

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ROBERT BOSCH LLC and MERCEDES-BENZ USA, LLC,
Petitioner,

v.

WESTPORT FUEL SYSTEMS CANADA INC.,
Patent Owner.

IPR2023-00292 (Patent 6,298,829 B1)
IPR2023-00293 (Patent 6,575,138 B1)¹

Before NEIL T. POWELL, CARL M. DeFRANCO, and
FRANCES L. IPPOLITO, *Administrative Patent Judges*.

PER CURIAM.

DECISION
Granting Petitioner's Request for Rehearing and
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. §§ 42.4, 42.71

¹ This Decision applies to each of the listed proceedings. The parties are not authorized to use this style heading for any subsequent papers.

I. INTRODUCTION

Robert Bosch LLC and Mercedes-Benz USA, LLC (collectively, “Petitioner”) filed a Petition (IPR2023-00293, Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–3, 6, 13, 14, 17–21, 26–28, and 41 of U.S. Patent No. 6,575,138 B2 (IPR2023-00293, Ex. 1001, “the ’138 patent”). Separately, Petitioner also requested an *inter partes* review of claims 1–3, 6, 11, 12, 14, 15, and 18–20 of U.S. Patent No. 6,298,829 B1 (IPR2023-00292, Ex. 1001, “the ’829 patent”). IPR2023-00292, Paper 1.²

On June 20, 2023, this panel denied institution of *inter partes* review in both proceedings. IPR2023-00293, Paper 20 (“Decision” or “Dec.”); *see also* IPR2023-00292, Paper 8. In each proceeding, Petitioner filed a request for rehearing of our determination that the Petitioner fails to demonstrate a reasonable likelihood of establishing that at least 1 of the claims challenged in the Petition is unpatentable. IPR2023-00293, Paper 9 (“Request” or “Req. Reh’g”); *see* IPR2023-00292, Paper 9.

For the reasons given below, we grant these Requests.

II. LEGAL STANDARDS

“The burden of showing a decision should be modified lies with the party challenging the decision,” and the challenging party “must specifically identify all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed” in a paper of record. 37 C.F.R. § 42.71(d) (2021). Because Petitioner seeks rehearing of our Decision denying the Petition, it must show an abuse of discretion. *See* 37 C.F.R. § 42.71(c) (“When rehearing a decision on

² Unless indicated otherwise, we cite to Papers and Exhibits filed in IPR2023-00293. Similar Papers and Exhibits were filed in IPR2023-00292.

petition, a panel will review the decision for an abuse of discretion.”). An abuse of discretion may arise if the decision is based on an erroneous interpretation of law, if a factual finding is not supported by substantial evidence, or if an unreasonable judgment is made in weighing relevant factors. *Star Fruits S.N.C. v. U.S.*, 393 F.3d 1277, 1281 (Fed. Cir. 2005); *Arnold P’ship v. Dudas*, 362 F.3d 1338, 1340 (Fed. Cir. 2004); *In re Gartside*, 203 F.3d 1305, 1315–16 (Fed. Cir. 2000).

III. ANALYSIS

A. Petitioner’s Grounds

The Decision addressed grounds of unpatentability, all of which rely on Klügl as a reference. In the Petition, Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §³	Reference(s)/Basis
1–3, 6, 13, 14, 17–21, 26, 27, 41	103(a)	Wirbeleit, Klügl ⁴
28	103(a)	Wirbeleit, Klügl, Newcomb
1–3, 6, 13, 14, 17–21, 26, 27, 41	103(a)	Klügl, Hayes
28	103(a)	Klügl, Hayes, Newcomb

Pet. 8.

³ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. We apply the pre-AIA version of § 103 here because the application which became the ’138 patent was filed before the effective date of the AIA. *See* Ex. 1001, code (22).

⁴ Certified translation of DE 19708304 A1, published Feb. 28, 1997 (Ex. 1006, “Klügl”) and original German language version (Ex. 1005).

Of the challenged claims, claims 1 and 41 are independent. For illustrative purposes, claim 1 is below:

1. [1-p] An injection valve for injecting fuel into a combustion chamber of an internal combustion engine, said injection valve comprising:

[1(a)] (a) a valve housing comprising:

[1(a)-1] a fuel inlet port;

[1(a)-2] an interior chamber fluidly connected to said fuel inlet port; and

[1(a)-3] a valve seat for cooperating with a valve member to seal said interior chamber from said combustion chamber when said injection valve is closed;

[1(b)] (b) said valve member having one end disposed within said valve housing and an opposite end extendable from said valve seat toward said combustion chamber, wherein said valve member comprises a sealing surface that fluidly seals against said valve seat when said injection valve is closed and that is liftable away from said valve seat when said injection valve is open;

[1(c)] (c) a biasing mechanism associated with said valve member, said biasing mechanism applying a closing force to said valve member when said valve member is in said closed position;

[1(d)] (d) an actuator assembly associated with said valve member, wherein said actuator assembly may be actuated to apply an opening force to said valve member stronger than said closing force, for moving said valve member to said open position; and

[1(e)] (e) a hydraulic link assembly comprising a passive hydraulic link having a hydraulic fluid thickness through which said opening and closing forces are transmitted, whereby said hydraulic fluid acts substantially as a solid with said thickness being substantially constant while said actuator assembly is actuated and wherein said thickness of said hydraulic link is adjustable while said actuator assembly is not actuated in response to changes in the dimensional relationship between components of said injection valve to maintain a desired valve lift upon actuation of said actuator assembly.

Ex. 1001, 17:17–53 (bracketed designations by Petitioner (*see* Pet. 24–31)).

Klügl is titled “Device for transmitting a motion and an injector with a device for transmitting a motion.” Ex. 1006, code (54). Klügl discloses:

Id. at 2:7–12.⁵ Figure 1 of Klügl is reproduced below.

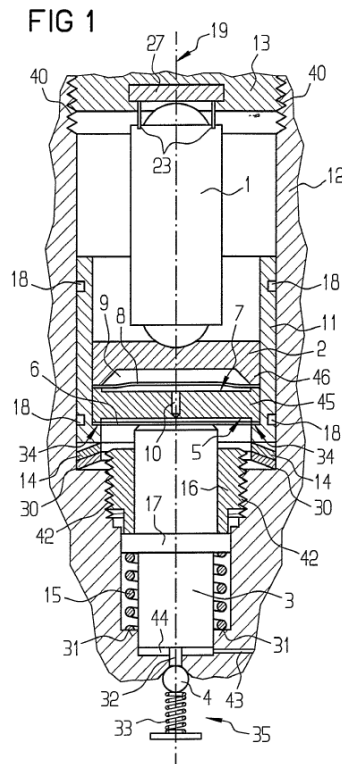


Figure 1 of Klügl depicts an injection valve including housing 12 and piezoelectric actuator 1, which is arranged between upper stop 13 and

⁵ In citations to Klügl, we (like the parties) refer to the native pagination (i.e., column and line numbers).

transmission module 2. *Id.* at 1:47–51. Transmission module 2 is essentially cylindrical and includes pressure chamber 5, which is at least partially filled with hydraulic fluid and is delimited by first membrane 6. *Id.* at 1:60–62; 1:68–2:2. Connecting bore 10, which has a throttling effect, connects pressure chamber 5 to compensation chamber 7. *Id.* at 1:62–66. Drive piston 3 is biased against lower stop 16 and merges into control needle 32, which extends through relief chamber 34 to valve seat 35. *Id.* at 2:35–36, 50–52. Ball (or closing element) 4 presses against valve seat 35 by valve spring 33. *Id.* at 2:54–55. Actuating piezoelectric actuator 1 presses transmission module 2 against the spring force of the disk spring 14 and exerts pressure on drive piston 3 via first membrane 6, which exercises the hydraulic fluid in pressure chamber 5. *Id.* at 3:23–29. The hydraulic fluid moves drive piston 3 against the force of tension spring 15, and control needle 32 lifts ball 4 off valve seat 35. *Id.* at 3:30–33.

In the Decision, we were persuaded by Patent Owner that the fluid in Klügl’s pressure chamber 5 does not possess “a thickness being substantially constant while the actuator assembly is activated,” as required by claim 1(e), because membrane 6 is flexible. Dec. 16–17, 18–22 (analyzing an annotated version of Klügl’s Figure 1 provided on page 34 of the Petition). We found that Patent Owner’s expert, Dr. Christopher Atkinson, considered that the portion of membrane 6 that does not bear against a drive piston would experience pressure from the fluid within pressure chamber 5. *Id.* at 22. We were persuaded by Dr. Atkinson that this portion of membrane 6 would “bulge outward where unconstrained in the annular area between the edge of the drive piston and the wall of the transmission module.” *Id.* (citing Ex. 2004 ¶ 52); *see also id.* at 20 (Patent Owner illustrated in three drawings,

each based on Figure 1 of Klügl, that deformation of Klügl's membrane 6 during actuation would result in changes in the thickness of fluid within pressure chamber 5.).

We further found that the Patent Owner's expert's testimony was "consistent and better supported by the disclosure of Klügl" in comparison to the testimony of Petitioner's expert, Dr. Matt Quinlan. *Id.* at 22 (finding that "Petitioner's expert's testimony is incomplete and does not fully take into account how membrane 6 functions in Klügl's actuator assembly."). We determined that "the Petition itself does not explicitly discuss Klügl's membrane 6 with regard to claim 1(e)." *Id.* (citing Pet. 31–37).

In its Request, Petitioner contends that Klügl's disclosure with respect to Figure 1 does not support Patent Owner's allegations or the Board's conclusions that an alleged bulging of membrane 6 is associated with changes in the fluid's thickness within pressure chamber 5. Req. Reh'g 7. In particular, Petitioner argues that "the Board's decision misapprehended and did not fully account for Klügl's actual disclosure [of] . . . **two different embodiments.**" *Id.* at 1 (citing Pet. at 34–35; Ex. 1003, ¶¶ 207–215, 222) (emphasis added). Petitioner further argues Klügl discloses that the embodiment shown in Figure 1 "operates '**without stroke translation,**'" which requires that "the piston and actuator must move by the **same amount.**" Req. Reh'g 1 (citing Ex. 1003 at 1:41–42, 3:22–29; Ex. 1003 ¶¶ 208–210 (Dr. Quinlan testifies that "[i]n the embodiment shown in Klügl's Figure 1, . . . there is no change in the 'stroke translation.'")).

According to Petitioner, Klügl contrasts the embodiment shown in Figure 1 with the embodiment shown in Figure 3, which is disclosed as operating "'**with stroke translation**' and applies a '**stroke ratio**' to the

injector's piston during actuation.” Req. Reh’g 1–2 (citing Ex. 1006 1:45–46, 7:12–14; Ex. 1003, ¶ 210). Petitioner contends Klügl discloses that “movement of the piston” in the embodiment shown in Figure 3 “is *different* than that of the actuator.” Req. Reh’g 2 (citing Ex. 1006 1:45–46, 7:12–14; Ex. 1003, ¶ 210).

Further, Petitioner contends that, in the embodiment shown in Klügl’s Figure 1, “the thickness of Klügl’s hydraulic fluid 5 *must* remain substantially constant” because Klügl explicitly discloses that the first embodiment performs “without stroke translation,” such that “the piston moves by the same amount as the actuator.” Req. Reh’g 10. Petitioner argues that, in this embodiment, “actuator 1 and drive piston 3 move the same amount and, thus, the shape of the space defined by membrane 6 remains the same such that the fluid in chamber 5 maintains a constant thickness.” *Id.* at 13.

We are persuaded by these arguments. We note that Patent Owner’s incorrect reading of Klügl’s Figure 1 is reflected by Patent Owner’s argument that actuation on an allegedly flexible membrane 6 in Klügl’s Figure 1 would result in “the downward movement of drive piston 3 . . . less than the longitudinal expansion of the actuator 1.” Prelim. Resp. 32 (citing Ex. 2004 ¶¶ 48–49 (Patent Owner’s expert testifying as to Figure 1 of Klügl.)); *see also* Req. Reh’g 2. In other words, on the preliminary record, Patent Owner argues that an alleged bulging of membrane 6 in Klügl’s *Figure 1* during injector actuation would occur *with stroke translation*, which contradicts Klügl’s explicit disclosure. Ex. 1006 1:41–42. However, as discussed above, the embodiment described in Klügl’s Figure 1, relied upon by Petitioner, operates without stroke translation.

We note further that in the Preliminary Response, Patent Owner presents additional arguments against institution. For completeness and clarity of the record, we address these below.

Patent Owner contends that Wirbeleit combined with Klügl does not teach, “a hydraulic link assembly comprising a passive hydraulic link having a hydraulic fluid thickness through which said opening and closing forces are transmitted,” required by claim 1. Prelim. Resp. 22–28. Patent Owner asserts that Wirbeleit provides no description of how hydraulic transmission element 22 operates and “Klügl does not teach closing forces being transferred through the membrane 6 and chamber 5, and Klügl’s system would be unnecessary if the closing force was so transferred.” Prelim. Resp. 27 (“A POSITA would have understood that Wirbeleit’s actuators longitudinally contract when deenergized and provide whatever force is needed to return the hydraulic transmission to its initial position.”).

In the Petition, for Grounds 1 and 2, Petitioner explains that Wirbeleit’s hydraulic transmission element 22 is positioned between return spring 7 and magnetostrictive actuator 21. Pet. 32 (citing Ex. 1004, Fig.; Ex. 1003 ¶¶ 181–189). In operation, Wirbeleit teaches that the actuator is energized and acts on the injector needle by way of the hydraulic element against the compression spring. Ex. 1004, 2:1–4. In this way, we agree with Petitioner, for the purposes of this Decision, that Wirbeleit’s hydraulic transmission element 22 transmits an opening force.

Similarly, based on the preliminary record, we observe that the positioning of hydraulic transmission element 22 between the actuator and compression spring is consistent and supports Dr. Quinlan’s testimony that “during valve closing, force is exerted from the spring, to the needle, and

back through the hydraulic transmission element until a rest position is reached.” Ex. 1003 ¶ 186. In other words, we understand Dr. Quinlan’s testimony to be that when the spring moves in the other direction to close the slot-injection orifice, the spring exerts a force on hydraulic transmission element 22 that is, in turn, transmitted. *Id.* While there is some question as to the details of Wirbeleit’s hydraulic transmission element 22 (*see* Ex. 1004, 2:60–64), the express disclosure, nonetheless, indicates the relative position of hydraulic transmission 22 that, on this preliminary record, supports Petitioner’s position. We are aware that Patent Owner disagrees with Dr. Quinlan’s qualifications, experience, and testimony on many points including this one. Prelim. Resp. 22–28, 34. The parties will have ample opportunity to develop the record on these and other issues through discovery, including cross-examination of the declarants, after institution.

Patent Owner further contends that the asserted combination would not “maintain a desired valve lift upon activation of said actuator assembly,” required by claim 1. Prelim. Resp. 32. Patent Owner argues that Klügl’s flexible membrane 6 “will not maintain a substantially constant thickness of hydraulic fluid in the pressure chamber of the transmission module during actuation.” *Id.* (citing Ex. 2004 ¶¶ 48–50). “This loss of actuator linear translation, or stroke, means that the actual lift created in ball 4 by actuator 1 will not be consistent.” *Id.* In addition, Patent Owner contends that

[i]t is not clear why a POSITA would be motivated to add the complicated structure of Klügl to Wirbeleit “to maintain a desired needle lift” when Wirbeleit already senses and adjusts lift as needed. The deflection of the membrane in Klügl, as described above, would make the system of Wirbeleit work even harder to ensure a desired lift.

Id. at 33.

Patent Owner’s arguments rely on a Klügl embodiment that operates “without stroke translation,” (Ex. 1006, 1:41–42), which does not support Patent Owner’s conclusion that there will always be linear stroke translation or loss of that translation due to flexible membrane 6. *See* Prelim. Resp. 32. Further, we note that Petitioner argues, among other things, that

Wirbeleit’s system is meant to facilitate control of the amount of “needle lift” . . . [and] a POSITA would have understood that when applied to Wirbeleit, Klügl’s transmission module 2 would be structured so as to maintain the intended needle lift or position range (i.e., the claimed “desired valve lift upon actuation”).

Pet. 36 (citing Ex. 1004, 2:1–12; Ex. 1003 ¶¶ 224–225). At this stage, Dr. Quinlan’s testimony, including paragraphs 224–225, supports Petitioner’s arguments sufficiently for institution whereas Patent Owner’s arguments are inconsistent with the cited embodiment described in Figure 1 of Klügl. Nonetheless, the parties may develop the record on this issue to the extent needed.

In the Petition, Petitioner articulates several reasons why a POSITA would have combined the teachings of Wirbeleit and Klügl (*see* Pet. 46–52), including that

Wirbeleit teaches a fuel injector with controllable valve lift that allows the injection amount to be tailored to engine operation. It already includes a hydraulic force transmission element. Klügl teaches a hydraulic transmission element like that employed by Wirbeleit that can be designed to automatically adjust to account for the effects of thermal expansion and wear. A POSITA would have understood that combining these two references’ teachings results in an injector that continues to exhibit these very same benefits.

Id. at 51 (citing Ex. 1003 ¶ 349). Patent Owner argues that a POSITA would not have combined Wirbeleit and Klügl to solve the problems addressed by the ’138 Patent because contemporaneous evidence shows “serious

technological deficiencies in Klügl's system." Prelim. Resp. 34–37. Based on the preliminary record, Petitioner's reasoning, at this stage, is sufficient for institution based on the cited disclosure in the references and Dr. Quinlan's testimony. That being said, the parties may develop the record on this issue after institution.

With regard to Petitioner's challenge to dependent claim 28, Patent Owner relies on the arguments discussed above for independent claim 1, with the additional argument that Petitioner fails to provide a motivation to combine Newcomb with Wirbeleit and Klügl. Prelim. Resp. 37. However, for the purposes of institution, Petitioner has sufficiently articulated reasons for the asserted combination, which include that

[a] POSITA would have been motivated to combine Newcomb's teachings with the injector of W[i]rbeleit and Klügl. Klügl itself already recognizes that injector valves should be designed to account for the effects of thermal expansion. (Ex. 1006, 3:52-55, 4:25-31, 6:29-33.) Similarly, Newcomb explains that it is "essential" that a fuel injector be designed to "minimize the effect of thermal expansion." (Ex. 1014, 1:34-38; *see also* Ex. 1003, ¶¶ 372-376.) . . . [and] [a]pplying Newcomb's above teachings to the injector of Wirbeleit and Klügl therefore results in an injector where the injector's housing, needle, and actuator are made from materials with sufficiently similar thermal expansion coefficients such that any change in relative dimension would be minimized. (*See id.*, ¶ 371.)

Pet. 54–55.

Aside from dependent claim 28, Patent Owner does not provide separate arguments specific to dependent claims 2, 3, 6, 13, 14, 17–21, 26, and 27, and independent claim 41.⁶ Prelim. Resp. 19–20. For the same

⁶ Patent Owner indicates that claim 1 is the only independent claim challenged in Petitioner's Ground 1. Prelim. Resp. 19–20. That is incorrect. Independent claim 41 is also challenged. Pet. 44–46.

reasons discussed above, we do not agree with Patent Owner's arguments. Based on the preliminary record, specifically the evidence and arguments presented in and with the Petition, there is a reasonable likelihood that Petitioner will prevail in demonstrating that claims 1–3, 6, 13, 14, 17–21, 26, 27, 28, and 41 are unpatentable as obvious in view of Wirbeleit and Klügl. Pet. 24–46, 52–55.

Patent Owner also argues that Klügl in combination with Hayes, or in combination with Hayes and Newcomb, fail to render the challenged claims obvious. Prelim. Resp. 37–47. However, for the reasons provided in the Petition and accompanying evidence, there is a reasonable likelihood that Petitioner will prevail in demonstrating that claims 1–3, 6, 13, 14, 17–21, 26, 27, 28, and 41 are unpatentable as obvious in view of Klügl with Hayes or with Hayes and Newcomb. Pet. 55–75. Again, the parties may further develop the record on these issues during trial.

With respect to IPR2023-00292, the same analysis applies. There, the challenged claims include substantially similar elements, including an identical claim element 1(e) to the one discussed here, along with substantially similar arguments by the parties in the application of Klügl's teachings to that claim element.

B. Discretionary Denial

Patent Owner requests that we exercise our discretion to deny institution under 35 U.S.C. §§ 314(a) and 325(d). We decline. As for § 314(a) discretion, we note: (1) the parallel litigation is in its early stages (the parties have yet to submit their joint claim construction statement and the court has yet to conduct a Markman hearing), (2) final judgment is not likely to be rendered until after our final decision issues (jury selection is

scheduled for September 23, 2024, but the court has yet to set a schedule for post-trial motions, which inevitably occur after a jury trial), and (3) the court has indicated a willingness to consider whether a stay is appropriate should we institute (the court earlier denied a stay, but only because it was “far too early to determine that a stay will—rather than may—simplify the issues in the case”). *See* Exs. 3001 (scheduling order), 3002 (stay order). For all these reasons, we decline to exercise our discretion under § 314(a).

As for § 325(d) discretion, we note that neither Wirbeleit nor Klugl was before the Office during prosecution (i.e., not applied by the examiner and not cited in an IDS). Patent Owner argues only that “these references are substantially the same as art considered by the Patent Office during prosecution.” Prelim. Resp. 14. But nowhere does Patent Owner meaningfully explain how the Wirbeleit reference asserted here is cumulative of the “other Wirbeleit” references cited during prosecution. *Id.* at 14. Patent Owner also fails to meaningfully explain how Klugl teaches substantially the same “diaphragm/membrane-type device” as “other references,” such as the Takahasi reference (Ex. 2017), cited during prosecution in an IDS. *Id.* at 15. Instead, Patent Owner’s assertions in this regard are conclusory and vague, leaving us to discern exactly how the Wirbeleit and Klugl references asserted by Petitioner here teach no more than what a reasonable examiner would consider taught by the so-called “other references” already before the Office during prosecution. *Id.* at 14–15. That is Patent Owner’s burden, not ours. As such, we decline to exercise our discretion under § 325(d).

For the foregoing reasons, we grant Petitioner’s Rehearing Request and modify our earlier Decision to institute *inter partes* review of the ’138

IPR2023-00292 (Patent 6,298,829 B1)

IPR2023-00293 (Patent 6,575,138 B1)

patent and the '829 patent on all challenged claims and all grounds set forth in the Petition.

IV. CONCLUSION

For the foregoing reasons, we conclude that the information presented in the Petition and Petitioner's Rehearing Request demonstrates a reasonable likelihood of prevailing with respect to establishing that at least one claim of the '138 patent and the '829 patent is unpatentable. Accordingly, we institute *inter partes* review of all challenged claims and all grounds presented in the Petition. *See PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (indicating that a decision whether to institute an *inter partes* review "require[s] a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition"); Guidance on the Impact of *SAS* on AIA Trial Proceedings (April 26, 2018).

V. ORDER

Accordingly, it is:

ORDERED that Petitioner's request for rehearing is *granted*;

FURTHER ORDERED that an *inter partes* review is instituted on all challenged claims and all grounds set forth in the Petition of IPR2023-00292 (Patent 6,298,829 B1) and IPR2023-00293 (Patent 6,575,138 B1); and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which commences on the entry date of this decision.

IPR2023-00292 (Patent 6,298,829 B1)

IPR2023-00293 (Patent 6,575,138 B1)

FOR PETITIONER:

K. Patrick Herman

Bas de Blank

ORRICK, HERRINGTON & SUTCLIFFE LLP

p52ptabdocket@orrick.com

m2bptabdocket@orrick.com

Celine Jimenez Crowson

Joseph J. Raffetto

HOGAN LOVELLS US LLP

celine.crowson@hoganlovells.com

joseph.raffetto@hoganlovells.com

FOR PATENT OWNER:

Derek V. Forinash

Miranda Y. Jones

PORTER HEDGES LLP

dforinash@porterhedges.com

mirandajones@porterhedges.com