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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JODY SLIKE, PAUL PO-WEN YU and PATRICK
HERTRICH

Appeal 2011-000023
Application 11/308,339
Technology Center 3700

Before: MICHAEL C. ASTORINO, PATRICK R. SCANLON and
BARRY L. GROSSMAN, *Administrative Patent Judges*.

GROSSMAN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from a rejection of claims 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

The Claimed Subject Matter

The claimed subject matter relates to a pump and methods for increasing static pressure within a seal cavity of the housing of a centrifugal water pump for an internal combustion engine. Spec. [Para 4]. Claims 1, 4, 8, and 16 are the independent claims. Claim 1, a method claim, and claim 8, an apparatus claim, both reproduced below, are illustrative of the claimed subject matter:

1. A method for improving performance of a seal mounted in a housing of a centrifugal water pump for an internal combustion engine, the water pump including an impeller disposed within the housing and mounted for rotation with a shaft extending through the seal, the method comprising:

increasing static pressure within the housing at the seal during operation of the water pump by positioning a plurality of ribs within the seal cavity with a first rib positioned within about 30 degrees of a pump outlet as measured in the direction of rotation of the impeller, the ribs extending toward the seal to reduce fluid velocity around the seal while providing clearance between the plurality of ribs and the seal to allow fluid to flow between the ribs and the seal to improve performance of the seal.

8. A centrifugal fluid pump for an internal combustion engine, the fluid pump comprising:

a housing having an inlet and outlet fluidly coupled to a pumping chamber; and

an impeller disposed within the pumping chamber of the housing and mounted for rotation on a shaft extending into the housing through a seal, the seal having an outer stationary part mounted in the housing and cooperating with an inner rotating

part mounted to the shaft to substantially contain fluid within the housing;

wherein the housing includes a bowl-shaped seal cavity surrounding the seal behind the impeller with a plurality of ribs extending from a seal cavity periphery toward the seal, the ribs positioned to disrupt circular fluid flow behind the impeller induced by impeller rotation and reduce fluid velocity around the seal with at least one rib disposed within about 30 degrees of the outlet, the housing also including at least one slot disposed within about 30 degrees of the outlet and extending through the periphery of the seal cavity and fluidly coupling the seal cavity to the pumping chamber to increase static pressure at the seal.

References

The Examiner relied upon the following prior art references:

Ray	US 5,489,187	Feb. 6, 1996
Fiore	US 5,713,719	Feb. 3, 1998
Ro	US 2005/0152786 A1	July 14, 2005

Rejections

Appellants seek review of the following rejections (App. Br. 5):

1. Claim 1 rejected under 35 U.S.C. § 102(b) as anticipated by Ray;
2. Claims 4, 16, and 18 rejected under 35 U.S.C. § 102(b) as anticipated by Fiore;
3. Claims 2, 6-13, and 15 rejected under 35 U.S.C. § 103(a) as unpatentable over Ray and Fiore;
4. Claims 3 and 14 rejected under 35 U.S.C. § 103(a) as unpatentable over Ray, Fiore, and Ro;
5. Claim 5 rejected under 35 U.S.C. § 103(a) as unpatentable over Fiore and Ro; and

6. Claims 17, 19, and 20 rejected under 35 U.S.C. § 103(a) as unpatentable over Fiore and Ray.

ANALYSIS

Claim 1 Rejected Under 35 U.S.C. § 102(b) As Anticipated By Ray

Appellants argue that (1) Ray does not disclose reducing static pressure at the seal by reducing fluid velocity around the seal, as called for in claim 1 (App. Br. 6), and (2) Ray does not disclose a first rib within about 30 degrees of the pump outlet, as called for in claim 1 (App. Br. 7; Reply Br. 2). Appellants also argue that the Examiner's rejection is “based on a theory of inherency” and is “inefficient as a matter of law.” App. Br. 6.

The following general principles apply to a rejection under Section 102. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989).

If the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if that element is inherent in its disclosure. To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. *In re Robertson*, 169

F.3d 743, 745 (Fed. Cir. 1999) (citations and internal quotation marks omitted).

*Whether Ray Discloses Reducing Static Pressure At The Seal
By Reducing Fluid Velocity Around The Seal*

We first address whether Ray discloses reducing static pressure at the seal by reducing fluid velocity around the seal, as called for in claim 1 and as found by the Examiner. Ans. 4. As found by the Examiner, Ray expressly discloses that the vanes 64, or ribs, reduce the velocity of the fluid within the seal chamber. Ans. 4, citing Ray, col. 5, ll. 13-20. This is the same action (reduced fluid velocity), caused by the same structure (ribs within the seal cavity), as called for in claim 1 and thus, as found by the Examiner (Ans. 4), will result in the same effect as stated in claim 1 – increased static pressure. Indeed, the Specification states that the disclosed invention reduces coolant velocity at the seal and that it is this reduced coolant velocity that increases static pressure and enhances seal performance. Spec. [Para 7]. Appellants’ argument that “the mere presence of ribs does not necessarily increase the static pressure in the cavity” (App. Br. 7 is not persuasive.

According to Appellants, it is spring 56 in Ray that provides pressure at the seal, not increased static pressure caused by positioning ribs within the seal cavity as called for in claim 1. Reply Br. 2. The fact that Ray may use a spring to supplement the seal pressure does not diminish the fact found by the Examiner (Ans. 4) that the reduced fluid velocity in Ray results in increased static pressure at the seal as called for in claim 1.

*Whether Ray Discloses A First Rib
Within About 30 Degrees Of The Pump Outlet*

We next address whether Ray discloses a first rib within about 30 degrees of the pump outlet, as called for in claim 1.

Appellants position is that Ray is unclear about whether a rib is positioned as called for in claim 1. Appellants argue that Ray “appears to be silent with respect the positioning of vane segments 64 relative to the pump outlet”, but that the cross-section of Figure 1 “seems to suggest that vane segments 64 are aligned with discharge 34 and would therefore not meet the claim limitations as suggested by the Examiner.” Reply Br. 2.

The Examiner found that Ray is not “silent” about the positioning of vane segments 64 with respect to the pump outlet. The Examiner found that “[c]onsidering that 6 ribs are disclosed and Figure 2 shows their positioning, it is clear that at least on [sic] of the those ribs would be within 15 degrees of the outlet”¹ Ans. 5. Ray discloses that outer vane segments 64 are equally circumferentially distributed about axis 60 of the impeller shaft. Ray, col. 3, ll. 32-35, figs. 2, 3. This equal distribution results in a rib every 60 degrees. The Examiner also found that the outlet of the pump in Ray is positioned at a point along the circumference of the casing. Ans. 5. Thus, based on the Examiner’s reasoned findings, at least one rib in Ray would be positioned within about 30 degrees of the outlet. If the outlet were placed equidistantly between two ribs, the outlet would be about 30 degrees

¹ The Examiner refers to a rib within “15 degrees” of the outlet. Ans. 5. Claim 1 clearly calls for a first rib “within about 30 degrees of the pump outlet.” The Examiner’s reference to “15 degrees” is deemed a harmless misstatement that apparently confuses the limitation in claim 1 with the limitations in claims 12, 16, and 17, which call for a rib within 15 degrees of the outlet.

from each rib. If the outlet were placed closer to one rib than the other, than it would be less than 30 degrees from the closer rib. Thus, as found by the Examiner, at least one of the ribs in Ray would be positioned as called for in claim 1.

Appellant has not pointed to any evidence or expressed any persuasive reasoning tending to establish that the Examiner erred in his findings of what the reference discloses.

Accordingly, we affirm the rejection of claim 1.

*Claims 4, 16, And 18 Rejected Under 35 U.S.C. § 102(b)
As Anticipated By Fiore*

Appellants argue that Fiore discloses only a single slot; that claims 4 and 18 recite a plurality of generally radially extending slots about the circumference of the seal cavity; and that Fiore therefore cannot anticipate these claims. App. Br. 7. Appellants also argue that the mere presence of ribs, slots, or holes as claimed does not necessarily increase static pressure at the seal. App. Br. 8. Appellants also argue that Fiore does not disclose positioning a plurality of generally radially extending slots about the circumference of the seal cavity with at least one slot positioned within about 30 degrees of a pump outlet. App. Br. 9.

With respect to claim 16, Appellants argue that Fiore does not disclose at least one slot extending into the seal cavity positioned within about 15 degrees from the outlet; at least one rib extending from a seal cavity periphery toward the seal and positioned within about 15 degrees from the outlet; or a plurality of holes in the impeller sized to increase static pressure within the seal cavity, all as called for in claim 16.

The Examiner's position is that claim 16 only requires at least one slot to achieve the increase in static pressure. Ans. 5. The Examiner did not address the other specific limitations called for in claim 16, that is, at least one slot extending into the seal cavity and positioned within about 15 degrees from the outlet and at least one rib extending from a seal cavity periphery toward the seal and positioned within about 15 degrees from the outlet. The Examiner also did not address the specific limitations called for in claims 4 and 18. In explaining the Section 102 rejection of claims 4, 16, and 18 based on Fiore, the Examiner referred to a "prima facie case of obviousness" and concluded that as long as some "motivation or suggestion to combine" the references is provided by the prior art taken as a whole, "the law does not require that the references be combined for the reasons contemplated by the inventor." Ans. 5. The Examiner also found that that the duplication of the single slot disclosed in Fiore would be "within the routine skill in the art." Ans. 6.²

Fiore does not anticipate independent claims 4 and 16 and dependent claim 18 because Fiore does not disclose the slots and/or ribs called for in these claims or the specific position of the slots and/or ribs called for in the claims. The Examiner has not pointed to any evidence or provided a convincing rationale that Fiore discloses, expressly or inherently, each and every element as set forth in claims 4, 16, and 18. Accordingly, we cannot sustain the rejections of claims 4, 16, and 18 under 35 U.S.C. § 102(b) as anticipated by Fiore.

² The Examiner's references to "obviousness," "motivation or suggestion to combine the references," and "routine skill in the art" are not relevant since the rejection of claims 4, 16, and 18 is under Section 102, not Section 103.

*Claims 2, 6-13, And 15 Rejected Under 35 USC § 103(a)
As Unpatentable Over Ray And Fiore*

Claims 2, 6-13 and 15 call for the elements of slots and vent holes. Appellants argue generally that Fiore “teaches away” from Applicants’ invention, and from Ray, because Fiore teaches *increasing* coolant velocity at the seal to flush debris in contrast to the claims which call for *reducing* coolant velocity at the seal to increase static pressure. App. Br. 10.

With respect to the specific claims at issue, regarding claim 2, which depends from independent method claim 1, Appellants argue that neither Ray nor Fiore discloses or suggest increasing static pressure by positioning a plurality of generally radially extending slots about the circumference with at least one slot positioned within about 30 degrees of the pump outlet as called for in claim 2. App. Br. 11.

With respect to claims 6-7, which depend from method claims 2 and 6 respectively, Appellants argue that neither Ray nor Fiore disclose or suggest increasing static pressure by positioning a plurality of circular holes in the impeller. App. Br. 11.

With respect to independent apparatus claim 8 and claims 9 – 11 and 13, dependent directly or indirectly on claim 8, Appellants argue that neither Ray nor Fiore disclose or suggest a housing having ribs positioned with at least one rib disposed within about 30 degrees of the outlet *and* at least one slot disposed within about 30 degrees of the outlet to increase static pressure at the seal. App. Br. 11.

With respect to claim 12, dependent on independent apparatus claim 8, Appellants argue that neither Ray nor Fiore disclose a plurality of slots,

and neither reference discloses at least one slot positioned within about 15 degrees from the outlet to increase static pressure at the seal. App. Br. 11.

Finally, with respect to claim 15, dependent on independent apparatus claim 8, Appellants argue that the specific dimension called for in the claim for the position of each of the ribs, that is, that the ribs extend to within about two millimeters of the stationary part of the seal, is more than an obvious design choice as found by the Examiner. App. Br. 11. Appellants state that the effect of different lengths of ribs on fluid velocities is described and illustrated in the Specification and would not be inherent. App. Br. 11-12.

In the Final Rejection mailed July 22, 2009, the Examiner found that Ray discloses all of the claimed subject matter “except for the cavity having a plurality of generally radially extending slots and a plurality of circular holes in the impeller.” Final Rej. 5. The Examiner also found that Fiore discloses a slot 50 extending into the seal cavity and circular holes 36 to vent fluid from the back face of the impeller. Final Rej. 5-6. The Examiner concluded that it would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the cavity of Ray, with the teachings of Fiore by “providing a plurality of slots in the cavity for the purpose of further flushing the seal cavity and being inherently capable of increasing static pressure in the cavity.” Final Rej. 6. Regarding claim 15, the Examiner concluded that it would have been an obvious matter of design choice to further modify the ribs of Ray by utilizing the specific dimensions as claimed for the purpose of providing clearance for cooling and flushing fluid. Final Rej. 7.

The Examiner has not pointed to any evidence or provided a persuasive analysis to sustain the rejections of claims 2, 6-13 and 15. Neither Ray nor Fiore disclose a single slot or a plurality of slots as called for in the claims. The Examiner has not pointed to anything in the applied references that discloses or suggests the specific position of the slots called for in the claims. The Examiner's explanation of the rejections of claims 2, 6-13, and 15 (Ans. 6) does not provide a persuasive, clear articulation of the reason(s) why the claimed invention would have been obvious based on the applied references. Accordingly, we reverse the rejection of claims 2, 6-13, and 15.

*Claims 3 And 14 Rejected Under 35 U.S.C. § 103(a)
As Unpatentable Over Ray, Fiore, And Ro*

Claim 3, dependent on method claim 2, and claim 14, dependent on apparatus claim 8, both call for slots curved in the direction of impeller rotation. The Examiner cited and applied Ro for the disclosure of curved slots. Final Rej. 6. Ro fails to compensate for the deficiencies noted above in the rejections of the claims on which claims 3 and 14 depend. Accordingly, we reverse the rejections of claims 3 and 14.

*Claim 5 Rejected Under 35 U.S.C. § 103(a)
As Unpatentable Over Fiore And Ro*

Claim 5, dependent on independent method claim 4, calls for curved slots. The Examiner cited and applied Ro for the disclosure of curved slots. Final Rej. 7. Ro fails to compensate for the deficiencies noted above in the rejection of claim 4. Accordingly, we reverse the rejection of claim 5.

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*Rejection Of Claims 17, 19, And 20 Under 35 U.S.C. § 103(a)
As Unpatentable Over Fiore And Ray³*

Claims 17, 19, and 20 depend directly or indirectly from independent apparatus claim 16. For the reasons explained above with respect to claim 16, we also reverse the rejection of claims 17, 19, and 20.

DECISION

We AFFIRM the decision of the Examiner to reject claim 1.

WE REVERSE the decision of the Examiner to reject claims 2-20.

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-IN-PART

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³ The Examiner and Appellants grouped claims 17, 19, and 20 separately even though the references applied, Ray and Fiore, and the ground of rejection, section 103(a), are the same as for claims 2, 6-13, and 15. Accordingly, we also have grouped them separately.