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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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

~~Ex parte~~ JAMAL RIGHI, JAMES R. FIELDS and ERIC D. ARNDT

MAILED

JAN 22 1997

**PAT.&T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES**

Appeal No. 96-2301
Application 08/238,465¹

ON BRIEF

Before MEISTER, ABRAMS and STAAB, *Administrative Patent Judges*.
MEISTER, *Administrative Patent Judge*.

DECISION ON APPEAL

Jamal Righi, James R. Fields and Eric D. Arndt (the appellants) appeal from the final rejection of claims 1-5 and 7-19,² the only claims remaining in the application. We affirm-in-part and, pursuant to our authority under the provisions of 37 C.F.R. § 1.196(b), enter new rejections of claims 1-5 and 7-19.

¹ Application for patent filed May 5, 1994.

² Claim 17 has been amended subsequent to final rejection.

Appeal No. 96-2301
Application 08/238,465

The appellants' invention is directed to a method and apparatus for casting parts from metal in a cold-chamber die casting machine. Independent claims 1 and 14 are further illustrative of the appealed subject matter and read as follows:

1. Cold chamber die-casting apparatus for casting metal parts, said apparatus comprising:

die means comprising a fixed die part and a movable die part defining between them a die cavity in which said part is formed;

a shot cylinder connected to said die means and having a shot cylinder bore of a preselected diameter in which a charge of molten metal is received; said die means also defining a sprue cavity communicating with said shot cylinder bore and a runner connecting said sprue cavity to said die cavity;

a piston reciprocally slidable in said shot cylinder bore; and

means advancing said piston in said shot cylinder bore to inject said charge of molten metal through said sprue cavity and runner into said die cavity to fill said die cavity; said sprue cavity having a diameter and a depth forming a biscuit extending from said shot sleeve [sic, said shot cylinder bore] into said sprue cavity having a volume sufficient such that a solidified cylindrical shell of metal which forms on said biscuit in said shot cylinder bore and said sprue cavity is thin enough to allow said piston to crush said solidified cylindrical shell of metal and to continue advancing after said die cavity is filled with said molten by a distance which inject additional molten metal into said die cavity to make up for any shrinkage of said part during solidification.

14. A method of casting parts from metal in a cold-chamber die-casting machine having a shot cylinder with a piston which injects a charge of molten metal through a sprue cavity and a runner to fill a die cavity to form said part, said method comprising the steps of:

sizing said sprue cavity to a diameter about as great as and substantially concentric with said shot cylinder and a

Appeal No. 96-2301
Application 08/238,465

depth in front of said shot cylinder to form a biscuit extending from said shot sleeve into said sprue cavity having a volume sufficient to form a solidified cylindrical shell of metal thin enough such that after said piston is advanced to inject molten metal to fill said die cavity, said piston is advanced farther toward said sprue cavity to crush said solidified cylindrical shell of metal and inject additional molten metal into said die cavity to make up for shrinkage of molten metal during solidification.

The reference relied on by the examiner is:

Klein (Germany) ³	3,044,992	Jun. 16, 1982
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Additional references relied on by this merits panel of the Board are:⁴

Bauer	3,008,202	Nov. 14, 1961
Morita et al. (Morita)	4,059,143	Nov. 22, 1977

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by the German reference.

Claims 2-5 and 7-19 stand rejected under 35 U.S.C. § 103 as being unpatentable over the German reference.

The examiner's rejections are explained on pages 2-4 of the final rejection (Paper No. 7). The arguments of the appellants and the examiner in support of their positions may be

³ Our understanding of this reference is derived from a translation furnished by the appellants as an attachment to the amendment filed after final rejection on September 08, 1995 (Paper No. 8).

⁴ These references have been made of record in the appellants' information disclosure statement filed on May 05, 1994 (Paper No. 4).

Appeal No. 96-2301
Application 08/238,465

found on pages 4-10 of the brief and 3-6 of the answer,
respectively.

OPINION

As a preliminary matter we note that the appellants on
page 4 of the brief state that:

For the purposes of this Appeal, Claims
1, 9, 10 and 14-19 [sic, 14-16] stand or fall
together. Claims 2-5, 7 and 8 stand or fall
together. Claims 11, 12 and 13 each stand
alone. Claims 17-19 stand or fall together.

We have carefully reviewed the appellants' invention as
described in the specification, the appealed claims, the prior
art applied by the examiner and the respective positions advanced
by the appellants in the brief and by the examiner in the answer.
As a consequence of this review, we will sustain the examiner's
rejections of claim 1 under 35 U.S.C. § 102(b) and claims 9, 10
and 14-16 under 35 U.S.C. § 103. We will not, however, sustain
the examiner's rejection of claims 2-5, 7, 8, 11-13 and 17-19
under 35 U.S.C. § 103. Additionally, we will enter new
rejections of claims 1-5 and 7-19 under 35 U.S.C. § 112, first
paragraph and claims 11-13 under 35 U.S.C. § 103.

Considering first the rejections of claim 1 under 35
U.S.C. § 102(b) and claims 9, 10 and 14-16 under 35 U.S.C. § 103
based on the German reference, the main thrust of the appellants'
position is that:

Appeal No. 96-2301
Application 08/238,465

The German reference utilizes a casting chamber which is larger in diameter but shorter. Significantly, at the point where the die initially becomes filled with molten metal, the plunger extends beyond the end of the casing chamber and into what the German reference calls the "remainder", which is equivalent to applicants' sprue cavity. (See German translation page 4, lines 23-28). There is no metal remaining in the casting chamber at this point and while a skin begins to form in the remainder, the diameter of the remainder is made larger than the diameter of the plunger so that the plunger remains operating in molten metal to continue advancing and make up for shrinkage. See the German translation at page 8, line 24 to page 9, line 1, and Figure 2 where it can be seen that the skin 12 is not contacted at all by the plunger 1.

On the other hand, in applicants' apparatus, the plunger or piston, remains within the casting chamber or shot cylinder at the point where the die becomes filled. However, the sprue cavity is extended so that the biscuit formed extends from the shot cylinder into the sprue cavity and has a volume sufficient that the solidified cylindrical shell of metal which forms on the biscuit in the shot cylinder bore and the sprue cavity is long enough to allow the piston to create bending moments which crush the solidified cylindrical shell of metal. This permits the piston to continue advancing after the die cavity is filled with molten metal by a distance which injects the additional molten metal into the die cavity to make up for shrinkage.

Clearly, the German reference describes a different apparatus which operates in a different way to achieve the similar result of allowing the piston to continue to inject metal to make up for shrinkage after the die

Appeal No. 96-2301
Application 08/238,465

cavity becomes filled. Accordingly, Claim 1 is not anticipated by the German reference. [See brief, page 5.]

We are unpersuaded by the appellants' arguments. The terminology in a pending applications' claims is to be given its broadest reasonable interpretation (*see In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)) and limitations from a pending application's specification will not be read into the claims (*see Sjolund v. Musland*, 847 F.2d 1573, 1581-82, 6 USPQ2d 2020, 2027 (Fed. Cir. 1988)). Moreover, anticipation by a prior art reference does not require either the inventive concept of the claimed subject matter or the recognition of inherent properties that may be possessed by the prior art reference. *See Verdegaal Brothers Inc. v. Union Oil Co. of California*, 814 F.2d 628, 633, 2 USPQ2d 1051, 1054 (Fed. Cir. 1987). A prior art reference anticipates the subject matter of a claim when that reference discloses, either expressly or under the principles of inherency, each and every element set forth in the claim (*see In re Paulsen*, 30 F.3d 1475, 1478-79, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994) and *In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990)); however, the law of anticipation does not require that the reference teach what the appellants are

Appeal No. 96-2301
Application 08/238,465

claiming, but only that the claims on appeal "read on" something disclosed in the reference (*see Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983)).

Here, Fig. 1 of the German reference discloses a cold chamber die-casting apparatus for casting metal parts comprising die means comprising a fixed die part 4 and a movable die part 5, said die means also defining a "sprue cavity" 2a (i.e., the portion of the cylinder 2 that is within the fixed die part), a shot cylinder (that portion of the cylinder 2 which is to the right of the fixed die part 4), a reciprocally slidable piston 1 and a means 1a advancing the piston, with the "sprue cavity" 2a having a volume sufficient that a solidified cylindrical shell 10 of metal is formed (see translation, page 7, lines 25-28) which is thin enough to allow the piston to crush the solidified cylindrical shell (see the sentence bridging pages 7 and 8). Thus, we find response in the prior art arrangement illustrated by the German reference in Fig. 1 for all the subject matter as broadly recited in independent claim 1. Indeed, it does not appear that this claim even defines over the "prior art" arrangement the appellants have described in their specification where the solidified cylindrical shell appears to be thin enough to also be crushed (albeit at "very high pressures" with "limited success" - see page 5, lines 27-29).

Appeal No. 96-2301
Application 08/238,465

In view of the foregoing, we will sustain the examiner's rejection of claim 1 under 35 U.S.C. § 102(b) and, in view of the above-noted grouping of the claims by the appellants, we will also sustain the rejection of claims 9, 10 and 14-16 under 35 U.S.C. § 103.

Turning to the rejection of claims 2-5, 7, 8, 11-13 and 17-19 under 35 U.S.C. § 103 based on the German reference, it is the examiner's position that it would have been obvious to: (1) provide the German reference with a riser or reservoir since it is "common practice," (2) make such a reservoir spherical in shape because it "has a smallest surface to volume ratio in according [sic, in accordance with the] theory of Geometry" and (3) provide a concave surface "if the tip of the plunger" hits the wall. The examiner also states that it is common knowledge that a stronger material will have a longer service life and, therefore, the use of a steel plunger instead of a copper plunger "is deemed to be a matter of design choice." The problem is, however, that the examiner has provided no **evidence** which is supportive of his position. Obviousness under § 103 is a legal conclusion based on **factual evidence** (*In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988)) and the subjective opinion of the examiner as to what is or is not obvious, without

Appeal No. 96-2301
Application 08/238,465

evidence in support thereof, does not suffice. While the examiner may be correct in his assertion that it is "common practice" to provide a reservoir, he has provided no prior art reference which shows this to be the case. Moreover, even if the examiner provided a reference to show that reservoirs are conventional in the art, it does not follow that just because, generally speaking, a sphere has a "smallest surface to volume ratio" that it would have been obvious to make such a prior art reservoir spherical in shape. Similarly, it does not follow that (1) just because the plunger tip hits the wall that it would have been obvious to provide the wall with a "complementary concave rear face" (claim 11) or (2) just because a stronger material would make the plunger last longer than the provision of steel (claims 12 and 13) can be dismissed as a matter of design choice.

Since the examiner has not provided a factual basis which is supportive of his position (*see In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967)), we will not sustain the examiner's rejection of claims 2-5, 7, 8, 11-13 and 17-19 under 35 U.S.C. § 103.

Under the provisions of 37 C.F.R. § 1.196(b) we make the following new rejections.

Claims 1-5 and 7-19 are rejected under 35 U.S.C. § 112, first paragraph, as being based upon a nonenabling disclosure.

Appeal No. 96-2301
Application 08/238,465

As our reviewing court stated in *In re Wright*, 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993):

Although not explicitly stated in section 112, to be enabling, the specification of a patent must teach those skilled in the art how to make and use **the full scope** of the claimed invention without "undue experimentation." ... (the first paragraph of section 112 requires that the **scope of protection sought in a claim bear a reasonable correlation to the scope of enablement provided by the specification**). Nothing more than objective enablement is required, and therefore it is irrelevant whether this teaching is provided through broad terminology or illustrative examples. [Citations omitted; emphasis ours.]

Here, we are of the opinion that the scope of protection sought in the claims on appeal does not bear a reasonable correlation to the scope of enablement provided by the appellants' disclosure. In particular, we point out that independent claim 1 broadly requires that the sprue cavity have "a volume sufficient that" the solidified cylindrical shell is "thin enough to allow" the piston to crush the shell and independent claim 14 requires the step of "sizing" the sprue cavity to a "volume sufficient to form a solidified cylindrical shell of metal thin enough" to be crushed by the piston. While the appellants' specification identifies the problem that the formation of a solidified cylindrical shell requires very high pressures in order to

Appeal No. 96-2301
Application 08/238,465

advance the piston "to make up for shrinkage porosity" (see page 5), the primary solution set forth in the specification is to increase the depth of the sprue cavity along a portion thereof by eliminating the shoulder 65 of the prior art (see page 7).

Independent claims 1 and 14 are not in any way directly related to the elimination of this shoulder but, instead, are much more broadly couched in terms of "sufficient volume." In fact, as we have noted above in the § 102 rejection, claim 1 is so broad that it appears to read directly on the prior art arrangement described on page 5 of the specification **which has a shoulder.**

The same can be said regarding the breadth of claim 14. The appellants' specification makes no specific teachings of what "volumes" might be necessary, gives no working examples or teaches how such "volumes" should be calculated or arrived at. Similarly, claims 2 and 17 recite that the reservoir contain a volume of molten metal "sufficient to delay solidification" without (1) providing any specific teachings of what "volumes" might be necessary, (2) giving working examples or (3) teaching how such a "volume" should be calculated or arrived at.

Particularly in view of the vast number of "volumes" possible for a cold chamber die casting apparatus, we are of the opinion that the appellants disclosure fails to enable a person skilled in the

Appeal No. 96-2301
Application 08/238,465

art to make and use the claimed invention **without undue experimentation**. See *In re Scarbrough*, 500 F.2d 560, 566, 182 USPQ 298, 303 (CCPA 1974).

Claim 11 is rejected under 35 U.S.C. § 103 as being unpatentable over the German reference in view of Bauer. Bauer in Fig. 5 shows the working face of the sprue cavity being provided with a concave face for the self-evident purpose of accommodating a convex working face on the piston 30. A combined consideration of Fig. 1 of the German reference and Fig. 5 of Bauer would teach the artisan that (1) a flat working face on the sprue cavity in conjunction with a flat face on the piston and (2) a concave face on the sprue cavity in conjunction with a convex working face on the piston are art-recognized equivalents, thus fairly suggesting to the artisan to provide the German reference with a concave face on the sprue cavity and a convex face on the piston.

Claims 12 and 13 are rejected under 35 U.S.C. § 103 as being unpatentable over the German reference in view of Morita. Morita in column 6, lines 49-55 teaches that when it is desired to cast iron or various types of steel, the driving piston should be made of steel. Accordingly, it would have been obvious to one

Appeal No. 96-2301
Application 08/238,465

of ordinary skill in this art to make the driving piston of Fig. 1 of the German patent of steel in order to achieve the advantage of casting these metals.

In summary:

The examiner's rejection of claim 1 under 35 U.S.C. § 102(b) and claims 9, 10 and 14-16 under 35 U.S.C. § 103 are sustained.

The examiner's rejection of claims 2-5, 7, 8, 11-13 and 17-19 are reversed.

New rejections of claims 1-5 and 7-19 under 35 U.S.C. § 112, first paragraph, and claims 11-13 under 35 U.S.C. § 103 have been made.

Any request for reconsideration or modification of this decision by the Board of Patent Appeals and Interferences based upon the same record must be filed within one month from the date hereof (37 C.F.R. § 1.197).

With respect to the new rejections under 37 C.F.R. § 1.196(b), should appellants elect the alternate option under that rule to prosecute further before the Primary Examiner by way of amendment or showing of facts, or both, not previously of record, a shortened statutory period for making such response is hereby set to expire two months from the date of this decision. In the

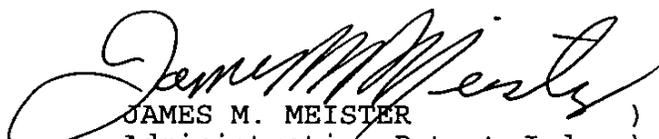
Appeal No. 96-2301
Application 08/238,465

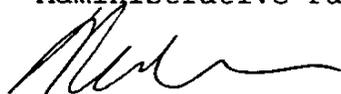
event appellants elect this alternate option, in order to preserve the right to seek review under 35 U.S.C. § 141 or 145 with respect to the affirmed rejections, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejections are overcome.

If the appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to us for final action on the affirmed rejections, including any timely request for reconsideration thereof.

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

AFFIRMED-IN-PART
37 C.F.R. § 1.196(b)


JAMES M. MEISTER)
Administrative Patent Judge)


NEAL E. ABRAMS)
Administrative Patent Judge)


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Appeal No. 96-2301
Application 08/238,465

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