Paper No. 34

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte PATRICIO F. MENDEZ, CHRISTOPHER S. RICE,
STUART B. BROWN and SHINYA MYOJIN

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Appeal No. 2003-1583
Application 09/253,235

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ON BRIEF

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Before KIMLIN, OWENS and KRATZ, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal is from the final rejection of claims 31-41, which are all of the claims pending in the application.

THE INVENTION

The appellants claim an apparatus and a method for producing a semisolid metal slurry and using it for casting. Claim 38, directed toward the method, is illustrative:

38. A method for producing a component from semi-solid metal comprising the steps of:

receiving a metal from a source of molten metal maintained at a predetermined temperature range above a solidification temperature of the metal in a container having a wall,

forming the metal received in the container into a semi-solid condition including molten metal and solid particles with a thermal control system including a heater and an agitator positioned adjacent the wall within the container and designed to shear dendrites from the wall of the container and to mix dendrites in the molten metal,

maintaining the metal in the semi-solid condition in a substantially isothermal state by applying heat as required and continuing the shearing and mixing,

transferring a portion of the metal to a casting device,

maintaining the portion of the metal transferred in the semi-solid condition prior to casting, and

casting the portion of the metal into the component with the casting device.

THE REFERENCE

Sato et al. (JP '345)[1] 01-178345 Jul. 14, 1989
(Japanese Kokai laid open patent publication)

[1] Citations herein to JP '345 are to the English translation thereof which is of record.

THE REJECTIONS

The claims stand rejected as follows: claims 31-33 and 35-39 under 35 U.S.C. § 102(b) as anticipated by JP '345, and claims 40 and 41 under 35 U.S.C. § 103 as obvious over JP '345.

OPINION

We affirm the aforementioned rejections.

The appellants state that the claims stand or fall separately (brief, page 7). We discuss the claims separately to the extent justified by the appellants' arguments. *See In re Ochiai*, 71 F.3d 1565, 1566 n.2, 37 USPQ2d 1127, 1129 n.2 (Fed. Cir. 1995); 37 CFR § 1.192(c)(7)(1997).

JP '345 discloses an apparatus and a method for producing a semisolid metal slurry and using it to make castings (page 3). Molten metal is supplied to the apparatus through a molten metal supply pipe (5) to a vessel (3) having, between its iron skin (1) and fire resistant liner (2), thermal media supply pipes (6) and coolant supply pipes (7) (page 4). Molten metal in the vessel is stirred with stirrer 16 which has a polygonal or cylindrical shape and has embedded therein an iron piece (18) which creates an induction electric current for heating the stirrer (pages 4-6). "[S}tirrer 16 provides stirring and shearing effects to the molten metal so that growing dendrite structures are crushed and

fine spherical crystal grains uniformly coexist in the molten metal, thereby producing the semi-solidified metal slurry" (page 6). Selected amounts of the semisolid metal slurry are sequentially supplied to casting mold 28 (pages 6-7).

The appellants acknowledge that JP '345 discloses a source of molten metal maintained at a temperature above the solidification temperature, and argue that the reference does not disclose that the source maintains the metal within a predetermined temperature range above the temperature at which the metal will begin to solidify as required by claims 31 and 38 (brief, page 12; reply brief, page 2). This argument is not well taken because the disclosure in JP '345 that the metal is supplied in molten form (page 4), not semisolid form, indicates that it is at a predetermined temperature above the temperature at which it will begin to solidify.

The appellants argue that JP '345 does not disclose that the semisolid metal bath is maintained in a substantially isothermal state as required by claims 32, 38 and 39 (brief, page 13). JP '345, however, discloses that the metal bath temperature is controlled (page 4) and that fine spherical crystal grains uniformly coexist in the molten metal (page 6). It is not apparent how the grains could uniformly coexist in the metal

without the temperature throughout the metal bath being uniform. Consequently, this disclosure in JP '345 indicates that the metal bath is isothermal.

The appellants argue that JP '345 does not disclose that the stirrer is disposed adjacent to the side wall for movement within the vessel to shear dendrites formed on the side wall as required by claims 33, 36 and 38 (brief, pages 15-19). The JP '345 dendrites, the appellants argue, could be formed at the interface between the molten metal bath and the gas above it, rather than being formed on the side wall (brief, page 18). Regardless of whether some dendrites could form at the molten metal/gas interface, the teaching that the cooling pipes around the vessel cool the molten metal (page 4) indicates that dendrites are formed on the cooled vessel wall. JP '345 does not indicate that these dendrites build up on the vessel wall. Thus, the teaching that the shearing effects of the stirrer crush growing dendrites (page 6) indicates that the stirrer shears dendrites from the wall. The similarity of the structures of the apparatus of JP '345 and the appellants, i.e., an elongated stirrer near a cooled wall (compare the JP '345 figure and the appellants' figure 1), supports this finding.

The appellants argue that JP '345 fails to disclose that the stirrer mixes the dendrites in three dimensions as required by claims 39 and 41 (brief, page 19). A stirrer having a polygonal or cylindrical shape, the appellants argue, is not conducive to stirring in three dimensions. *See id.* JP '345 does not describe the periphery of the stirrer. However, the teaching that the fine spherical crystal grains uniformly coexist in the molten metal (page 6) indicates that there is sufficient three dimensional mixing for this uniformity to be obtained. Moreover, the examiner finds that a stirring method cannot produce a flow pattern which is not three dimensional to some extent (answer, page 7). Because the appellants do not challenge this finding, we accept it as fact. *See In re Kunzmann*, 326 F.2d 424, 425 n.3, 140 USPQ 235, 236 n.3 (CCPA 1964). The appellants argue that the specification defines three dimensional mixing inferentially (reply brief, pages 5-7). The relied-upon disclosures in the specification describe the two-rotor embodiment shown in figure 1. The appellants are reading this embodiment into claims 39 and 41, which is improper. *See In re Prater*, 415 F.2d 1393, 1405, 162 USPQ 541, 551 (CCPA 1969).

The appellants argue that JP '345 does not disclose or suggest 1) transferring an amount of semisolid metal to the casting device which is less than 10% of the volume of semisolid metal in the container as required by claim 40, or 2) replacing the transferred portion of semisolid metal with a like quantity of molten metal as required by claim 41 (brief, pages 25-27). The examiner argues that to carry out the JP '345 casting process at steady state, one of ordinary skill in the art would have added molten metal to the vessel in small increments, including increments less than 10% of the semisolid metal volume, so as to minimize temperature fluctuations in the semisolid metal bath (answer, page 9). The appellants point out that JP '345 does not disclose that the apparatus is operated at steady state, and argue that the disclosure leaves the impression that the apparatus is operated batchwise (reply brief, page 8). The appellants do not point out, and it is not apparent, what it is about the disclosure that leaves that impression. Because JP '345 does not limit the disclosure to either batch or continuous operation, it reasonably appears that the reference would have fairly suggested either of these modes of operation to one of ordinary skill in the art. The examiner's finding that in the continuous mode, one of ordinary skill in the art would have

added the molten metal in small percentages of the semisolid metal volume to minimize temperature fluctuations in the semisolid metal bath is reasonable and has not been challenged by the appellants. Therefore, we accept it as fact. *See Kunzmann*, 326 F.2d at 425 n.3, 140 USPQ at 236 n.3.

For the above reasons we conclude that the claimed invention would have been obvious to one of ordinary skill in the art within the meaning of 35 U.S.C. § 103.

DECISION

The rejections over JP '345 of claims 31-33 and 35-39 under 35 U.S.C. § 102(b) and claims 40 and 41 under 35 U.S.C. § 103 are affirmed.

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

AFFIRMED

EDWARD C. KIMLIN Administrative Patent Judge	)	
TERRY J. OWENS Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
PETER F. KRATZ Administrative Patent Judge	)	

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