UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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*Ex parte* WAYNE F. SQUIRES

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Appeal 2008-1692
Application 10/983,962
Technology Center 1700

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Decided: April 29, 2008

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Before EDWARD C. KIMLIN, CATHERINE Q. TIMM, and
ROMULO H. DELMENDO, *Administrative Patent Judges*.

DELMENDO, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from a final rejection of all pending claims (claims 1-16). (Final Office Action entered July 19, 2006). We have jurisdiction under 35 U.S.C. § 6(b).

Appellant's invention relates to an apparatus for die casting where "molten or semi-molten metal is injected under pressure into hardened steel dies." (Spec. ¶ 0004). As described in the Specification, "[m]olten or semi-molten metal to be cast is charged into the die cavities by a charging assembly that includes a pressure cylinder or 'shot sleeve' for receiving molten metal from an inlet, a piston movable in the shot sleeve for forcing the molten metal into the die cavities, and a shot block extending over the shot sleeve and connected to the die." (Spec. ¶ 0006). According to Appellant, "the present invention utilizes a shot block that does not encompass the shot sleeve as know[n] in the prior art so that cooling effects provided by the shot block act directly upon the biscuit rather than indirectly on the biscuit through the shot sleeve." (Spec. ¶ 0012). The claims are directed to the shot block alone (claims 12-16) and the shot block combined with other elements for a die casting machine (claims 1-11).

Representative claims 1, 8, 12, and 13 read as follows:

> 1. A die casting machine for creating a die cast component from a molten or semi-molten metal charge, said die casting machine comprising:
>
> a first die and a second die configured for confronting engagement with one another along a separation surface and together defining at least one die cavity therebetween;
>
> a shot block having mutually opposed first and second engagement surfaces and a passage extending therethrough from the first engagement surface to the second engagement surface, said passage in fluid communication with said die cavity for transmitting a molten or semi-molten metal charge to said die cavity;
>
> a cooling channel within said shot block for circulating a fluid therethrough to absorb heat from said charge located within at least a portion of said shot block passage;

a shot sleeve having a passage, said shot sleeve abutting said shot block along the first engagement surface wherein said shot sleeve passage is in fluid communication with said shot block passage for transmitting said charge to said shot block passage;

a plunger disposed within said shot sleeve passage for forcing said charge through said shot sleeve; and

wherein a cross-section of said shot sleeve passage is substantially equal to a cross-section of said shot block passage so that said plunger is capable of entering said shot block passage.

8. A die casting machine for creating a die cast component from a molten or semi-molten metal charge; said die casting machine comprising:

a first die and a second die configured for confronting engagement with one another along a separation surface and together defining at least one die cavity therebetween;

a shot block having mutually opposed first and second engagement surfaces and a generally cylindrical passage extending therethrough from the first engagement surface to the second engagement surface, said passage in fluid communication with said die cavity for transmitting a molten or semi-molten metal charge to said die cavity, said passage having a diameter;

a cooling channel within said shot block for circulating a fluid therethrough to absorb heat from said charge located within at least a portion of said passage;

a shot sleeve having a generally cylindrical passage with a diameter, said shot sleeve abutting said shot block along the first engagement surface, wherein said shot sleeve passage is in fluid communication with said shot block passage for transmitting said charge therethrough to said shot block passage;

a plunger disposed within said shot sleeve passage for forcing said charge through said shot sleeve; and

wherein the diameter of said shot block passage is substantially equal to the diameter of said shot sleeve passage

so that said plunger is capable of entering said shot block passage.

12. A shot block for use in a die casting machine wherein said shot block provides fluid communication of a molten or semi-molten metal charge between a shot sleeve and a die having a die cavity, the shot block comprising:

a body having mutually opposed first and second engagement surfaces, said first engagement surface abutting a shot sleeve and said second engagement surface abutting a die having a die cavity;

a passage extending longitudinally through said body and defining an opening at said first engagement surface and an opening at said second engagement surface for transmitting a molten or semi-molten metal charge under pressure through said passage;

a cooling channel within said body for circulating a fluid therethrough to absorb heat from said charge located within at least a portion of said passage.

13. The shot block of claim 12 wherein said passage is substantially cylindrical.

The prior art relied upon by the Examiner to reject the claims on appeal are:

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|---|---|---|
| Guha | 6,591,894 B2 | Jul. 15, 2003 |

Appellant's description of the admitted prior art in the Specification at pp. 2-4.

The following rejections are before us for review:

Claims 12 and 14 are rejected under 35 U.S.C. § 102(a) as being anticipated by Appellant's admitted prior art.

Claims 13 and 15-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Appellant's admitted prior art.

Claims 1-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the teachings of Guha.

## ISSUES

Has Appellant shown a reversible error in the Examiner's determination that the prior art described in the Specification anticipates the subject matter of claims 12 and 14?

Has the Appellant shown a reversible error in the Examiner's determination that the subject matter of claims 13, 15, and 16 would have been obvious over the Appellant's admitted prior art?

Has Appellant shown the Examiner reversibly erred in determining claims 1-16 would have been obvious to one of ordinary skill in the art over the teachings of Guha?

## FINDINGS OF FACT

1. The Specification discusses conventional die casting machines where "[m]olten or semi-molten metal to be cast is charged into the die cavities by a charging assembly that includes a pressure cylinder or 'shot sleeve' for receiving molten metal from an inlet, a piston movable in the shot sleeve for forcing the molten metal into the die cavities, and a shot block extending over the shot sleeve and connected to the die." (Spec. ¶ 0006).

2. The Specification discloses a prior art shot block in Figure 2, reproduced below:

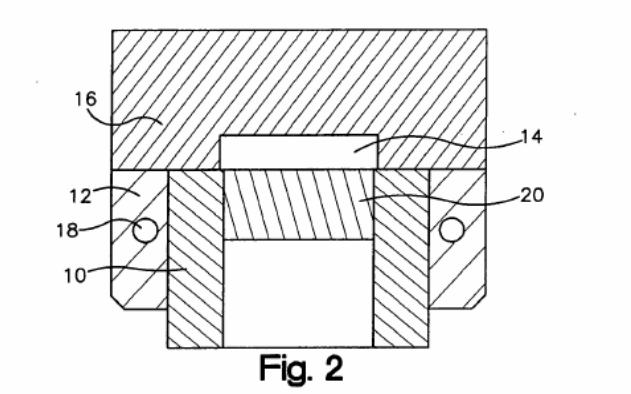

Fig. 2

Figure 2 depicts a prior art shot block 12 with cooling passages 18 and metal charge or biscuit 20, arranged with sleeve 10, runner block 16, and runner 14. (Spec. ¶ 0016, 0022; Figure 2).

3. The prior art shot block 12 has mutually opposed first and second engagement surfaces that are able to abut to elements or devices placed against them; the second engagement surface abuts to runner block 16 and the mutually opposed first engagement surface is free, and able to abut to elements placed against its surface. (Spec. Figure 2).

4. Consistent with the ordinary meaning of "abut," the Specification establishes that the term "abut," as used in Appellant's claimed invention, is an arrangement between the inventive shot sleeve and shot block where the shot sleeve is adjacent or touches the shot block. (Spec. ¶ 0028, Figure 3).

5. Guha states conventional die casting machines include a "charging assembly which includes a pressure cylinder for receiving molten metal from an inlet, a piston movable in the pressure cylinder for forcing the molten metal into the die cavities, and a shot block made from conventional tool steel mounted in or on the cover die half of the die," where "[t]he shot block defines a manifold or reservoir for receiving molten metal from the pressure cylinder and supplying this molten metal to the die cavities." (Col. 1, ll. 33-39).

6. It is common knowledge to make a mechanical connection between the shot block and other steel parts of the die casting machine as a mounting in or on other parts. (Guha, col. 3, ll. 58-59).

7. Guha discloses a conventional die with runners located in the separation surfaces between the die halves (Col. 1, ll. 42-43).

8. Guha teaches a die casting machine "equipped with a shot block . . . such that it received the end of a shot sleeve (pressure cylinder), provided for receiving an associated plunger." (Col. 8, ll. 10-13).

9. Guha claims the "shot block further being shaped to receive the plunger of the die casting machine." (Col. 9, ll. 9-10).

10. In the context of the configuration of structural parts, "receive" means "to bear the weight or force of; support," as well as "to take in, hold, or contain." (receive. Dictionary.com. *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. (accessed: April 09, 2008) http://dictionary.reference.com/browse/receive.

11. Guha states "the time it takes molten metal in the shot block reservoir to solidify sufficiently represents the constraining factor in achieving shorter cycle times in 25 to 50% of commercial die casting operations." (Col. 2, ll. 9-13).

12. Appellant states that it is known in the art that "[i]t is always desirable to shorten cycle times in the die casting operation to improve efficiency and increase production." (Spec. ¶ 0008).

## PRINCIPLES OF LAW

Anticipation requires that a single prior art reference discloses, either expressly or under the principles of inherency, each and every element of the claimed invention. *In re King*, 801 F.2d 1324, 1326 (Fed. Cir. 1986).

"During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow." *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989).

"One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims." *KSR Int'l. Co. v. Teleflex Inc.*, 127 S. Ct 1727, 1742 (2007).

## ANALYSIS

The Rejections of Claims 12 and 14 Based on 35 U.S.C. § 102 over the Admitted Prior Art.

Appellant submits arguments for claims 12 and 14 under separate subheadings, but relies on similar arguments in discussing these claims. We address these arguments accordingly.

Appellant states that "claim 12 is directed towards a shot block for use in a die casting machine." (Br. 19, l.15). Appellant asserts that the admitted prior art does not teach all the limitations of claim 12 because the Specification's description of the prior art "contemplates 'a shot block extending over a sleeve' . . . illustrated in prior art figures 1 and 2 of the application," (*Id*. 20, ll. 2-8), not a shot block that "includ[es] the structural

limitation of [a] 'first engagement surface abutting a shot sleeve.'" (*Id*. 19, ll. 27-28).

We cannot agree with Appellant. A shot block is one part of a charging assembly in a conventional die casting machine. (FF 1, 3). As recognized by Appellant, Claim 12 is directed to this one part, *a shot block for use in* a die casting machine. (Br. 19, l. 15). Using the phrase "a shot block for use in" sets a functional relationship between the claimed shot block and other elements described in the claim body, such as a shot sleeve and a die. Taking into account this functional relationship, we determine that the claim scope does not include a shot sleeve combined with the shot block. Here, the shot block is claimed alone. While the claimed shot block includes structure of a "first engagement surface abutting a shot sleeve," this structure only sets out how a shot block engagement surface would relate to a shot sleeve, if a shot sleeve were combined with the shot block. To construe the claim otherwise would result in an inconsistency with the claim limitation a "shot block for use in a die casting machine." The Specification's Figure 2 shows a prior art shot block having an engagement surface to which a shot sleeve could abut. (FF 2, 3). Though the prior art shot sleeve is shown positioned within a shot block, this overlapping arrangement does not negate the engagement surface of the shot block, to which a different shot sleeve could abut.

Though the Appellant vaguely implies that the sleeve may be included in the claim by stating that an "amendment clarified the claim by removing the functional language of 'capable of abutting engagement' to form a structural limitation of the 'first engagement surface abutting a shot sleeve,'" Appellant never explicitly argues that the shot sleeve is a required element

of claim 12. (Br. 19 bridging to 20). Removing the "capable of abutting" language, which solidified the claim scope as directed to a shot block for use with other elements in a die casting machine, and replacing with "surface abutting a shot sleeve," which is inconsistent with the "for use in" phrase of the claim, does not help clarify the claim. During prosecution, Appellant could have clearly amended claim 12 similarly to claims 1 and 8, which recite a shot sleeve in combination with the shot block; he did not so amend the claim. Giving the claim its broadest reasonable reading, as directed by *In re Zletz*, the Examiner determined that the scope of claim 12 did not include the shot sleeve, but required the shot block alone. (Ans. 6 bridging to 7). As the burden of precise claim drafting is Appellant's, not the PTO's, we agree with the Examiner that the claim scope does not include a shot sleeve. *In re Morris*, 127 F.3d 1048, 1056 (Fed. Cir. 1997) ("It is the applicants' burden to precisely define the invention, not the PTO's."). The Examiner found the claimed shot block indistinguishable from the prior art shot block described in Appellant's Specification. (Ans. 3, ll. 8-14). Appellant has not shown any persuasive evidence that the Examiner erred in his determination that the prior art anticipates the shot block recited in claim 12.

With regards to dependent claim 14, Appellant states the claim "inherits the limitation of 'a body having mutually opposed first and second engagement surfaces where the second engagement surface abuts a shot sleeve,'" and relies on similar arguments as discussed above with respect to independent claim 12. (Br. 20, l. 11 – 21, l. 2). These arguments are unpersuasive, as discussed above, to show that the Examiner erred in determining the prior art anticipates the claimed invention.

The Rejections of Claims 13, 15, and 16, Based on 35 U.S.C. § 103 over the Admitted Prior Art.

Appellant argues claims 13, 15, and 16 together. Accordingly, we select claim 13 as representative and confine our discussion to this claim. 37 C.F.R. § 41.37(c)(1)(vii) (2006).

Appellant states that claim 13 "inherits the limitations of 'a body having mutually opposed first and second engagement surfaces where the second engagement surface abuts a shot sleeve.'" (Br. 21, ll. 10-11). Appellant argues that with this limitation and "[i]n light of the arguments presented herein that claim 12 is patentable over the prior art," the Examiner "fails to satisfy the requirements for a 35 U.S.C. § 103 obviousness rejection." (*Id*. 21, ll. 15-17). For the same reasons as discussed with Appellant's arguments regarding claim 12 above, we agree with the Examiner that claim 13 would have been obvious in view of the prior art. Appellant has not successfully rebutted the Examiner's obviousness determination.

The Rejections of Claims 1-16, Based on 35 U.S.C. § 103 over Guha.

With respect to the Examiner's rejections of claims 1-16, Appellant submits arguments for claims 1, 8, and 12 under separate subheadings. We address these arguments accordingly.

Claim 1.

Appellant does not contest the Examiner's finding that Guha discloses a die casting machine including a first and second die, a shot block for transmitting molten metal charge to the die cavity, a fluid cooling channel within the shot block, a shot sleeve having a passage, and a plunger within

the shot sleeve. (Br. 11-21). Rather, Appellant contends that Guha does not teach the limitations of:

> 1) the shot sleeve abutting the shot block along the first engagement surface wherein the shot sleeve passage is in fluid communication with the shot block passage; and
> 2) a cross-section of the shot sleeve passage substantially equal to a cross-section of the block passage so that a plunger is capable of entering the shot block passage.

(*Id*. 12, ll. 19-26). Appellant argues that the prior art does not describe a shot sleeve abutting a shot block, as required in the claim, because Guha describes a "shot block 'receiving' an end of the shot sleeve," and has used "receive" or "received" in other locations of the reference "to indicate one element entering a second element." (*Id*. 14, ll. 7-15). Appellant asserts that Guha has not defined "receive" and "nothing in the reference leads to a conclusion that 'received' means abutting." (*Id*. 14, ll. 10-11). Furthermore, Appellant argues that the Examiner has not established a prima facie case of obviousness for claims 1-16 because the Examiner did not identify a motivation to modify the prior art to meet the claim limitations, discuss why any modification would have a reasonable expectation of success, or assert how Guha teaches or suggests every claim limitation. (*Id*. 12, ll. 5-11).

We cannot agree with Appellant's argument. Guha discloses a die casting machine including a shot sleeve (pressure cylinder) with a piston or plunger and a shot block where the plunger forces molten metal to flow from the shot sleeve to the shot block and then to the die cavities. (FF 5). While claim 1 requires a shot sleeve to abut a shot block, Guha teaches to arrange the shot block and shot sleeve such that the shot block "receives" the end of the shot sleeve. (FF 8). Guha does not define the term "receives" within the

reference so we look to what one of ordinary skill in the art would consider as its ordinary meaning within Guha's disclosure. The dictionary defines "receive" as "to bear the weight or force of; support," as well as, "to take in, hold, or contain." (FF 10). Therefore, the term "receive" is consistent with an "abutting" arrangement between the shot sleeve and shot block. (FF 4). Guha teaches arranging the shot block and shot sleeve passages so the shot block accepts the shot sleeve's associated plunger while the shot block receives the end of a shot sleeve. (FF 8 and 9). The term "receive" supports a limited number of shot sleeve and shot block connection arrangements. In one arrangement, the shot sleeve would extend into, or overlap, the shot block. In another arrangement, the shot sleeve and shot block would not overlap. With these limited choices to arrange a shot sleeve and shot block connection, it would have been obvious to one of ordinary skill in the art to employ either arrangement, aligning respective passages, and enabling the plunger to force molten metal to flow from the shot sleeve to the shot block to the die cavities. An expectation of success to achieve a mechanical connection between the shot sleeve and shot block is common knowledge, as it is known to mount the shot block in or on other parts (FF 6).

Additionally, Guha addresses die casting commercial concerns and states that "the time it takes molten metal in the shot block reservoir to solidify sufficiently represents the constraining factor in achieving shorter cycle times in 25 to 50% of commercial die casting operations." (FF 11). In recognizing market forces, Appellant states that it is known in the art that "[i]t is always desirable to shorten cycle times in the die casting operation to improve efficiency and increase production." (FF 12). Given the market forces and the limited number of arrangements to connect the shot block and

shot sleeve, one of ordinary skill in the art would have found it obvious to abut the shot sleeve with the shot block to connect the fluid passages of each. *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742 (2007) ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.").

Furthermore, Guha discloses the shot block shape receives the plunger associated with the shot sleeve. (FF 8 and 9). The Examiner determined that the use of the shot sleeve associated plunger in the shot block would suggest that the shot sleeve and shot block passages have the same cross-sectional (and diameter) dimension. (Ans. 6, ll. 10-17). Having the same cross-sections (and diameters) provides a substantial fit between the plunger and each passage, respectively, enabling the plunger to develop sufficient pressure to efficiently force molten metal through the shot sleeve and shot block. Using similar dimensions to accommodate the same plunger would have been obvious to one of ordinary skill in the art. *In re Preda*, 401 F.2d 825, 826 (CCPA 1968) ("[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom."). Appellant has failed to present sufficient evidence to rebut the Examiner's obviousness determination.

Claim 8.

In discussing claim 8, Appellant relies on similar arguments presented with respect to claim 1, above. Appellant argues that Guha

does not teach: 1) "the shot sleeve abutting the shot block along the first engagement surface" with fluid communication between the shot sleeve and shot block, or 2) "a diameter of the shot sleeve passage substantially equal to a diameter of the block passage so that a plunger is capable of entering the shot block passage." (Br. 15, ll. 5-15). As discussed above, we find Appellant's arguments unpersuasive to show the Examiner erred in finding the abutting relationship of the shot block and shot sleeve obvious to one of ordinary skill in the art. Furthermore, the consideration of diameters is incorporated in the discussion above regarding the cross-sections of the shot block and shot sleeve passages. Moving the same plunger from the shot sleeve to the shot block suggests using substantially same shot sleeve and shot block diameters in the same manner as suggesting substantially same cross-sections.

Claim 12.

Again, Appellant submits similar arguments as discussed with respect to claims 1 and 8 above to contend that the "Examiner has not shown that Guha teaches or suggests a shot block with a body having mutually opposed first and second engagement surfaces where the first engagement surface abuts a shot sleeve." (Br. 17, ll. 20-22).

Appellant's arguments remain unpersuasive. Claim 12 is directed to a shot block for use in a die casting machine, as discussed above. The Examiner found that Guha teaches a shot block between a shot sleeve and the runner (Ans. 4 bridging to 5). The runners are in the die, located in the separation surfaces between the die halves (FF 7). Therefore, since the shot block is located between the shot sleeve and die, connecting to these

elements on either side of the block would necessarily require opposing surfaces. Choosing abutting arrangements to connect mechanically to these opposing surfaces would have been obvious to one of ordinary skill in the art, as discussed above with respect to claim 1. Appellant has not satisfied his burden to show that the Examiner erred in determining the claim would have been obvious to one of ordinary skill in the art.

## CONCLUSION

Appellant has failed to show that the Examiner reversibly erred in determining that Appellant's admitted prior art anticipates claims 12 and 14. Also, Appellant has not shown that the Examiner erred in determining that one of ordinary skill in the art would have found the subject matter of claims 13, 15, and 16 obvious over Appellant's admitted prior art. Finally, Appellant has not shown the Examiner erred in determining claims 1-16 would have been obvious to one of ordinary skill in the art over the teachings of Guha. Therefore, we affirm the decision of the Examiner to reject appealed claims 1-16.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

## AFFIRMED

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