

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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte RICHARD F. CALCATERRA and PAUL K. HOFFMAN

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Appeal No. 97-0176  
Application No. 08/313,604<sup>1</sup>

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HEARD: February, 8, 1999

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Before MEISTER, STAAB and GONZALES, Administrative Patent Judges.

GONZALES, Administrative Patent Judge.

DECISION ON APPEAL

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

We AFFIRM-IN-PART.

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<sup>1</sup> Application for patent filed September 29, 1994.

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BACKGROUND

The appellants' invention relates to a method of fabricating end plugs for nuclear fuel rods. An understanding of the invention can be derived from a reading of exemplary claims 1, 8 and 9 which appear in the appendix to the appellants' brief.

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

Van Dievoet	3,699,638	Oct. 24, 1972
Nilson	3,804,708	Apr. 16, 1974
Clapham (United Kingdom patent specification)	1,404,234	Aug. 28, 1975

The following rejections are before us for review:

(1) Claims 1, 2, 4, 5, 7 and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Van Dievoet in view of Clapham.

(2) Claims 3, 6, 8 and 10 stand rejected under 35 U.S.C. § 103 as being unpatentable over Van Dievoet in view of Clapham and Nilson.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellants regarding the above-noted rejections, we make reference to the examiner's answer (Paper

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No. 15, mailed August 8, 1996) for the examiner's complete reasoning in support of the rejections, and to the appellants' brief (Paper No. 14, filed June 17, 1996) and reply brief (Paper No. 16, filed September 20, 1996) for the appellants' arguments thereagainst.

In the main brief (page 5), appellants state that claims 2, 4, 5 and 7 stand or fall with claim 1 and that independent claims 1 and 9 do not stand or fall together. Appellants also state that claims 3, 6, 8 and 10 do not stand or fall together. Appellants, however, have not presented separate arguments for each of claims 3, 6, 8 and 10. Therefore, claims 3, 6, 8 and 10 stand or fall together. 37 CFR § 1.192(c)(7).

#### 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, and to the respective positions articulated by the appellants and the examiner. As a consequence of our review, we make the determinations which follow.

a. Claims 1 and 9

We sustain the rejection of claims 1 and 9 under 35 U.S.C. § 103 as being unpatentable over Van Dievoet in view of Clapham.

Van Dievoet discloses a method of fabricating a porous end plug for a nuclear fuel rod comprising the steps of superposing thin sheets of metal to form a layered assembly, pressing the layers of the assembly together to form a laminate in which the layers are bonded together with directional oriented porosities between the layers, and cutting a "plug"<sup>2</sup> from the laminate (see claim 1 at columns 3 and 4). Specifically, Van Dievoet describes the thin sheets of metal as "sheet-iron" (col. 2, lines 27 and 28) which have been oxidized on their surface. The reference further discloses that the cut out piece or blank 7 may be cut out of the sheet metal shown in Figure 3 in a perpendicular direction to the laminating process (col. 3, lines 4-8). In Figure 4, Van Dievoet shows a plug 3 which was cut out of the sheet-iron of Figure 3 (col. 2, lines 6-8). The plug is shown in Figure

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<sup>2</sup> Van Dievoet uses the word "plug" in referring to the cut out piece 7 in col. 4, line 2.

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4 as including what appears to be a "cavity" extending partially through and along the longitudinal axis of the plug. The "cavity," however, is not mentioned or discussed in Van Dievoet's specification.

Clapham teaches that Zirconium base alloys, e. g., ZIRCALOY®, are excellent base materials for fabricating nuclear fuel "cans" (appellants' cladding tubes) and "closures" (appellants' end plugs). Clapham specifically teaches that Zirconium based alloys have a low neutron absorption cross section and a good high temperature performance (lines 37-47 and 67-70).

In applying the test for obviousness,<sup>3</sup> we reach the conclusion that it would have been obvious to one having ordinary skill in the art, from a combined assessment of the Van Dievoet and Clapham teachings, to substitute ZIRCALOY® for the "sheet-iron" in the manufacture of the Van Dievoet end plug as suggested by Clapham. In our view, one of ordinary skill in the art would have been motivated to manufacture the

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<sup>3</sup> The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. See In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991) and In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981).

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end plug shown in Figure 4 in Van Dievoet using ZIRCALOY® based on the advantageous properties of ZIRCALOY® discussed in Clapham and would have had a reasonable expectation of success in doing so based on Clapham's specific disclosure that ZIRCALOY® was particularly suitable for making nuclear fuel rod end plugs. This conclusion is buttressed by appellants' admissions in their specification (page 1) and in the main brief (page 14) that ZIRCALOY® was a material known in the art prior to appellants' invention to be useful in fabricating nuclear fuel rod end plugs.

Appellants argue (main brief, pages 6-10) that Van Dievoet "teaches away" from the claimed invention and, therefore, cannot serve to create a prima facie case of obviousness, because Van Dievoet teaches the use of a porous end plug while appellants' claimed invention relates to a method for manufacturing end plugs for nuclear fuel rods, including the step of "minimizing, eliminating or rendering ineffective defects forming fluid leakage paths through the end plugs."

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We are not persuaded by appellants' argument. The rejection under review is based on a combination of references, namely, Van Dievoet and Clapham. The argument that Van Dievoet teaches away from the claimed invention appears to us to be an attack on Van Dievoet individually as opposed to an argument that one would not combine Van Dievoet and Clapham in the manner suggested by the examiner because the art teaches away from the examiner's proposed modification. Appellants have not identified any teaching in either Van Dievoet or Clapham that would discourage a person of ordinary skill in the art from using ZIRCALOY® in the manufacture of the end plugs as taught by Van Dievoet.

In addition, we agree with the examiner that the step of "minimizing, eliminating or rendering ineffective defects forming fluid leakage paths through the end plugs" is disclosed in Van Dievoet. The terminology in a pending application's claims is to be given its broadest reasonable interpretation (In re Morris, 127 F.3d 1048, 1053-54, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997) and In re Zletz, 893 F.2d 319, 321, 13 USPQ2d, 1320, 1322 (Fed. Cir. 1989)) and limitations from a pending application's specification will

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not be read into the claims (Sjolund v. Musland, 847 F.2d 1573, 1581-82, 6 USPQ2d 2020, 2027 (Fed. Cir. 1988)).

The step of "minimizing, eliminating or rendering ineffective defects forming fluid leakage paths through the end plugs" is written in the alternative and is met by Van Dievoet if Van Dievoet teaches minimizing or eliminating or rendering ineffective defects forming fluid leakage paths through the end plugs. The claim language does not require that the end plug manufactured according to the steps of the claimed method be non-porous or that all defects forming fluid leakage paths through the end plug be rendered ineffective or specify in what area of the end plug the paths which are rendered ineffective must be located. The language is met if any defects forming fluid leakage path through the end plug shown in Van Dievoet is rendered ineffective.

In our opinion, it is reasonable to conclude that those leakage paths 5 shown in Figure 4 of Van Dievoet which are orientated approximately 90° to the longitudinal axis of the plug and which are not in communication with the "cavity" are rendered ineffective. It is noted that any leakage paths in appellants' end plug which have not been eliminated are

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similarly rendered ineffective by orientating the potential leakage paths such that they are at approximately 90° to the longitudinal axis of the end plug (main brief, sentence bridging pages 5 and 6). Thus, in our view, Van Dievoet does render ineffective at least some defects forming fluid leakage paths through the end plug.

Appellants argue (main brief, page 11) that the claims require a minimization of leakage paths through the end plug, not just a portion of the end plug. However, as we have indicated above, the claims do not require "a minimization of leakage paths." The claims actually require that the leakage paths be minimized, eliminated or rendered ineffective. Further, the language "through the end plugs" does not distinguish the claimed subject matter over Van Dievoet. The leaks paths 5 shown in Figure 4 of Van Dievoet which are rendered ineffective (see discussion above) do, in fact, extend through the end plug.

With respect to claim 9, appellants argue (main brief, page 14) that Van Dievoet fails to teach the steps of forming an ingot into a flat plate having a material extension direction and forming an elongated blank from the flat plate

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with the longitudinal axis of the blank lying generally perpendicular to the direction of material extension resultant from the formation of the ingot into the flat plate.

We disagree. Van Dievoet teaches the formation of a flat plate. An example of such a plate is illustrated in Figure 3. As can be seen in Figure 3, the material of the plate extends in a longitudinal direction (generally in the direction of arrow 5).

Figure 3 also shows that a cut out piece or blank 7 is formed from the plate with the longitudinal axis of the cut out piece or blank lying generally perpendicular to the direction of material extension of the plate.

For the reasons set forth above, the decision of the examiner to reject claims 1 and 9 under 35 U.S.C. § 103 is affirmed.

b. Claims 2, 4, 5 and 7

The appellants have grouped claims 2, 4, 5 and 7 as standing or falling with claim 1. Thus, it follows that the decision of the examiner to reject claims 2, 4, 5 and 7 under 35 U.S.C. § 103 is also affirmed.

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c. Claims 3, 6, 8 and 10

We will not sustain the rejection of claims 3, 6, 8 and 10 under 35 U.S.C. § 103 as being unpatentable over Van Dievoet in view of Clapham and Nilson.

Claims 3, 6, 8 and 10 each call for hot-rolling an ingot of ZIRCALOY® material into a flat plate. Appellants' specification (page 10) discloses that by hot-rolling the ZIRCALOY® ingot, centerline defects inherent in prior art processes are reduced or eliminated. We agree with the appellants' argument (main brief, pages 15) that while hot-rolling per se is old and well known, there is no suggestion in the references of forming a ZIRCALOY® ingot into a flat plate by hot-rolling.

Nilson is cited by the examiner for teaching the use of a rolling operation in the shaping of ZIRCALOY® to orient the constituent metal crystals in particular directions. Nilson, however, teaches cold-rolling which is usually performed at room temperature,<sup>4</sup> not hot-rolling which takes place above the

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<sup>4</sup> Myron L. Begeman & B. H. Amstead, Manufacturing Processes 192 (5th ed., John Wiley & Sons, Inc. 1963)

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recrystallization temperature,<sup>5</sup> and does not recognize the advantages of using hot-rolling discussed in appellants' specification. For this reason, the rejection must be reversed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1, 2, 4, 5, 7 and 9 under 35 U.S.C. § 103 is sustained. The decision of the examiner to reject claims 3, 6, 8 and 10 under 35 U.S.C. § 103 is reversed.

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

JAMES M. MEISTER	)	
Administrative Patent Judge	)	
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LAWRENCE J. STAAB	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND

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<sup>5</sup> Id. at 166.

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