JEFFREY V. NASE Administrative Patent Judge	)

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