

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YUKIO ISHIUCHI, TOSHIKAZU HAMAMOTO, MICHISHIGE SAKAI, MAKOTO
NAGATA, HIROSHI WARAGAYA, IWAO ISHII, EIJI KANEKO and HIROYOSHI
OOTSUKI

Appeal No. 1999-1818
Application No. 08/586,806

ON BRIEF

Before STAAB, McQUADE, and JENNIFER D. BAHR, Administrative Patent Judges.
JENNIFER D. BAHR, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-5, 7, 8 and 10, which are all of the claims pending in this application.

BACKGROUND

The appellants' invention relates to a push rod (claims 1-5) comprising an aluminum alloy rod body and a steel ball bonded by resistance welding to one end of the rod body and a process for producing the push rod (claims 7, 8 and 10). The resistance welding process yields "biting-in" portions in the rod body into the steel ball and an aluminum layer formed on the surface of the steel ball. Further understanding of the invention can be derived from a reading of exemplary claims 1 and 7, which are reproduced in the opinion section of this decision.

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

Macura	2,975,775	Mar. 21, 1961
Enda et al. (Enda) (Japanese patent publication)	61-279711	Dec. 10, 1986
Sugiyama et al. (Sugiyama) (Japanese patent publication)	57-29069	Jun. 25, 1982 ¹

The following rejections are before us for review.

Claims 1-4, 7, 8 and 10 stand rejected under 35 U.S.C. § 103 as being unpatentable over Macura in view of Enda.

Claims 1, 2 and 5 stand rejected under 35 U.S.C. § 103 as being unpatentable over Macura in view of Sugiyama.

¹ English language translations of the Enda and Sugiyama references, prepared by the Patent and Trademark Office, are appended hereto.

Reference is made to the brief and reply brief (Paper Nos. 19 and 21) and the answer (Paper No. 20) for the respective positions of the appellants and the examiner with regard to the merits of these rejections.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellants' specification and claims², to the applied prior art references, and to the respective positions articulated by the appellants and the examiner. As a consequence of our review, we make the determinations which follow.

Independent claims 1 and 7 read as follows:

1. A push rod comprising a rod body, and a steel ball bonded to bond sections of at least one end of the rod body by an electric resistance welding, wherein said rod body is formed from an aluminum alloy, and said bond sections of said rod body and said steel ball have mechanical engagement portions formed by said electric resistance welding wherein said mechanical engagement portions include biting in portions of the rod body into the steel ball and an aluminum layer formed on a surface of the steel ball by a liquid phase generated from the rod body during welding.

7. A process for producing a push rod, comprising the steps of:
bringing one end face of a rod body into pressure contact with a steel ball;

² We note that the preambles of claims 4 and 5, which are directed only to a push rod, appear to be inconsistent with the recitations of these claims. Specifically, the limitation in claim 4 that the push rod is "disposed between a cam shaft and a rocker arm in an internal combustion engine" indicates the claim is directed to an internal combustion engine. Similarly, the limitation in claim 5 that the push rod is "disposed between a pressure plate and a clutch-disengaging drive source in a friction clutch" indicates the claim is directed to a friction clutch. While these informalities do not, in our opinion, render the scope of the claims indefinite, they are deserving of correction in the event of further prosecution before the examiner.

supplying an electric current between said rod body and said steel ball to perform an electric resistance welding of said rod body and said steel ball to each other;

wherein a pipe material formed of an aluminum-magnesium-silicon based alloy is used as said rod body, a welding current I is set in a range of 18,000 # I # 21,000 amperes, a pressing force P is set in a range of 350 kilogram-force # P # 400 kilogram force and a current supplying time t is set in a range of $t < 2$ cycle; and

bonding said rod body and said steel ball together by utilizing biting-in portions of the rod body into the steel ball and an aluminum layer formed on a surface of the steel ball by a liquid phase generated from the rod body during the welding.

Macura discloses a push rod employed to transmit mechanical force from the tappets to the rocker arms in an internal combustion engine (column 1, lines 15-18) comprising a Bundy tubing (copper plated steel strip rolled into a tube) body 10 having a steel bearing ball 11 securely and rapidly welded at each end by resistance welding. The welding is performed by forcing the bearing ball against the body 10 with a pressure of 450 pounds, applying a current of 12,000 amperes for 6 cycles³ and maintaining the pressure for one second thereafter to insure "quick cooling" which preserves the original hardness of the ball in the areas remote from the weld (column 1, line 43, to column 2, line 6). The Macura push rod is intended to reduce the weight of the valve train without any substantial increase in cost or sacrifice of operating characteristics (column 1, lines 22-27).

³ Macura does not specify the frequency or the duration of a cycle.

Enda discloses making the push rod of an aluminum alloy, rather than copper, to match its coefficient of thermal expansion with that of an aluminum alloy cylinder head (1) of an engine to thereby minimize the increase in valve head gap due to thermal expansion of the cylinder head (translation, pages 3 and 9). This, in turn, stabilizes the rigidity of the oil pressure tappet (translation, page 4). The spherical end portions (14a) may be made of steel (translation, page 10).

Sugiyama discloses a push rod 11 for transmitting force to a pressure plate 6 in a friction clutch.

In rejecting claim 1 as unpatentable over Macura in view of Enda, the examiner finds that Macura discloses the claimed subject matter with the exception of the rod body being formed from an aluminum alloy but takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made, in view of the teachings of Enda, to make the push rod and engine body of Macura of aluminum alloy for the purpose of suppressing an increase in capacity in the pressure oil chamber (answer, page 4). Likewise, in rejecting claim 1 as unpatentable over Macura in view of Sugiyama, the examiner asserts that it would have been obvious to one of ordinary skill in the art to use the push rod disclosed by Macura in the friction clutch of Sugiyama for the purpose of reducing weight and that to use aluminum alloy for the rod body would have been an obvious matter of design choice (answer, pages 5 and 6).

The appellants do not appear to contest the examiner's position with regard to these proposed modifications but argue that the proposed combinations would still lack the "biting in portions" required by claim 1. According to the appellants, it is not only the relationship of aluminum alloy to steel, but the specifically disclosed welding conditions which produce the "biting in portions"; the short current supplying time disclosed by the appellants is such that the aluminum body and steel ball are cooled before they are melted and mixed together, while the welding conditions of Macura are intended to cause the two metal elements to be melted and mixed with each other and therefore solidified and bonded together (brief, pages 5 and 6).

In proceedings before it, the PTO applies to the verbiage of claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the appellants' specification. In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). Moreover, absent an express definition in their specification, the fact that appellants can point to definitions or usages that conform to their interpretation does not make the PTO's definition unreasonable when the PTO can point to other sources that support its interpretation. Id., 127 F.3d at 1056, 44 USPQ2d at 1029.

While the appellants' specification, on pages 3 and 11, discloses that the welding process results in the rod body having "biting-in portions" which exhibit an anchoring effect

and points to illustrations of "biting-in portions" 12 in Figures 11 to 13, we do not find therein a clear definition of the term "biting in portions" as suggested on page 2 of the appellants' reply brief. Accordingly, in the absence of an express definition which differs from the ordinary usage of "biting," we interpret "biting in portions" to be portions of the rod body material which cut or migrate into the steel material of the ball, such that there is not a smooth and clear interface line between the aluminum alloy material and the steel ball material. Further, in light of this interpretation, the examiner's stated position (answer, page 6) that such biting in portions would inherently result from the melting, mixing and re-crystallization of the rod body and ball materials which occurs during the Macura resistance welding process strikes us as reasonable. Thus, in our opinion, the examiner has discharged the initial burden of providing sound reasoning to support the determination that the allegedly inherent characteristic (biting-in portions) logically flows from the teachings of the applied prior art so as to shift the burden to the appellants to prove that the push rod of Macura does not possess the biting in portions of the claimed invention. See In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985); In re King, 801 F.2d 1324, 1327, 231 USPQ 136, 138 (Fed. Cir. 1986). The appellants, in merely arguing that the welding process of Macura will not result in biting in portions, have fallen far short of meeting this burden.⁴

⁴ An attorney's arguments in a brief cannot take the place of evidence. In re Pearson, 494 F.2d 1399, 1405, 181 USPQ 641, 646 (CCPA 1974).

For the foregoing reasons, we shall sustain the examiner's rejections of claim 1 as being unpatentable over Macura in view of Enda and as being unpatentable over Macura in view of Sugiyama.

With regard to claim 2, which depends from claim 1 and further requires that the aluminum alloy is an aluminum-magnesium-silicon based alloy, the examiner contends that it would have been an obvious matter of design choice to use such an alloy as the push rod body material, "since the selection of a known material based on its suitability for the intended use is generally recognized as being within the level of ordinary skill in the art" (answer, pages 4 and 5).⁵ From our perspective, one of ordinary skill in the art would have appreciated from the teachings of Macura the desirability of using a push rod body material which is relatively light weight, reasonably strong and easily weldable and, further, would have recognized an aluminum-magnesium-silicon based alloy as a material possessing such properties. Therefore, we perceive no error in the examiner's determination that the use of such an alloy in the Macura push rod would have been obvious. Accordingly, we shall sustain the examiner's rejections of claim 2 as being unpatentable over Macura in view of Enda and as being unpatentable over Macura in view of Sugiyama.

As the appellants have not argued separately the patentability of claims 3-5 apart from claims 1 and 2, these claims shall stand or fall with claims 1 and 2 from which they depend (see

⁵ The selection of a known material based upon its suitability for the intended use is an obvious design consideration within the skill of the art. In re Leshin, 227 F.2d 197, 199, 125 USPQ 416, 418 (CCPA 1960).

In re Young, 927 F.2d 588, 590, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); In re Wood, 582 F.2d 638, 642, 199 USPQ 137, 140 (CCPA 1978)). It follows then that we shall also sustain the examiner's rejections of claims 3 and 4 as being unpatentable over Macura in view of Enda and of claim 5 as being unpatentable over Macura in view of Sugiyama.

Turning now to the examiner's rejection of claims 7, 8 and 10 as being unpatentable over Macura in view of Enda, we note that claim 7 is directed to a process for producing a push rod comprising, inter alia, a step of supplying an electric current between the rod body and the steel ball, wherein

a welding current I is set in a range of 18,000 # I # 21,000 amperes, a pressing force P is set in a range of 350 kilogram-force # P # 400 kilogram force and a current supplying time t is set in a range of $t < 2$ cycle.⁶

Neither Macura nor Enda discloses or suggests a welding process using this particular combination of current, pressing force and current supplying time. From our perspective, the only suggestion to weld the push rod in accordance with the claimed combination of operating parameters is found in the luxury of hindsight accorded one who first viewed the appellants' disclosure. This, of course, is not a proper basis for a rejection. See In re Fritch, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992).

Therefore, we shall not sustain the examiner's rejection of claims 7, 8 and 10.

⁶ While the claim does not explicitly recite the frequency of the applied current or define what is meant by a cycle, based on the definition of 1 cycle as 1/50 second on page 8 of the appellants' specification, we interpret "t < 2 cycle" as requiring that the current supplying time be less than 2/50 second.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-5, 7, 8 and 10 under 35 U.S.C. § 103 is affirmed as to claims 1-5 and reversed as to claims 7, 8 and 10.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

LAWRENCE J. STAAB)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
JOHN P. McQUADE)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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