

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

WESTPORT FUEL SYSTEMS CANADA INC.,
Patent Owner.

Case No. IPR2023-00293
U.S. Patent No. 6,575,138

**PETITIONERS' REQUEST FOR REHEARING
UNDER 37 C.F.R. § 42.71(d)**

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LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 6,575,138 B2 to Welch et al.
1002	File History of U.S. Patent No. 6,575,138 B2 to Welch et al.
1003	Declaration of Dr. Matt Quinlan
1004	U.S. Patent No. 5,479,902 to Wirbeleit et al.
1005	DE 197 08 304 A1 to Klügl
1006	Certified translation of DE 197 08 304 A1 to Klügl and associated translator's declaration
1007	U.S. Patent No. 5,735,240 to Ito et al.
1008	U.S. Patent No. 6,295,969 B1 to Kato et al.
1009	U.S. Patent No. 5,697,554 to Auwaerter et al.
1010	U.S. Patent No. 4,725,002 to Trachte
1011	U.S. Patent No. 5,630,550 to Kurishige et al.
1012	U.S. Patent No. 4,684,067 to Cotter et al.
1013	EP 0 107 894 A2 to Beck et al.
1014	U.S. Patent No. 4,284,263 to Newcomb
1015	GB 2 318 390 A to Roessler et al.
1016	Docket from <i>Westport Fuel Systems Canada Inc. v. Ford Motor Company</i> , No. 2:21-cv-00453 (E.D. Tex.)
1017	Docket from <i>Westport Fuel Systems Canada Inc. v. Mercedes-Benz USA, LLC</i> , No. 2:21-cv-00454 (E.D. Tex.)
1018	Docket from <i>Westport Fuel Systems Canada Inc. v. Nissan North America, Inc.</i> , No. 2:21-cv-00455 (E.D. Tex.)

1019	Docket from <i>Westport Fuel Systems Canada Inc. v. General Motors, LLC</i> , No. 2:21-cv-00456 (E.D. Tex.)
1020	Docket from <i>Westport Fuel Systems Canada Inc. v. FCA USA LLC d/b/a FCA Group US LLC</i> , No. 2:21-cv-00457 (E.D. Tex.)
1021	Docket from <i>Robert Bosch, LLC v. Westport Fuel Systems Canada Inc.</i> , No. 1:22-cv-00370 (E.D. Va.)
1022	Plaintiff Westport Fuel Systems Canada Inc.’s Disclosure of Asserted Claims and Infringement Contentions, <i>Westport Fuel Systems Canada Inc. v. Ford Motor Company</i> , No. 2:21-cv-00453 (E.D. Tex. April 12, 2022)
1023	U.S. Patent No. 6,148,842 to Kappel et al.
1024	U.S. Patent No. 5,779,149 to Hayes, Jr.

I. INTRODUCTION

On June 20, 2023, the Board issued a Decision declining to institute *Inter Partes* Review of U.S. Pat. No. 6,575,138 (the “’138 Patent”). IPR2023-00293, Paper 8 (“Decision”) at 2. The challenged claims are directed to an injector with “a hydraulic link assembly comprising a passive hydraulic link having a hydraulic fluid thickness... ***with said thickness being substantially constant while said actuator assembly is actuated.***” The Board adopted Patent Owner’s incorrect argument that while the prior art Klügl patent includes a hydraulic link assembly, the hydraulic fluid in that assembly purportedly would not have a “substantially constant thickness” during injector actuation. No other element of any claim was identified as missing from the prior art. *See* Decision at 20-22.

Respectfully, the Board’s decision misapprehended and did not fully account for Klügl’s actual disclosure. As explained in both the Petition and the accompanying Declaration of Dr. Matt Quinlan, Klügl discloses two different embodiments. *See* Paper 1, Petition at 34-35; Ex. 1003, ¶¶ 207-215, 222. Petitioner relied on the first embodiment (shown in Figure 1). Importantly, Klügl states that this embodiment operates “***without stroke translation.***” Ex. 1006 at 1:41-42. This means the piston and actuator must move by the ***same amount.*** *Id.* at Fig. 1, 1:41-42, 3:32-29; Ex. 1003, ¶¶ 208-210. Klügl contrasts this with another embodiment (shown in Figure 3) that operates “***with stroke translation***” and applies a “***stroke***

ratio” to the injector’s piston during actuation, such that movement of the piston is **different** than that of the actuator. Ex. 1006 at 1:45-46, 7:12-14; Ex. 1003, ¶ 210. Neither Patent Owner nor its expert made any attempt to address Klügl’s explanation that Figure 1 operates “without stroke translation,” or account for its two separate embodiments, one with and one without stroke translation.

The Board, however, following the reasoning of the Patent Owner, arrived at the conclusion that Klügl’s first embodiment operates in a way the effect of which is **directly contrary** to what Klügl itself teaches. The Board concluded that membrane 6 in Klügl’s first embodiment would deform during injector actuation resulting in a substantial change in hydraulic fluid thickness. This—as Patent Owner itself concedes (see Paper 7, Response at 32)—would in turn cause Klügl’s injector piston to move by an amount **less** (*i.e.*, different) than its actuator. In other words, instead of being “**without stroke translation**” as Klügl unambiguously says, the interpretation of Klügl’s Figure 1 embodiment proffered by Patent Owner and adopted by the Board results in a hydraulic link “**with stroke translation**” that applies a “**stroke ratio**” to the piston movement. This is in clear contradiction to Klügl and simply does not account for what the prior art teaches.

The Board also committed legal error by relying on what it called the “better supported” testimony of Patent Owner’s expert. While expert testimony can of course elaborate on and further explain the prior art, it cannot **contradict** the art’s

teachings. That, however, is what Patent Owner's expert improperly does here. He opines that Klügl operates in a way that is the opposite of what Klügl says.

II. APPLICABLE LEGAL STANDARDS

This Request is authorized under 37 C.F.R. § 42.71(d). It has been filed within 30 days of the June 20, 2023 entry of a decision not to institute a trial. Under 37 C.F.R. § 42.71(d), the Request “must specifically identify all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed in a motion, an opposition, or a reply.” 37 C.F.R. § 42.71(c) provides that a panel will review the decision for an abuse of discretion. An abuse of discretion exists when the Board (1) overlooks relevant disclosures in a prior art reference, *see Merial Ltd. v. Virbac*, IPR2014-01279, Paper 18 at 7 (Apr. 15, 2015), or (2) misapplies the law, *see PNY Techs., Inc. v. Phison Electronics Corp.*, IPR2013-00472, Paper 16 at 3 (April 23, 2014).

III. BASIS FOR RELIEF REQUESTED

Petitioner respectfully requests that the Board reconsider its Decision and institute review of the challenged claims. As explained in the Petition, Wirbeleit, Hayes and Klügl, render claims 1-3, 6, 13-14, 17-21, 26-27, and 41 obvious. Newcomb teaches the additional limitations of claim 28. *See* Petition at 8.

Petition at 34 (*citing* Ex. 1006, Klügl, Fig. 1 and Ex. 1003, ¶¶ 197-206).

“During operation, when the ‘piezoelectric actuator 1 is ... controlled,’ ‘pressure is exerted on the drive piston 3 via ... the transmission medium located in the pressure chamber 5....’ (Ex. 1006, 3:23-29.)” Petition at 34. Patent Owner and its expert agree with at least this. Patent Owner’s expert explained that “[i]n operation, the actuator 1 extends longitudinally and pushes the transmission module downward, which applies a downward-acting opening force on drive piston 3 by way of the pressure chamber 5 and membrane 2 [sic, 6].” Ex. 2004 at ¶ 51; *see also* Decision at 14. Thus, as the Board found, in Klügl “[t]he hydraulic fluid moves drive piston 3 against the forces of tension spring 15” to open the injector. *Id.* There is no dispute—and all agree—that Klügl’s hydraulic fluid acts as a link that transmits force exerted by and movement of Klügl’s actuator 1 to its drive piston 3.

The only dispute here is whether during actuation the thickness of the fluid in Klügl’s pressure chamber 5 remains “substantially constant.” The Board accepted Patent Owner’s argument that “Klügl’s membrane 6 will deform inward where it contacts the drive piston ... and bulge outward in the annular area between the drive piston and sleeve 11 ... when a force ... is applied.” Decision at 20 (*citing* Ex. 2004, ¶¶ 48-50.)

The Board explained that it reached this Decision for two reasons. **First**, it found that “[t]he testimony of Westport’s expert[] is consistent and better supported

by the disclosure of Klügl while the testimony of Bosch’s expert is incomplete and does not fully account for how membrane 6 functions in Klügl’s actuator assembly.” Decision at 22. **Second**, “the Petition itself does not explicitly discuss Klügl’s membrane 6 with regard to claim 1(e).” *Id.* Respectfully, this overlooks Petitioner’s arguments and misapprehends Klügl. Moreover, the Board’s finding is premised on expert testimony contradicted by the prior art.

A. Patent Owner’s Characterization of Klügl—Which the Board Accepted—Entirely Ignores that Embodiment 1 Is “*Without Stroke Translation*”

As the Board noted, “Klügl teaches that when actuated, ... *pressure is exerted on the drive piston 3 via the first membrane 6* and the transmission medium located in the pressure chamber 5 is exercised.” Decision at 20 (*citing* Ex. 1006, 3:12-29) (original emphasis). Patent Owner’s argument—and the Board’s Decision—is premised on the assumption “that [during actuation] ‘membrane [6] will tend to deform inward where it contacts the drive piston and bulge outward where unconstrained in the annular area between the edge of the drive piston and the wall of the transmission module in order to accommodate the volume of the fluid contained therein.’” Decision at 22 (*citing* Ex. 2004, ¶ 52). Patent Owner concedes that deformation of membrane 6 and the associated changing fluid thickness would result in a “loss of actuator linear translation, or stroke” (*i.e.*, the piston will move less than the actuator). See Response at 32.

Neither Patent Owner nor the Board cite any teaching in Klügl to suggest membrane 6 deforms in this manner or that the thickness of the fluid filling pressure chamber 5 in Klügl’s first embodiment would change during actuation. Moreover, if the embodiment did operate this way, “stroke translation” would occur and a “stroke ratio” would be applied because drive piston 3 would move less than actuator 1 as a result of a reduction in the thickness of the fluid in pressure chamber 5. Klügl itself teaches, however, that the embodiment of Figure 1 operates without stroke translation, which means that it cannot operate in the manner described by Patent Owner. See, e.g., Petition at 34-35; Ex. 1003, ¶¶ 208-215 both *citing* Klügl at 1:41-43 (“Fig. 1 shows a device for power transmission without stroke translation”). In that embodiment—which the Petition relied on—“the movement of the actuator results in the same amount of movement of the piston without amplification” because there is no stroke translation. Ex. 1003, ¶ 208. Thus, the intermediate fluid layer through which force is transmitted must maintain substantially the same thickness during actuation (otherwise, the stroke would be subject to translation and a stroke ratio would be applied). *Id.*; Petition at 34-35; Ex. 1003, ¶¶ 208-209.

As also explained in the Petition, Klügl distinguishes between alternative embodiments: a first embodiment “without stroke translation” (shown in Figure 1, on which the Petition relies) and another embodiment “with stroke translation” (shown in Figure 3). Petition at 34-35 (*citing* Ex. 1006, Klügl at 1:41-46). Because

the embodiment in Fig. 1 is “**without stroke translation**,” its piezoelectric actuator 1 and the drive piston 3 move by the same amount. *Id.* (citing Klügl at 1:41-42). In contrast, the embodiment “**with stroke translation**” in Fig. 3 “achieves a stroke ratio between the deflection of the piezoelectric actuator 1 and the deflection of the drive piston 3.” *Id.* (citing Klügl at 7:12-14); Ex. 1003, ¶¶ 208-215.

Petitioner’s expert provided an illustration to explain the difference between embodiments with and without stroke translation. In operation **without stroke translation**, “when the actuator is expanded, the control piston moves by a distance equal to the amount of actuator expansion.... [T]he hydraulic fluid[’s] ... thickness stays the same. Again, this is representative of Klügl’s Figure 1 and is what the ’829 patent’s claims require.” Ex. 1003, ¶¶ 213-214. Petitioner’s expert explained, in contrast, if the space containing the fluid changes, this would lead to **stroke translation**: “the volume of the fluid stays constant” (as it is substantially incompressible) but “its thickness changes (as it is now contained in a differently shaped space).” *Id.*, ¶ 215.

Once again, Petitioner relied on Klügl’s embodiment **without stroke translation**. Petition at 32-35. Specifically, the Petition quoted Klügl to note “that Fig. 1 is ‘without stroke translation’” (in contrast to Fig. 3, an alternative embodiment that is “with stroke translation.”) *Id.* at 34-35. Petitioner then explained that in the embodiment of Klügl **without stroke translation**, the thickness of the

hydraulic fluid must be substantially constant during actuation (because the fluid is incompressible and actuator 1 and drive piston 3 move by the same amount):

Per Klügl, the fluid also has a low compressibility. And, in the embodiment of Figure 1 (unlike the embodiment of Figure 3), no stroke amplification occurs and chamber 5 does not change dimension during actuation. As a result, the hydraulic link simply transmits force rather than generating it and its “*thickness*” is “*substantially constant.*” (See Ex. 1003, ¶¶ 230-234.)

Petition at 36 (original emphasis). Petitioner’s expert likewise explained why the fact that there is no stroke translation in Klügl’s Fig. 1 embodiment means that the thickness of the hydraulic link remains substantially constant during operation:

208. In the embodiment shown in Klügl’s Figure 1, the movement of the actuator results in the same amount of movement of the piston without amplification. In other words, there is no change in the “stroke translation.” (*id.*, Fig. 1; 1:41-42, 3:23-29.)

...

220. In Klügl, as in Wirbeleit, force from an actuator passes through the hydraulic fluid in chamber 5 to the piston 3 for purposes of opening a valve during actuation. As I have explained, in Figure 1, the fluid in the chamber 5 simply transmits the actuator force. It does not generate force or engage in amplification.

221. Further, Klügl explains that fluid does not flow into or out of chamber 5 during actuation. Thus, in my opinion this chamber and the fluid it contains, just like Wirbeleit’s hydraulic transmission

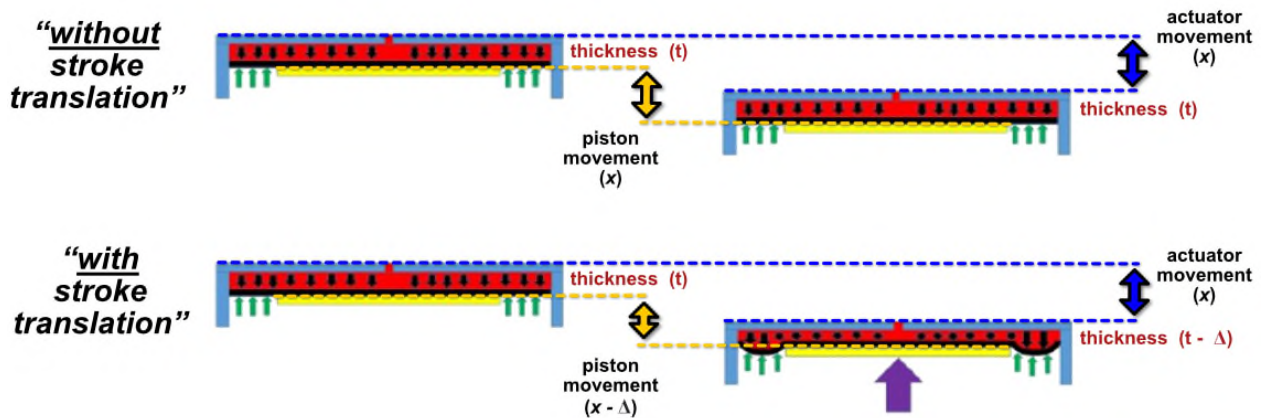
element 22, is the claimed “passive hydraulic link” that acts as a “solid.”

222. As I have noted, Klügl states that the fluid in chamber 5 has a low compressibility. And, as I have also explained, in the embodiment of Figure 1, no stroke amplification or change in translation distance occurs and chamber 5 does not change dimension during actuation. As a result, its “*thickness*” is “*substantially* constant.”

Ex. 1003, ¶¶ 208, 220-222. Importantly, it is not the structure of Klügl’s hydraulic link alone that teaches what claim 1 requires. Instead, it is both that structure *and* Klügl’s teaching that it operates “without stroke translation” that results in the claimed subject matter. Because Klügl’s first embodiment is “without stroke translation,” no stroke ratio is applied, and the piston moves by the same amount as the actuator. This in turn means that the thickness of Klügl’s hydraulic fluid 5 *must* remain substantially constant (as otherwise a stroke ratio would be applied in contravention to Klügl’s teachings).

The Board does not appear to have considered Klügl’s teaching that embodiment 1 operates “*without stroke translation.*” And, Patent Owner ignored it, characterizing Klügl’s first embodiment as entailing a “loss of actuator linear translation, or stroke.” See Response at 32. Thus, respectfully, the Board misapprehended the teaching of Klügl. Per Klügl, actuator 1 and drive piston 3 move

the same amount such that membrane 6 cannot substantially deform and the thickness of the hydraulic fluid between the transmission module and the piston must remain substantially constant. The figures below, based on Patent Owner's demonstrative, show the difference between what Klügl actually teaches (***"without stroke translation"***) and the effect of Patent Owner's erroneous interpretation (***"with stroke translation"***):



Response at 31 (excerpted and annotated). The top figures show Klügl's teaching of operation ***"without stroke translation,"*** where the thickness (t) of the hydraulic fluid between the transmission module and the piston remains constant such that the piston and actuator move by the same amount (x). The bottom figures show the effect of Patent Owner's erroneous interpretation on operation where the deformation of the membrane creates a different shaped space, causing the thickness of the hydraulic fluid (t) to be reduced by Δ such that it becomes $t - \Delta$. As a consequence, while the actuator still moves x , the piston movement is reduced to $x - \Delta$, resulting in ***stroke translation***.

B. Petitioner And Its Expert Explained the Operation of Klügl Including Membrane 6.

The Board also declined to institute *Inter Partes* review because it believed that “the Petition itself does not explicitly discuss Klügl’s membrane 6 with regard to claim 1(e).” Decision at 22. Respectfully, the Board is mistaken. The Petition ***did*** reference this element. It did not mention its deformation because in the context of Figure 1, no substantial deformation can or does occur without negating Klügl’s teaching that the injector operates “***without stroke translation.***”

In particular, the Petition makes clear that Klügl’s “incompressible hydraulic fluid [is] ‘located in [a] pressure chamber 5’” and that “[t]his chamber is defined and sealed by a membrane 6.” Petition at 20-21. Then, in the context of element 1(e), the Petition explains how “[t]he hydraulic fluid is completely captured, contained, and sealed within the transmission module.” *Id.* at 33. The Petition illustrated how chamber 5 (defined by membrane 6) is the hydraulic link of limitation 1(e). *Id.* at 34. And, the Petition explicitly explained how “this chamber and the fluid it contains” meets limitation 1(e) because it “is a ‘***passive hydraulic link.***’... [that] simply transmits force rather than generating it and its ‘***thickness***’ is ‘***substantially constant*** [during actuation].’... [But] fluid flows between chambers 5 and 7 through the throttle 10 during times of rest to account for thermal expansion or wear so as to ensure that the various components remain in contact. Thus, its “***thickness ... is***

adjustable while said actuator is not activated in response to changes in the dimensional relationship between components.” Id. at 36.

In fact, in addressing limitation 1(e) the Board acknowledged Petitioner’s discussion of chamber 5 and membrane 6. Decision at 21. The Board block quoted Petitioner’s expert who further explained that membrane 6 holds the fluid in chamber 5 in place so that the thickness does not change during actuation:

In the embodiment shown in Klügl’s Figure 1, the movement of the actuator results in the same amount of movement of the piston without amplification. In other words, there is no change in the “stroke translation.” (Id., Fig. 1; 1:41–42, 3:23–29.) *As the fluid in chamber 5 is held in place by a membrane 6 and moves through a cylindrical space of constant width and unchanging shape, the thickness of the fluid in chamber 5 will remain constant throughout actuation. (See id.).*

Decision at 21 (*citing* Ex. 1003 ¶ 208 (Board’s emphasis).)

No further discussion of membrane 6 was required because—in the context of Figure 1—the membrane performs no function besides holding the fluid in place. As explained, “Fig. 1 shows a device for power transmission ***without stroke translation.***” Ex. 1006, 1:41-42 (emphasis added). As explained in the Petition and by Petitioner’s expert, the fact that there is no stroke translation means that 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. Petition at 34-35; Ex. 1003, ¶¶ 208-215.

C. The Board Erroneously Relied on Patent Owner’s Expert Testimony

The Board also committed legal error when it found that Patent Owner’s expert testimony “consistent and better supported by the disclosure of Klügl.” Decision at 22. As explained above, Patent Owner’s expert interprets Klügl such that the injector shown in Figure 1 operates “with stroke translation” and applies a “stroke ratio” (*i.e.*, the piston moves by a different amount than the actuator). Again, this is the **opposite** of what Klügl teaches. Per Klügl, the injector of Figure 1 operates “without stroke translation.”

As the Federal Circuit has explained, expert testimony that “contradict[s] a reference ... is not substantial evidence.” *Ericsson Inc. v. Intellectual Ventures I LLC*, 890 F.3d 1336, 1346 (Fed. Cir. 2018). Indeed, it is incumbent on the Board to “disregard the testimony of an expert that is plainly inconsistent with the record.” *Id.* (quoting *Homeland Housewares, LLC v. Whirlpool Corp.*, 865 F.3d 1372, 1378 (Fed. Cir. 2017).) “[T]his is not a matter of credibility but of technological evidence.” *Id.*

The prior art teaches what it teaches. Prior art disclosure cannot be negated by contrary expert testimony. Yet, this is what Patent Owner’s expert improperly does here: he opines that the embodiment in Figure 1 of Klügl operates in a way that it cannot. Klügl states that the injector of Figure 1 is “without stroke translation.” But, Patent Owner’s expert nonetheless testifies that in this injector, the thickness of

hydraulic fluid 5 changes during operation resulting in less movement of piston 3, stroke translation, and the application of a stroke ratio. Per the Federal Circuit, because Patent Owner’s expert testimony is contradicted by the prior art, it must be ignored and cannot serve as the basis for decision. *See Homeland Housewares*, 865 F.3d at 1378. By relying on that testimony, the Board committed legal error and abused its discretion.

IV. CONCLUSION

In its Decision, the Board did not consider Klügl’s unambiguous teaching that the embodiment in Figure 1 operates “***without stroke translation.***” This led the Board to accept Patent Owner’s erroneous argument that Klügl operates in a way that has the opposite effect of what Klügl teaches (*i.e.*, an embodiment “without stroke translation” instead has “stroke translation” and applies a “stroke ratio” during actuation). Because the Board’s decision is contrary to and effectively negates the teachings of the reference itself, Petitioner respectfully requests the Board to reconsider its decision and institute *Inter Partes* review of the challenged claims.

Respectfully submitted,

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Dated: 7/19/2023

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CERTIFICATE OF SERVICE

The undersigned hereby confirms that the foregoing paper was caused to be served on 7/19/2023 upon the following counsel of record for Patent Owner via electronic mail:

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