

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* ARVINMERITOR INC.

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Appeal 2007-3869  
Reexamination Control 90/006,932  
Patent 5,046,377  
Technology Center 3600

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Decided: December 22, 2008

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Before JOHN C. MARTIN, LEE E. BARRETT, and MARK NAGUMO,  
*Administrative Patent Judges.*

MARTIN, *Administrative Patent Judge.*

DECISION ON REQUESTS FOR REHEARING

This decision addresses Appellant's "Request for Rehearing With Regard to Affirmed Rejections" and a "Request for Rehearing on New Grounds of Rejection."

Both Requests for Rehearing are denied.

I. THE REQUEST FOR REHEARING  
WITH REGARD TO AFFIRMED REJECTIONS

A. *Who discovered the cause of the back drive  
force problem with the Noel actuator?*

Appellant argues:

At page 18 of the Decision, the Board indicates that it is unclear who discovered the problem that was the cause of undesirable noise with regard to products such as shown in the Noel patent. In fact, Appellant has confirmed it was the inventor of U.S. Patent 5,046,377, Steven Wilkes, who initially discovered the problem. Certainly there is nothing on the record that would indicate anyone else discovered the problem.

In fact, in oral argument, at pages 4, 8 and 9 of the transcript, Appellant's representative indicated that the inventor in fact discovered the tilting problem.

Req. Reh'g at 1. This argument is unpersuasive for several reasons. In the first place, it mischaracterizes our Decision. Rather than finding it unclear who discovered the cause of the problems with the Noel actuator, we found that:

Appellant does not assert, and Mr. Spurr did not testify, that inventors Wilkes and Dean are to be credited with discovering that the back drive force and noise problems were due to tilting of the pinion relative to the motor shaft. As a result, this is not potentially a case in which "a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified." *In re Spinnoble*, 405 F.2d 578, 585 (CCPA 1969).

Decision 18.

Secondly, we do not agree with Appellant's argument that there is nothing on the record to indicate that anyone other than inventor Wilkes discovered the tilting problem. Wilkes's Figure 2, which depicts the tilting problem, is labeled "Prior Art," as is Figure 1, which shows a boss having an inside diameter  $D$  that appreciably exceeds the outer diameter  $d$  of the motor shaft. Appellant does not deny that Figures 1 and 2 represent Noel's bell-shaped member 3. Both of these figures are relied on in Wilkes's "Background of the Invention" to describe the "prevalent" problem of "racing" encountered in some actuator units. *See* Wilkes, col. 1, ll. 63-66 ("A problem which is prevalent and which has not hitherto been satisfactorily overcome in this type of actuator unit is the phenomenon hereinafter referred to as 'racing' which will now be explained as follows."). Specifically, Wilkes relies on Figure 1 to explain that "racing" refers to orbiting of boss 12 around the shaft in a "Hula-Hoop" orbiting action that increases the resistance to sliding of the boss relative to the shaft (*id.* at col. 2, ll. 14-33). More particularly, "[t]he higher the speed of said orbiting, the greater the centrifugal force at the contact point P increasing the resistance to sliding and thus further ensuring continuance and build-up of the 'racing.'" *Id.*, col. 2, ll. 38-42. Wilkes relies on Figure 2 to explain that the racing effect can be amplified if the gear wheel is out of balance viewed in the axial direction along the shaft (*id.*, col. 2, ll. 43-52) and to explain that the out of balance effect, which is greatly exaggerated in Figure 2, can result in non-slipping contact with the shaft (*id.*, col. 2, ll. 53-61).

According to Wilkes, the racing effect

acts surprisingly powerfully to restrict or brake free rotation of the components on the shaft and causes unpleasant and noticeable vibrations accompanied by a whirring or buzzing noise which will often be amplified due the actuator unit being mounted within hollow portions of the vehicle body, such as the void within a door, and in contact, directly or indirectly, with metal door or other panels which may also resonate.

*Id.*, col. 2, l. 62 to col. 3, l. 2. The “Description of the Preferred Embodiments” further explains that the “racing” effect can cause “braking and consequent extra loading” (col. 4, ll. 51-5), i.e., an increase in the back driving force.

Wilkes describes (col. 3, l. 9-10) various prior-art attempts to “avoid or mitigate” the racing effect (*id.*, col. 3, ll. 9-10) and then points out the disadvantages of those approaches (*id.*, col. 3, ll. 20-35). As noted at pages 18-19 of the decision, those prior-art approaches included “manufacturing the components to extremely high tolerances and with highly polished and finished bearing surfaces” (Wilkes, col. 3, ll. 11-13), “using specialised low friction materials, e.g. low friction plastics” (*id.*, col. 3, ll. 14-15), and “trying to ensure adequate and long term lubrication of the moving surfaces” (*id.*, col. 3, ll. 18-19).

The foregoing discussion of tilting in Wilkes’s “Background of the Invention” appears to be an admission that persons skilled in the art prior to the date of the Wilkes and Dean invention recognized that the back driving force and noise problems encountered when using actuators like Noel’s were

caused by the racing effect and that the racing effect is more pronounced if the inside diameter  $D$  of the boss exceeds the outside diameter  $d$  of the shaft enough to permit tilting of the bell-shaped member (Noel's element 3) relative to the axis of the shaft. This conclusion is not contradicted by anything else in the Specification or in the Spurr Declaration. As a result, in the absence of a declaration under 37 C.F.R. § 1.132<sup>1</sup> establishing that Wilkes and Dean should be credited with discovering that the back driving force problem in Noel is caused by the racing effect, and more particularly by tilting of Noel's bell-shaped member 3, the present record provides no credible evidence to credit them with that discovery. Appellant's reliance on arguments to that effect by counsel during oral argument is misplaced for two reasons. The first is that this argument was made for the first time during oral argument and Appellant has not shown good cause for failing to include it in the Brief or Reply Brief. *See* 37 C.F.R. 41.37(c)(1)(vii) ("Any arguments or authorities not included in the brief or a reply brief filed pursuant to § 41.41 will be refused consideration by the Board, unless good

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<sup>1</sup> 37 C.F.R. § 1.132 (2008) reads:

**§ 1.132. Affidavits or declarations traversing rejections or objections.**

When any claim of an application or a patent under reexamination is rejected or objected to, any evidence submitted to traverse the rejection or objection on a basis not otherwise provided for must be by way of an oath or declaration under this section.

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cause is shown.”). The second reason is that “arguments of counsel cannot take the place of evidence lacking in the record.” *Estee Lauder Inc. v. L’Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997) (citations omitted).

*B. Is Kagiya a proper primary reference?*

Appellant argues that “there is no evidence that Kagiya even had a tilting problem.” Req. Reh’g 3. We agree and did not so hold. In Kagiya, tilting of drum 4 relative to shaft 21 is prevented by lid member 7, which includes a bore 71 for loosely receiving the shaft (Kagiya, col. 3, ll. 66-68). Instead, we agreed (Decision 40) with the Examiner that it would have been obvious to apply the teachings of either of Coquot and Tuckey to Kagiya in order “to reduce friction, reduce wear, and increase the operating life of the device” (Answer 13-14).

Appellant further argues:

There is no evidence that the Kagiya reference is exposed to lubrication, and thus improving the lubrication of the internally captured surfaces between the shaft and drum is entirely based on hindsight. There is no lubricant mentioned as being utilized at that location, and changing the structure to “improve” the flow of lubrication would not have been obvious.

Req. Reh’g 3. Although in affirming the rejection we construed Coquot’s disclosure of “increasing the possibilities of lubrication” to mean increasing the amount of lubrication in bearings that already employ lubrication (Decision 30), that affirmance was based on an implicit finding that Coquot’s teachings would have not been understood to be limited to

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previously lubricated bearings. *See KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742 (2007) (“The second error of the Court of Appeals lay in its assumption that a person of ordinary skill attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem. . . . Common sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. . . . A person of ordinary skill is also a person of ordinary creativity, not an automaton.”).

We note that our affirmance of the rejection based on *Kagiyama* is also based on our finding, which is not addressed in the Request, that Appellant failed to respond to the Examiner’s alternative rationale that it would have been obvious to modify *Kagiyama* in view of *Tuckey* “to accommodate misalignment between the relatively rotating components” (Decision 41) (quoting Answer 13), a rationale that does not involve lubrication.

*C. The argument based on the bearings in Noel and Kagiyama*

Appellant argues:

**Arguments With Regard to the Bearings in the Housing of Noel and Kagiya**

Appellant had pointed out that Coqueiot [*sic*] and Tuckey actually suggest modifying a bearing that is fixed in a housing. Noel does disclose a bearing 19 that is fixed and that supports the shaft, and is typical of a bearing such as show in Coqueiot and Tuckey.

Kagiya has its drum also mounted in a housing in a similar manner.

Req. Reh'g 2.

This characterization of Kagiya as having its drum mounted in a housing in a manner similar to Noel's drum is a new argument and thus entitled to no consideration in the absence of the required showing. *See* 37 C.F.R. § 41.52(a) ("Arguments not raised in the briefs before the Board and evidence not previously relied upon in the brief and any reply brief(s) are not permitted in the request for rehearing except as permitted by paragraphs (a)(2) and (a)(3) of this section."). The same is true of the suggestion in the above-quoted heading that Appellant previously made an argument based on a bearing in Kagiya's housing. Instead, the "bearing" argument was limited to Noel. Brief 12. Specifically, Appellant argued that assuming the teachings of Coquiote and Tuckey are applicable to Noel, those teachings would be applied to Noel's bearing 19, which supports the end of the shaft for rotation, rather than to Noel's drum 3. *Id.* Appellant correctly points out (Req. Reh'g 2) that although we noted Appellant's reliance on this argument at page 16, footnote 7 of the Decision, we failed to address the merits of the argument. Our answer to that argument is that the racing effect

in Noel's actuator does not involve bearing 19. It therefore would not have been obvious to reduce the racing effect in Noel by applying the teachings of Coquiot and Tuckey to that bearing.

For the same reason, we are not persuaded by Appellant's related argument that

[e]ven accepting that the teaching extends from Coqueiot and Tuckey to the drum/shaft interface, that same teaching would also extend to the bearing 19 of Noel. If one is to modify both surfaces between the shaft 2, the bearing 19, and the drum 3 in Noel in view of Coqueiot or Tuckey, then simplicity would dictate the shaft 2 would have the facets, and not the internal bore of both the drum 3 and the bearing 19. One would simply need to modify one element, the shaft, and not two elements 3 and 19.

Req. Reh'g 2.

*D. Low-temperature lubrication*

At pages 22-24 of the Decision, we explained why we are unpersuaded by Appellant's argument that the failure of Noel's actuator, when lubricated with grease, to satisfy the back driving force requirement of Chrysler's Engineering Standard at low temperatures (Spurr Decl. para. 5) would have been seen as teaching away from considering other solutions that involve the use of a lubricant. We stated (1) that low-temperature performance is not required by the claims (*id.* at 23-24); (2) that satisfactory warm-weather performance is sufficient in the absence of evidence that Chrysler's Engineering Standard reflected an industry-wide standard

applicable to all automobile models and all geographic markets (*id.* at 23); (3) that Mr. Spurr did not testify that all available greases and other lubricants were considered and rejected (*id.* at 24); and (4) that

even assuming that the record included evidence showing that all available greases and other lubricants were considered and rejected as unsuited to solving the back driving force problem in the Noel actuator, which has a cylindrical pinion bore, we are not persuaded that the artisan would have been discouraged from considering solutions that employ noncylindrical, multifaceted bores for the purpose of facilitating lubrication, as taught by . . . Coquiot . . . .

*Id.*

Appellant argues that “all automakers have specifications requiring operation at extremely low temperatures” (Req. Reh’g 3). However, “arguments of counsel cannot take the place of evidence lacking in the record.” *Estee Lauder*, 129 F.3d at 595. Furthermore, even assuming Appellant is correct on this point, the “teaching away” argument fails for the other reasons identified above.

*E. The “tight fit” argument*

Appellant argues: “The Board finds the term ‘tight fit’ could extend to surfaces where there is a clearance. However, the purpose of the surface of Tuckey is to allow a run-in fitting. A run-in fitting necessarily requires there

be surface contact such that as the shaft rotates, it will run in.” Req. Reh’g 3. This argument misconstrues our position, which, as correctly noted in Appellant’s next argument, is based on modifying Noel and Kagiya so as to employ a hexagonal bore that is sized to “fit the shaft snugly enough to eliminate tilting as the cause of the high back driving force without being so tight that the tightness causes a high back driving force.” Req. Reh’g 3 (quoting Decision 38).

The argument that “since Tuckey is entirely devoted to providing a run-in fitting, one could not provide the Tuckey benefits without providing a fit that is so tight that it would itself cause a back driving force problem” (Response 3) is unconvincing in absence of some evidence that a fit that is tight enough to produce some cold flow will necessarily result in an excessive back drive force. *See Invitrogen Corp. v. Clontech Labs. Inc.*, 429 F.3d 1051, 1068 (Fed. Cir. 2005) (“Unsubstantiated attorney argument regarding the meaning of technical evidence is no substitute for competent, substantiated expert testimony.”).

*F. Appellant’s evidence of nonobviousness*

*(1) Unexpected results*

As support for the argument that the claimed invention produced unexpected results, Appellant argues that “[t]he inventors of the patent subject to reexamination discovered that utilizing the square bore solved the

tilting problem. As set forth in the supporting evidence, this was an unexpected benefit.” Req. Reh’g 4. This argument fails for lack of evidence that the inventors should be credited with identifying tilting as the cause of the back driving force problem associated with the Noel actuator.<sup>2</sup>

(2) *Commercial success*

We found the evidence of commercial success unpersuasive in part because Appellant failed to show that the sales represented a substantial share of the actuator market, as required by *In re Huang*, 100 F.3d 135, 139-40 (Fed. Cir. 1996). Decision 45-46. Appellant argues:

Of course, in all cases in the Patent Office, an Appellant does not have access to the Federal Rules or Civil Procedure, and thus would have difficulty proving overall market share. While this patent was initially the subject of federal litigation, the litigation was dismissed prior to extensive discovery such with the parties could pursue this re-examination. As such, Appellant has no evidence of market share.

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<sup>2</sup> The Request asserts (at 4) that the “square bore solved the tilting problem.” However, some tilting will occur because the length of the sides of the square bore exceeds the diameter of the shaft (Wilkes, col. 4, ll. 32-36). It therefore appears that the effect of the square bore is to reduce or eliminate the “racing effect” (*id.*, col. 4, l. 42), i.e., the resistance to sliding of the bore wall relative to the shaft periphery, an effect that is amplified by tilting (*id.*, col. 2, ll. 38-42).

Req. Reh’g 4. Be that as it may, under *Huang* evidence of sales is insufficient to establish commercial success in *ex parte* proceedings before the USPTO in the absence of market share evidence. *Id.* at 139-40.

(3) *Copying*

Appellant’s argument that “The fact . . . that Harada makes the identical actuator is also evidence of non-obviousness” (Req. Reh’g 4) does not raise any point not already addressed at pages 47-48 of the Decision.

(4) *Whether we have considered the totality of the evidence*

Appellant faults us for considering evidence of nonobviousness separately rather than in its totality. Req. Reh’g 4. We have considered the totality of the evidence relied on to show nonobviousness and conclude that it is outweighed by the evidence of obviousness.

## II. THE REQUEST FOR REHEARING ON THE NEW GROUND OF REJECTION

A. *Whether the Noel actuator has a friction problem*

At pages 49-50 of the Decision, we entered a new ground of rejection of claims 1-9 under 35 U.S.C. § 103(a) for obviousness over Noel in view of Coquiot’s teaching of using Coquiot’s bearing profiles to “decrease a coefficient of friction,” a teaching that we found (*id.* at 49) “appears to be independent of the teaching of using the bearing profiles to ‘increase the

possibilities of lubrication,” which as noted above is the Coquiot teaching on which the Examiner based the affirmed § 103(a) rejection of those claims. More particularly, the rationale of the new ground of rejection is that it would have been obvious in view of Coquiot to replace the cylindrical bore in Noel's pinion with any of the polygonal bore profiles disclosed in Coquiot in order to reduce the coefficient of friction without using a lubricant. *Id.* at 49-50.

Appellant does not question our finding that Coquiot's teaching of decreasing a coefficient of friction appears to be independent of the teaching of using the bearing profiles to increase the possibilities of lubrication.

Rather, Appellant argues:

There is no evidence anywhere in this record that there is a problem with friction between the drum and shaft of Noel. Thus, there would be no reason to combine these references as proposed by the Board to reduce friction. In fact, as set forth, for example, in Figures 1 and 2 of the patent subject to re-examination, and described at column 1, line 67 to column 2, line 14, there is clearance between the two components. For this reason, there would be no reason to undergo any modification to Noel et al. to change the shape of the bore in the drum to allegedly reduce friction.

Req. Reh'g 1-2. This argument is unpersuasive because, as noted above, the “Background of the Invention” in the Wilkes patent explains that the racing effect, which is the cause of the back driving force problem, refers to the fact that the centrifugal forces associated with orbiting of the annular boss around the shaft cause an increase in the sliding resistance between the boss

and the shaft (Wilkes, col. 2, ll. 34-42). This sliding resistance is clearly friction, as recognized by the prior art attempts to reduce the back driving force by lubricating the bore and shaft surfaces (*id.*, col. 3, ll. 18-19).

Although the Wilkes patent indicates that those attempts were unsatisfactory, it does not deny that the racing effect is caused by friction between the bore and shaft surfaces. Instead, the Wilkes patent explains that the lubrication approach was unsuccessful in practice due to problems identifying a lubricant that will perform satisfactorily under all of the expected working conditions.

*Id.*, col. 3, ll. 20-35.

*B. Appellant's reliance on Noel's bearing 19*

Appellant's argument that "should there be any reason to modify Noel in view of Coqueiot, it would be a modification to the bearing 19" (Req. Reh'g 2) is unpersuasive for the reasons given above in the discussion of the other request for rehearing.

*C. Claim 8 – the four-sided bore*

Coqueiot shows a three-sided polygonal bore (Fig. 3) and a six-sided polygonal bore (Fig. 4) and explains:

The polygon, from the most simple, the triangle (fig. 3); to the hexagon (fig. 4) the most simple to execute, practically

*the other polygon profiles being in the same area as this invention but not consisting of any practical use.*

Coquiot, 3d para. (emphasis added). We found that one skilled in the art would have understood from this paragraph that the “other polygon profiles” that are part of Coquiot's invention include a square profile and that the statement that these “other polygon profiles” do not have “any practical use” is too vague to constitute a teaching away from using those other polygon profiles, including a square profile, to reduce the coefficient of friction in Noel's actuator. Decision 51.

Appellant argues that

there is surely no reason to utilize a four sided bore if the goal is to reduce friction. Coqueiot discloses an eight sided bore, and a three sided bore. It is unclear which of the two embodiments would most reduce friction, but surely one motivated to reduce friction would select one of these extremes and not the four sided bore.

Req. Reh'g 2. We do not agree. The artisan would have understood Coquiot as disclosing that the coefficient of friction can be reduced by selecting a polygonal profile having from three to eight sides. It would have been prima facie obvious to use any of those polygonal profiles with a reasonable expectation of success. “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.” *KSR*, 127 S. Ct. at 1732.

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DECISION

For the foregoing reasons, both Requests for Rehearing are denied.

DENIED

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