

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 17

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GEORGE S. MORDUE and RICHARD S. HENDERSON

Appeal No. 1999-0405
Application No. 08/651,571

HEARD: November 15, 2000

Before FRANKFORT, NASE, and JENNIFER D. BAHR, Administrative Patent Judges.

FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's refusal to allow claims 1 through 3, 5 through 8 and 20 as amended subsequent to the final rejection in a paper filed October 22, 1997 (Paper No. 6) and from the examiner's final rejection of claims 9 through 19. Claim 4 has been canceled.¹

¹ Claims 6 and 8 on appeal are currently indicated as being dependent from canceled claim 4. For purposes of this appeal we have considered these claims as being dependent from

Appellants' invention is directed to a molten metal impeller (e.g., claims 1, 9, 14 and 20) and to a shaft for a molten metal impeller (claim 19). In the paragraph bridging pages 2 and 3 of their specification, appellants indicate that historically, a bearing ring is cemented to both the shaft and molten metal impeller. More particularly, appellants note that a typical impeller (usually formed of graphite) has a generally cylindrical portion which is machined to include a notched periphery, with a bearing ring (often of silicon carbide) cemented into the notch. Appellants observe that such prior art designs have remained a frequent area of failure because the joint is incompletely filled with cement and the graphite to cement adherence is relatively poor.

To increase the useful operable life of a molten metal pump and increase its overall reliability, appellants have

claim 1. Appellants should correct this oversight during any further prosecution of this application before the examiner. We also note that there does not appear to be any proper antecedent basis for "said adhesive joint" in line 3 of claim 6.

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devised a system whereby they have improved the means for attachment of the bearing ring to the impeller and shaft of a molten metal pump. That attachment system involves the inclusion of one or more generally concentric grooves on one or both of the surface portions of the notch in contact with the bearing ring. Note, for example, the grooves (58) in the radially facing wall (59) and axially facing wall (61) of the notch (56) seen in Figure 5 of the drawings. As indicated on page 8 of the specification, appellants have found that the grooved walls facilitate even distribution of the cement over the entire joint surface between the impeller notch and the bearing ring and improves the mechanical bonding at the graphite/refractory cement interface. Independent claims 1, 9, 14, 19 and 20 are representative of the subject matter on appeal and a copy of those claims may be found in the Appendix to appellants' brief.

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

Mordue et al. (Mordue)	5,028,211	Jul. 2,
1991		

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Cooper 1993	5,203,681	Apr. 20,
Thut 28, 1997	5,597,289	Jan.
Hattori 1987 (Japanese patent) ²	62-164525	Jul. 21,

Claims 1 through 3, 5 through 8 and 20³ stand rejected under 35 U.S.C. § 103 as being unpatentable over Thut in view of Hattori.

Claims 9 through 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Cooper in view of Hattori.

² Our understanding of this foreign language document is based on a translation prepared for the U.S. Patent and trademark Office. A copy of that translation is attached to this decision.

³ In reviewing appellants' specification (e.g., pages 8 and 9) and independent claims 1 and 20, we note some confusion and inconsistencies in the disclosure and in the claim recitations concerning the "radial wall" and "axial wall" in the enumerated claims. As is apparent from viewing Figures 5 and 6 of the application, it appears that the recitations in claims 1 and 20 should more properly be expressed as a "radially facing wall formed by said second section" and as an "axially facing wall formed by said first section." Likewise, the specification at page 9 should be reviewed to correct this same type of oversight.

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Claim 19 stands rejected under 35 U.S.C. § 103 as being unpatentable over Mordue in view of Hattori.

Rather than attempt to reiterate the examiner's full commentary with regard to the above-noted rejections and the conflicting viewpoints advanced by the examiner and appellants regarding the rejections, we make reference to the examiner's answer (Paper No. 11, mailed May 28, 1998) for the reasoning in support of the rejections, and to appellants' brief (Paper No. 10, filed February 23, 1998) and reply brief (Paper No. 13, filed July 28, 1998) for the arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to appellants' specification and claims, to the applied prior art references, and to the respective positions articulated by appellants and the examiner. As a consequence of our review, we have made the determinations which follow.

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Looking first at the examiner's rejections relying on Thut and Cooper, each of which is modified in view of Hattori, we note that the primary references both disclose a molten metal impeller including a circumferential notch and a bearing ring cemented into said notch. As can be seen in Figure 1 of Thut and Figure 10 of Cooper, the joint between the notch and bearing ring in both of these references includes flat surfaces of the notch cemented to flat surfaces on the bearing ring. To account for the lack of grooves in the wall or walls of the notch in Thut or Cooper as is required in the claims before us on appeal, the examiner has turned to Hattori.

The Hattori reference is specifically directed to an adhesion structure for fluorocarbon polymers. On page 2 of the reference it is noted that the invention concerns the adhesion of a fluorocarbon polymer to a partner material. Difficulties in bonding fluorocarbon polymers to normal partner materials with adhesive are also discussed on page 2. In the example of the invention on page 4 of Hattori the partner material is indicated to be a bondable metal member (2) and the fluorocarbon polymer member (1) is provided with

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grooves (4) oriented in the circumferential direction relative to the shear force shown by the arrow seen in Figure 1 of the drawings, with the gap between the members (1) and (2) and the grooves (4) being filled with an epoxy-based resin adhesive (5). Hattori notes, in the paragraph bridging pages 4 and 5, that "[i]n this way, the surface area is increased to the extent that grooves (4) are formed, not only increasing the adhesive strength, but also, since the hardened adhesive (5) is made to fill the grooves (4) of the fluororesin, the adhesive (5) serves as a key, and the fluorocarbon polymer (1) becomes extremely difficult to remove from the partner material (2)."

In the examiner's view, it would have been obvious to one of ordinary skill in the art at the time appellants' invention was made to form the notched wall of the molten metal impeller of either Thut or Cooper with a plurality of circumferentially extending grooves in the form of a spiral as taught by Hattori for the purpose of forming a strong joint.

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Appellants assert that the Hattori reference is non-analogous art because it is not within appellants' field of endeavor (i.e., molten metal pumps/impellers) or reasonably pertinent to the particular problem that appellants address (i.e., attaching a silicon carbide bearing ring to a graphite impeller of a molten metal pump). Appellants also argue that Hattori is not even a general teaching on mating of two components, because it is specific to the bonding of fluorine resin articles, and that, even if it were analogous art, there is no motivation or justification supporting the examiner's proposed combinations with Thut and Cooper since 1) the applied references do not in any way recognize a problem with the attachment of a bearing ring to a molten metal pump impeller and 2) there is no justification for applying the teachings of Hattori relating to bonding fluorine resin articles to metal to a structure involving attaching a silicon carbide bearing ring to a graphite impeller which is to be immersed in molten metal as in Thut and Cooper. In this regard, appellants assert that the examiner has employed an improper "obvious to try" standard of patentability and relied

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upon impermissible hindsight in attempting to combine Hattori with Thut or Cooper.

Assuming for argument sake that Hattori is analogous prior art, we share appellants' view that there would have been no motivation and no suggestion in the applied references for the examiner's proposed combination of Hattori with Thut or Cooper. In our opinion, the examiner has used impermissible hindsight derived from appellants' own teachings to combine the molten metal impeller arrangements of Thut and Cooper involving attaching a silicon carbide bearing ring to a graphite impeller with the totally disparate adhesion structure for fluorocarbon polymers taught in Hattori. In this regard, we note that, as our court of review indicated in In re Fritch, 972 F.2d 1260, 1266 n. 14, 23 USPQ2d 1780, 1783-84 n. 14 (Fed. Cir. 1992), it is impermissible to use the claimed invention as an instruction manual or "template" to piece together isolated disclosures and teachings of the prior art so that the claimed invention is rendered obvious. That same Court has also cautioned against focussing on the obviousness of the differences between the claimed invention

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and the prior art rather than on the invention as a whole as 35 U.S.C. § 103 requires, as we believe the examiner has done in the present case. See, e.g., Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1375, 231 USPQ 81, 93 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987).

Since we have determined that the teachings and suggestions found in Thut or Cooper considered with those of Hattori would not have made the subject matter as a whole of claims 1 through 3, 5 through 18 and 20 on appeal obvious to one of ordinary skill in the art at the time of appellants' invention, we must refuse to sustain the examiner's rejections of those claims under 35 U.S.C. § 103.

As for the examiner's rejection of claim 19 under 35 U.S.C. § 103 as being unpatentable over Mordue in view of Hattori, we have reviewed the Mordue patent, noting that it discloses (in Fig. 9) a shaft (15) for a molten metal impeller and a bearing ring (32) bonded to the shaft using refractory cement. Mordue does not disclose, teach or suggest a

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plurality of grooves on the surface of the shaft adjacent the bearing ring, with the plurality of grooves receiving an adhesive for securing the bearing ring to the shaft, as set forth in claim 19 on appeal. Again the examiner has turned to the teachings of Hattori, urging that it would have been obvious to one of ordinary skill in the art to form the shaft (15) of Mordue with a plurality of grooves adjacent the bearing ring as taught by Hattori for the purpose of forming a strong joint.

Similar to Thut and Cooper, Mordue is directed to the high temperature environment of a molten metal pump and involves the use of a graphite shaft and a silicon carbide bearing ring bonded thereto. We note again that Hattori is specifically directed to a solution for poor bonding of fluorocarbon polymer articles to metal partner materials and, absent appellants' disclosure, we see no reasonable suggestion or motivation for combining Mordue and Hattori in the manner urged by the examiner. Certainly the mere fact that the Hattori reference is classified in class 156, Adhesive Bonding, does not mean that it is automatically or obviously

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combinable with the molten metal pump shaft and impeller arrangement involved in Mordue. Like appellants, we consider that the examiner has improperly relied upon an "obvious to try" standard of patentability and used impermissible hindsight in attempting to combine the disparate teachings of Mordue and Hattori so as to arrive at appellants' claimed subject matter. Thus, the examiner's rejection of claim 19 under 35 U.S.C. § 103 will not be sustained.

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In light of the foregoing, the decision of the examiner to reject claims 1 through 3 and 5 through 20 under 35 U.S.C. § 103 is reversed.

REVERSED

CHARLES E. FRANKFORT)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JEFFREY V. NASE)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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JENNIFER D. BAHR)	
Administrative Patent Judge)	

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REVERSED

Prepared: August 14, 2001