

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 13

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte DANIEL G. SANDERS

Appeal No. 2001-1464
Application No. 09/141,499

ON BRIEF

Before McQUADE, NASE and BAHR, Administrative Patent Judges.
BAHR, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-10, 15-24 and 32, which are all of the claims pending in this application.

BACKGROUND

The appellant's invention relates to a method for making a tubular protrusion in a part made of a material exhibiting superplastic properties. In the method of appellant's

invention, the part is heated to a temperature at which the material exhibits superplastic properties and a pull die heated to about said superplastic temperature is pulled through an opening in the part to form the protrusion. A copy of the claims under appeal is set forth in the appendix to the appellant's brief.

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

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|----------------------------|-----------|---------------|
| Taylor | 1,911,653 | May 30, 1933 |
| Latham | 3,535,909 | Oct. 27, 1970 |
| Okada et al. (Okada) | 4,676,088 | Jun. 30, 1987 |
| Tsuchiya et al. (Tsuchiya) | 5,975,405 | Nov. 2, 1999 |

Admitted prior art at page 3, lines 17-34, of appellant's specification (AAPA)

The following rejections are before us for review.¹

Claims 1, 2, 5-8, 15-21 and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada in view of Taylor.

Claims 3 and 4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada in view of Taylor and AAPA.

Claims 9 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada in view of Taylor and Latham.

¹ The examiner (answer, Paper No. 10, pages 2-3) has withdrawn the rejections under the first and second paragraphs of 35 U.S.C. § 112 set forth in the final rejection (Paper No. 5).

Claims 22 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada in view of Taylor and Latham.

Claims 22 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada in view of Taylor and Tsuchiya.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the final rejection and answer (Paper Nos. 5 and 10) for the examiner's complete reasoning in support of the rejections and to the brief and reply brief (Paper Nos. 7 and 11) for the appellant's arguments thereagainst.

OPINION

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

Each of independent claims 1, 15 and 32 recites a method of forming an integral tubular protrusion on a part comprising, *inter alia*, a step of heating the part to a temperature at which the material of which the part is made exhibits superplastic properties. This step requires both a part made of a material which is capable of

exhibiting superplastic properties at some predetermined superplastic temperature and that the part be heated to said superplastic temperature.

Okada, the jumping off point for the examiner's determination of obviousness of the subject matter of claims 1, 15 and 32, as well as the claims depending therefrom, discloses a procedure (column 3, line 43 *et seq.*) for manufacturing a T-joint from a tube wherein the tube is heated in the vicinity of a pilot hole to a working temperature of, for example, 900° C (1652° F) in the vicinity of points 2*b*, 2*d* and, for example, 700° C (1292° F) in the vicinity of points 2*a*, 2*c* for the disclosed example of a carbon steel tube.² Okada also discloses that the invention disclosed therein "is not limited to the use of a carbon steel pipe; it can be applied to the case where a T-joint is manufactured by using any metal pipe or alloy pipe, for example, a stainless steel pipe and a steel alloy pipe" (column 5, lines 39-43).

Superplasticity is the "unusual ability of some metals and alloys to elongate uniformly by thousands of percent at elevated temperatures, much like hot polymers and glasses" (McGraw-Hill Dictionary of Scientific and Technical Terms, Fifth Edition (McGraw-Hill, Inc. 1994)). Additionally, the main prerequisite for superplasticity is an

² As explained by Okada at column 4, lines 11-16 and 41-46, the lower working temperature is used in the vicinity of points 2*a*, 2*c* to avoid undesired thinning and cracking at these points (see column 1, lines 35-60) during the burring operation carried out by the burring punch 4 to form the collar portion 2A.

extremely fine and stable grain size, which is readily produced by powder metallurgy technicians.³ There is no indication in Okada that the material of the tube from which the T-joint is made is capable of exhibiting superplastic behavior at any temperature, let alone at the working temperature at which the process is carried out. In fact, Okada expressly refers to the deformation which occurs during the process as “plastic deformation” (column 2, lines 48 and 52). Thus, Okada cannot be considered to teach a step of heating the part to a temperature at which the material of which the part is made exhibits superplastic properties, as required in each of claims 1, 15 and 32.

We recognize that (1) the working temperature of 900° C (1652° F) disclosed by Okada for the exemplary material of carbon steel is approximately the superplastic forming temperature (about 1650° F) for 6-4 titanium alloy disclosed in appellant’s specification (page 12, lines 25-26) and (2) Okada’s invention can be applied to the case where a T-joint is manufactured using any metal pipe or alloy pipe (column 5, lines 39-43). We agree with appellant (reply brief, page 3), however, that the general statement in Okada that any metal or alloy can be used is not a specific disclosure of using a superplastic material and certainly not a disclosure of heating a superplastic material to a temperature at which the material exhibits superplastic properties. Given the very large number of metals and metallurgical processes for making metals, it is our opinion that one skilled in the art would

³ “Metal Treatments” 16 Kirk-Othmer Encyclopedia of Chemical Technology, 471 (4th ed., John Wiley & Sons, Inc., 1995), a copy of which is appended to this decision.

not have at once envisaged superplastic materials upon reading the general disclosure by Okada of any metal or alloy. Compare In re Petering, 301 F.2d 676, 681, 133 USPQ 275, 280 (CCPA 1962) (in addition to disclosing a generic chemical formula, the prior art reference disclosed preferred substituents from which the court determined that one skilled in the art would have at once envisaged each member of the claimed class of compounds). Moreover, we perceive nothing in the teachings of Okada of using any metal or alloy which would have suggested using a material capable of exhibiting superplastic properties.

Furthermore, even if an artisan were to use a metal or alloy which is capable of exhibiting superplastic properties in Okada's process, we find nothing in Okada which would have taught or suggested to such an artisan the use of the working temperatures 900° C and 700° C employed in the exemplary embodiment disclosed by Okada for such materials. The selection of those particular working temperatures appears to have been made based upon the characteristics of the deformation resistance versus working temperature graph of Figure 3, which is specific to the carbon steel used in the disclosed exemplary embodiment and, thus, would not necessarily be suitable for other pipe materials.

In that each of the rejections before us on appeal is based at least in part on the examiner's flawed determination that Okada teaches or suggests a step of heating the

part to a temperature at which the material of which the part is made exhibits superplastic properties, as required by each of independent claims 1, 15 and 32, as well as all claims depending therefrom, and as the additional references (Taylor, AAPA⁴, Latham and Tsuchiya) relied upon by the examiner in rejecting the claims likewise do not teach or suggest such a step, we shall not sustain any of the examiner's rejections.

⁴ For the reasons expressed on pages 16 and 17 of the brief, we share appellant's view that the examiner's characterization of the paragraph bridging pages 3 and 4 of appellant's specification (AAPA) as teaching heating a pull die to about the superplastic temperature of the tubing material (final rejection, page 11) is unsound.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-10, 15-24 and 32 under 35 U.S.C. § 103(a) is reversed.

REVERSED

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| JOHN P. McQUADE |) | |
| Administrative Patent Judge |) | |
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| |) | BOARD OF PATENT |
| JEFFREY V. NASE |) | APPEALS |
| Administrative Patent Judge |) | AND |
| |) | INTERFERENCES |
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| |) | |
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Appeal No. 2001-1464
Application No. 09/141,499

Page 9

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