

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CARLISLE FLUID TECHNOLOGIES, INC.,
Petitioner,

v.

AKURATE DYNAMICS, LLC,
Patent Owner.

IPR2021-01256
Patent 10,159,996 B2

Before BARRY L. GROSSMAN, ERIC C. JESCHKE, and
RYAN H. FLAX, *Administrative Patent Judges*.

Opinion for the Board filed by Administrative Patent Judge GROSSMAN.

Opinion Concurring filed by Administrative Patent Judge FLAX.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background and Summary

Carlisle Fluid Technologies, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–20 (the “challenged claims”) of U.S. Patent No. 10,159,996 B2 (Ex. 1001, “the ’996 patent”). Akurate Dynamics, LLC. (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”).

We concluded that Petitioner satisfied the burden, under 35 U.S.C. § 314(a), to show that there was a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, on behalf of the Director (37 C.F.R. § 42.4(a)), and in accordance with *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348, 1353 (2018) and 37 C.F.R. § 42.108(a), we instituted an *inter partes* review of all the challenged claims, on all the asserted grounds. Paper 7 (“Dec. Inst.”).

In accordance with the requirement in our Scheduling Order (Paper 9, 8) (“Scheduling Order”),¹ on March 28, 2022, counsel for Patent Owner emailed the Board and stated that “Patent Owner has elected not to file a Patent Owner’s Response in this proceeding,” and requested a conference call to discuss this decision. Ex. 3002.

A conference call was held on March 30, 2022, among the Panel in this proceeding, Mr. James Hall, counsel for Patent Owner, and Mr. Nathan Mammen, counsel for Petitioner, to discuss Patent Owner’s decision not to

¹ “If Patent Owner elects not to file a response, Patent Owner must arrange a conference call with the parties and the Board. Patent Owner is cautioned that any arguments not raised in the response may be deemed waived.” Paper 9, 8.

file a Response. *See* Paper 10 (Order, Conduct of the Proceeding (“Order”)). As summarized in the Order, Counsel for each of the parties stated that they were aware that even in the absence of a Patent Owner Response, without a request to terminate, the proceeding may continue to the issuance of a final written decision. *Id.* at 2.

Neither party requested an oral hearing.

Petitioner submitted 35 exhibits. *See* Exs. 1001–1035. Petitioner relies, in part, on the Declaration testimony of David A. Rockstraw, Ph.D. *See* Ex. 1003.²

Patent Owner did not submit any exhibits or declaration testimony. We do not draw a negative inference from Patent Owner’s decision not to submit testimonial evidence with its Preliminary Response in this proceeding. Patent Trial and Appeal Board Consolidated Trial Practice

² Dr. Rockstraw earned a Ph.D. in Chemical Engineering in 1989 and a B.S. degree in Chemical Engineering in 1986. Ex. 1003 ¶ 7. Dr. Rockstraw is registered as a Professional Engineer in the states of Texas and New Mexico. *Id.* ¶ 8. He has over 35 years of experience working in chemical processing industries; academia; government labs; and private practice as a consultant, R&D engineer. *Id.* ¶ 9. At New Mexico State University, he holds the positions of Academic Head of the Department of Chemical & Materials Engineering; Robert Davis Distinguished Professor; and Distinguished Achievement Professor. *Id.* ¶ 10. He is a named inventor on three U.S. patents. *Id.* ¶ 16. *See also* Ex. 1028 (Curriculum Vitae of Dr. Rockstraw). We determine that Dr. Rockstraw is qualified to testify in the form of an opinion because his knowledge, skill, experience, training, and education will help the Board to understand the evidence or to determine a fact in issue, and because he otherwise meets the requirements of the applicable rule of evidence. *See* Fed. R. Evid. 702.

Guide 50 (Nov. 2019) (“TPG”) (“No negative inference will be drawn if a patent owner decides not to present testimonial evidence with a preliminary response.”).

We have jurisdiction under 35 U.S.C. § 6. We enter this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Petitioner has the burden of proving unpatentability of a claim by a preponderance of the evidence. 35 U.S.C. § 316(e).

Based on the findings and conclusions below, we determine that Petitioner has proven that all of the challenged claims are unpatentable.

B. Real Parties in Interest

Petitioner states the “real parties-in-interest are CFT,³ Carlisle Construction Materials, LLC, and Carlisle Companies Inc.” *See* Pet. 2. Patent Owner identifies itself, Akurate Dynamics, LLC, as the sole real-party-in-interest. Paper 4, 1.

C. Related Matters

Petitioner states that the sole related matter is “now-terminated *Akurate Dynamics, LLC v. Carlisle Fluid Technologies, Inc.*, Civil Action No. 6:20-cv-00606-ADA (W.D. Tex.)” Pet. 2; *see also* Ex. 3001, 6 (“Because Akurate did not adequately plead proper venue for its patent infringement claim . . . [and] failed to establish proper venue for its non-patent claims . . . CFT’s Motion to Dismiss (ECF No. 28) is **GRANTED** and this case is **CLOSED**.”). Petitioner adds that in this suit “Akurate asserted that CFT infringes claim 20 of the ’996 patent.” Pet. 2.

³ “CFT” refers to the sole named Petitioner, which is Carlisle Fluid Technologies, Inc. Pet. 1 (“Carlisle Fluid Technologies, Inc. (‘CFT’ or ‘Petitioner’)”).

Patent Owner states “Patent Owner is aware of no related matters.”
Paper 4, 1.

II. THE '996 PATENT

We make the following findings concerning the '996 patent.

A. Summary

The '996 patent is titled “System for Dispensing Multiple Component Chemical Sprays.” Ex. 1001, code (54). The disclosed system relates to the “field of systems for spray application of multiple component liquid compounds, wherein the multiple components are mixed at the point of spray application.” *Id.* at 1:22–25. Examples of such multiple component liquid compounds “include thermal insulation which may consist of two liquid components to be mixed at the point of application. The two liquid components react at the point of application to form a foam, which eventually cures into finished insulation.” *Id.* at 1:43–47. According to the Specification, these spray systems “require very precise control over the volume and/or mass flow rate of each of a plurality of liquid chemicals when applied by a spray gun.” *Id.* at 1:25–29.

The '996 patent acknowledges that known systems include a “plurality of liquid chemicals,” which are “mixed at the point of application of the spray discharged from the sprayer.” *Id.* at 1:30–38. In these known systems, each chemical is contained individually in 55 gallon drums and pumped through individual hoses to a “spray application ‘gun’ or sprayer.” *Id.*

The Specification also acknowledges that “[m]anufacturers of multiple component liquid chemical compounds specify the volume and/or mass of each component that is required to be dispensed so that the correct

chemical reaction or other physical process (e.g., evaporation) takes place at the point of application.” Ex. 1001, 1:48–52.⁴ According to the ’996 patent, however, using systems known in the art for spray applying multiple component chemicals “may not have sufficient accuracy in determining the volume and/or mass flow rate of each component chemical to dispense the manufacturer-specified amount of each component chemical when the spray is actually applied.” *Id.* at 1:52–57. The ’996 patent also states that these known systems pose a number of “environmental and personnel hazards.” *Id.* at 1:58–2:5.

Figure 1 from the ’996 patent, the sole figure in the Specification, is reproduced below.

⁴ See *Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1376 (Fed. Cir. 2022). The Federal Circuit determined in *Qualcomm* that a patent applicant’s admissions are “permissible evidence in an *inter partes* review for establishing the background knowledge possessed by a person of ordinary skill in the art” and “provide a factual foundation as to what a skilled artisan would have known at the time of the invention.”

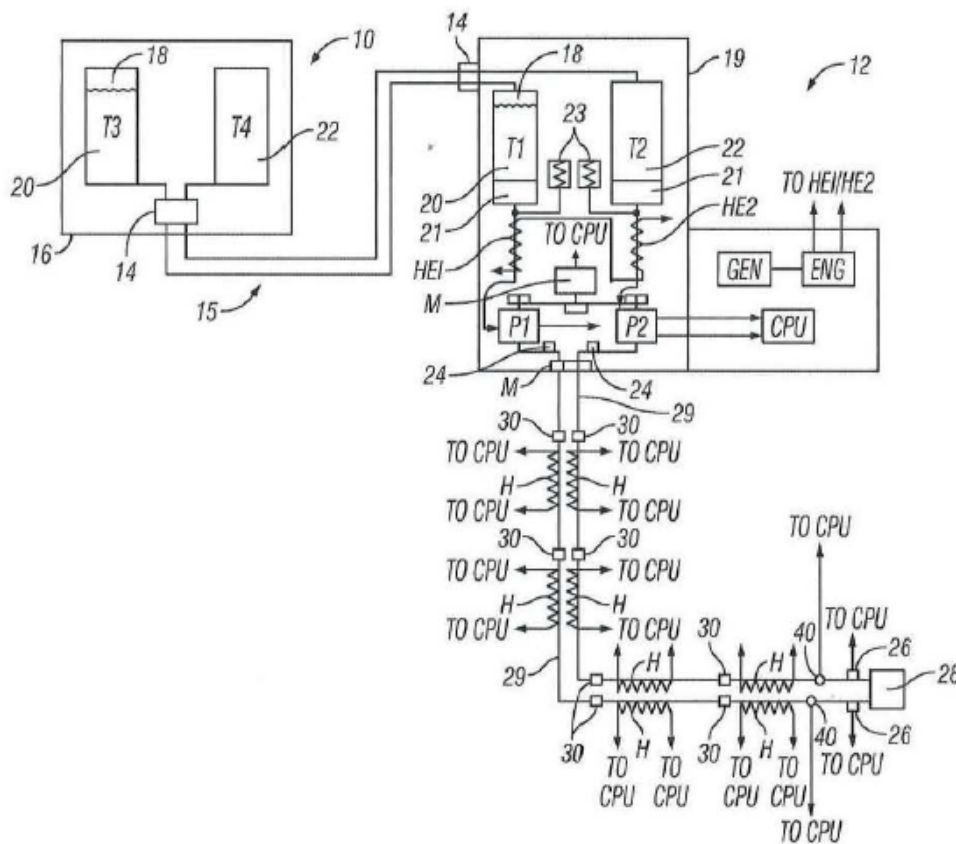


FIG. 1 shows an “embodiment of a multiple component spray applicator system according to the [’996 patent] disclosure.” Ex. 1001, 2:14–16.

As shown in Figure 1, the disclosed system may include bulk storage filling unit 10 and chemical dispensing unit 12. *Id.* at 2:16–17. Bulk storage filling unit 10 may include individual chemical storage tanks for each of a plurality of separate chemicals to be dispensed by chemical dispensing unit 12. *Id.* at 2:24–30. In the embodiment shown in Figure 1, there are two different chemicals, each stored in a separate storage tank, shown at T3, T4. First liquid chemical 20 is disposed in chemical storage tank T3. Second liquid chemical 22 may be disposed in chemical storage tank T4.

Id. at 2:33–39. In addition to *storage* tanks T3, T4, chemical dispensing unit 12 may include separate *supply* tanks T1, T2 for each of the separate liquid chemicals 20, 22 to be applied by spraying. *Id.* at 2:50–52.

The interior of chemical dispensing unit protective housing 19 may be thermally insulated so that the temperature inside protective housing 19 is maintained at a selected temperature. Ex. 1001, 2:60–63. This allows use at locations where the ambient temperature may be too low for proper withdrawal of liquid chemicals 20, 22 from respective supply tanks T1, T2. *Id.* at 2:63–67.

Each supply tank T1, T2 is coupled to a respective low-pressure transfer pump 21, which is coupled to a respective applicator pump P1, P2. *Id.* at 3:1–5. The outlet of each low-pressure transfer pump 21 is in “pressure communication” with accumulator 23. *Id.* at 3:5–7. Low pressure transfer pumps 21 and accumulators 23 maintain a minimum pressure in the inlet to each applicator pump P1, P2 in order to reduce the possibility of cavitation. *Id.* at 3:7–10.

Using various hoses, valves, and the described pumps, chemicals 20, 22 eventually reach spray gun 28.

A central processor CPU receives input signals from temperature sensors 30 and first and second pressure sensors 24, 26. The CPU also receives input measurements of volume of liquid pumped from each of applicator pumps P1, P2. The CPU also operates the motors M and the heating elements H. *Id.* at 3:55–64. According to the Specification, “[b]y selecting a temperature for each liquid chemical to be maintained at a selected viscosity, a pumping rate of each liquid chemical 20, 22 through each respective chemical delivery hose 29 may be more precisely

controllable.” *Id.* at 4:2–6. Pressure differences are used by the CPU to adjust the temperature measured at each of temperature sensors 30 by operating respective ones of heaters H so that a selected pressure difference is maintained during spray application of each of chemicals 20, 22.

Id. at 4:14–19. The Specification states that “[b]y adjusting temperature so that selected pressure differences are maintained, more precise control over respective flow rates of each liquid chemical 20, 22 may be maintained.”

Id. at 4:19–22.

B. Prosecution History

During prosecution of the application that matured into the ’996 patent, a telephone interview was held with the Examiner. Ex. 1002, 187. During the interview, the Appellant suggested further amending the independent claims to include “a spray gun, first and second heated discharge hoses, and four pressure sensors at the inlet and outlet of each hose, and the processor connected to all the sensors in order to control the first and second pumps.” *Id.* The Examiner agreed that the “added limitations . . . differentiated the claims from the prior art.” *Id.* The Examiner prepared an Examiner’s Amendment of the claims to include the added limitations. *Id.*

A Notice of Allowability, including the Examiner’s amendment of independent claims 1 and 20, and the reasons for allowance, followed the interview. Ex. 1002, 189–196. As reasons for allowance, the Examiner stated “[a]lthough Pham et al (U.S. 2003/0158630) teaches some of the claimed structure including first and second flow rate sensors, Pham fails to teach, among other things, a spray gun.” *Id.* at 193. The Examiner also stated that “O’Leary et al (U.S. 2014/0209630) does not teach a first,

second, third and fourth pressure sensors, as claimed. Instead, O’Leary teaches a pressure sensor at an upstream end and a downstream end of a pump, not at both ends of two discharge hoses, as claimed.” *Id.* at 194. Additionally, the Examiner stated “Tix [a reference] fails to teach, among other things, pressure sensors for measuring pressure at an inlet end and at an outlet end of each discharge hose, wherein a processor uses the readings from the pressure sensors to maintain a desired temperature throughout the system.” *Id.* In summary, the Examiner stated “[a]fter further consideration and search, [the] Examiner was not able to find a system that teaches a processor that makes use of two flow sensors, and four pressure sensors to control two pumps and adjust their input in real time, as claimed.” *Id.* The claims, as amended by the Examiner, issued as the ’996 patent’s claims.

C. Illustrative Claim

Claims 1 and 20 are independent claims challenged in the Petition. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. An apparatus for simultaneously dispensing at least two liquids at preselected flow rates comprising:
 - a spray gun;
 - a first container containing a first liquid;
 - a second container containing a second liquid;
 - a first pump having an inlet in fluid communication with the first container, the first pump having an outlet;
 - a first pressure sensor in fluid communication with the outlet of the first pump;
 - a first heated hose having an inlet connected to the outlet of the first pump and an outlet connected to the spray gun;
 - a second pump having an inlet in fluid communication with the second container, the second pump having an outlet;

a second pressure sensor in fluid communication with the outlet of the second pump;

a second heated hose having an inlet connected to the outlet of the second pump and an outlet connected to the spray gun;

a third pressure sensor in fluid communication with the outlet of the first heated hose;

a fourth pressure sensor in fluid communication with the outlet of the second heated hose;

a first flow rate sensor in fluid communication with the outlet of the first heated hose;

a second flow rate sensor in fluid communication with the outlet of the second heated hose;

a processor connected to the first pump, the second pump, the first pressure sensor, the second pressure sensor, the third pressure sensor, the fourth pressure sensor, the first flow rate sensor, and the second flow rate sensor and configured to vary the output of the second pump in real time in response to signals from the pressure sensor, the first flow rate sensor and the second flow rate sensor.

Ex. 1001, 4:63–5:31.

Independent claim 1 is directed to an “apparatus.” Independent claim 20 is similar to claim 1, but is directed to a “method” for simultaneously dispensing at least two liquids from a spray gun.

D. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–20 would have been unpatentable on the following four grounds (Pet. 4–5):

Claim(s) Challenged	35 U.S.C. §⁵	Reference(s)/Basis
1–5, 11, 17–20	103	Kogelbauer ⁶
8–10, 13–16	103	Kogelbauer, Cline ⁷
7	103	Kogelbauer, Kropfield ⁸
6, 12	103	Kogelbauer, Kukesh ⁹

III. ANALYSIS

A. Legal Standards

1. Status of Proceeding

“If an inter partes review is instituted and not dismissed under this chapter, the Patent Trial and Appeal Board *shall* issue a final written decision with respect to the patentability of any patent claim challenged by the petitioner and any new claim added under section 316(d).” 35 U.S.C. § 318(a) (emphasis added)).

Our rules also provide that a party “may request judgment against itself at any time during a proceeding.” 37 C.F.R. § 42.73(b). The request may be explicit or implicit. As stated in our rules, “[a]ctions construed to be a request for adverse judgment include:

- (1) Disclaimer of the involved application or patent;

⁵ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 296–07 (2011), took effect on September 16, 2011. The changes to 35 U.S.C. §§ 102 and 103 in the AIA do not apply to any patent application filed before March 16, 2013. Because the application for the patent at issue in this proceeding has an actual filing date of January 10, 2018, and a claimed effective filing date of October 20, 2014, which dates are after March 16, 2013, we refer to the AIA version of the statute.

⁶ Certified Translation of published Austrian Patent Application, Pub. No. 505858 A1, published April 15, 2009 (Ex. 1006, “Kogelbauer”).

⁷ U.S. Patent 5,857,589, iss. January 12, 1999 (Ex. 1017, “Cline”).

⁸ U.S. Patent 5,810,254, iss. September 22, 1998 (Ex. 1014, “Kropfield”).

⁹ U.S. Patent 4,809,909, iss. March 7, 1989 (Ex. 1021, “Kukesh”).

(2) Cancellation or disclaimer of a claim such that the party has no remaining claim in the trial;

(3) Concession of unpatentability or derivation of the contested subject matter; and

(4) *Abandonment of the contest.*”

37 C.F.R. § 42.73(b) (emphasis added).

During our March 30 conference call, counsel for Patent Owner indicated that it did not immediately intend to expressly abandon the contest and/or cancel the challenged claims. Order, 2. Counsel for Patent Owner also stated Patent Owner had no intention to file a motion to amend any claims in this proceeding. *Id.*; *see also* Ex. 3003 (April 1, 2022 email from counsel for Patent Owner confirming “that the order correctly states that Patent Owner does not intend to expressly abandon the contest or cancel the challenged claims” and confirming “that Patent Owner will not be filing [] a request [for adverse judgment]).” Thus, the status of this proceeding is that it has been instituted and has not been dismissed.

Based on counsel for Patent Owner’s statements in the April 1 email (Ex. 3003) and in the March 30 telephone conference (*see* Order), it is clear that Patent Owner has *not* made “an unequivocal abandonment of the contest of these proceedings.” *See Apple, Inc. v. Zipit Wireless, Inc.* IPR2021-01124, Paper 14 at 3 (PTAB Dec. 21, 2022) (Precedential, Director Review Decision). To the contrary, notwithstanding Patent Owner’s failure to file a Response, it is clear that Patent Owner is relying on a determination by the Board as to whether Petitioner has met its burden of proof. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378–79 (Fed.

Cir. 2015) (“In an *inter partes* review, the burden of persuasion is on the petitioner to prove ‘unpatentability by a preponderance of the evidence,’ 35 U.S.C. § 316(e), and that burden never shifts to the patentee.”); *see also In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016) (discussing how “it is inappropriate to shift the burden to the patentee after institution to prove that the patent is patentable”).

Once a trial is instituted, the Board may decline to consider arguments set forth in a preliminary response unless they are raised in the patent owner response. Scheduling Order, 8; *see also In re NuVasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (holding that a patent owner waived an issue presented in its preliminary response but not renewed in its response after trial is instituted). In *NuVasive*, the scheduling order was more draconian than the Scheduling Order in the proceeding before us. The scheduling order in *NuVasive* stated “[t]he patent owner is cautioned that any arguments for patentability not raised and fully briefed in the response *will* be deemed waived.” *Id.* (emphasis added). Our Scheduling Order gave the Board some flexibility by stating that “arguments for patentability not raised in the response *may* be deemed waived.” Scheduling Order 8 (emphasis added). In *NuVasive*, counsel for Patent Owner also stated at oral argument that it was “correct” that they were “no longer disputing public availability of a reference.” *NuVasive*, 842 F.3d at 1380–1381. No such explicit concession was made in the proceeding before us.

Accordingly, we comply with the statutory mandate “to issue a final written decision with respect to the patentability of any patent claim challenged by the petitioner” for which an IPR proceeding was “instituted and not dismissed.” 35 U.S.C. § 318(a).

We considered Patent Owner’s limited Preliminary Response arguments in our Decision to Institute based on a “reasonable likelihood” standard of proof. 35 U.S.C. § 314(a). As we explain in this Final Decision, our analysis and determination of Petitioner’s arguments and evidence remain the same under a preponderance of the evidence standard that applies to this Final Decision. *Id.* § 316(e) (“In an inter partes review instituted under this chapter, the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.”). In order to show that Petitioner met the preponderance of evidence standard, we make limited reference to Patent Owner’s arguments in its Preliminary Response.

2. *Obviousness*

Section 103(a) forbids issuance of a patent when “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when available, evidence such as commercial success, long felt but unsolved needs, and failure of others.¹⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see KSR*, 550 U.S. at 407 (“While the sequence of these questions might be reordered

¹⁰ Patent Owner does not direct us to any objective evidence of non-obviousness.

in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”). The Court in *Graham* explained that these factual inquiries promote “uniformity and definiteness,” for “[w]hat is obvious is not a question upon which there is likely to be uniformity of thought in every given factual context.” 383 U.S. at 18.

The Supreme Court made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To support this conclusion, however, it is not enough to show merely that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness additionally requires that a person of ordinary skill at the time of the invention “would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.*; see also *Orexo AB v. Actavis Elizabeth LLC*, 903 F.3d 1265, 1273 (Fed. Cir. 2018) (“The question is not whether the various references separately taught components of the ’330 Patent formulation, but whether the prior art suggested the selection and combination achieved by the ’330 inventors.”).

Accordingly, an obviousness determination generally requires a finding “that a person of ordinary skill in the art would have been motivated to combine or modify the teachings in the prior art and would have had a reasonable expectation of success in doing so.” *Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 160 (Fed. Cir. 2021) (citing *OSI*

Pharms., 939 F.3d at 1382 (quoting *Regents of Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018))). “Whether the prior art discloses a claim limitation, whether a skilled artisan would have been motivated to modify or combine teachings in the prior art, and whether she would have had a reasonable expectation of success in doing so are questions of fact.” *Strathclyde*, 17 F.4th at 160.

In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude the combination would have been obvious without identifying any reason *why* a person of skill in the art would have made the combination. *Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017).

Moreover, in determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 164 (Fed. Cir. 1985) (“It is elementary that the claimed invention must be considered as a *whole* in deciding the question of obviousness.”); *see also Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537 (Fed. Cir. 1983) (“[T]he question under 35 U.S.C. § 103 is not whether the differences *themselves* would have been obvious. Consideration of differences, like each of the findings set forth in *Graham*, is but an aid in reaching the ultimate determination of whether the claimed invention *as a whole* would have been obvious.”).

As a factfinder, we also must be aware “of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *KSR*, 550 U.S. at 421.

Applying these general principles, we consider the evidence and arguments of the parties.

3. *Level of Ordinary Skill in the Art*

The level of skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). “This reference point prevents . . . factfinders from using their own insight or, worse yet, hindsight, to gauge obviousness.” *Id.* Moreover, “the inquiry into whether any ‘differences’ between the invention and the prior art would have rendered the invention obvious to a skilled artisan necessarily depends on such artisan’s knowledge.” *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1337 (Fed. Cir. 2020) (citing *Dow Jones & Co. v. Abblaise Ltd.*, 606 F.3d 1338, 1349, 1353 (Fed. Cir. 2010) (affirming the district court’s grant of summary judgment of invalidity in part because the obviousness “analysis *requires* an assessment of the ‘. . . background knowledge possessed by a person having ordinary skill in the art’” (emphasis added))).

Factors pertinent to a determination of the level of ordinary skill in the art include: (1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field. *Env’t Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed.

Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.* Moreover, these factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art. *Daiichi Sankyo Co. Ltd, Inc. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007).

In determining a level of ordinary skill, we also may look to the prior art, which may reflect an appropriate skill level. *Okajima*, 261 F.3d at 1355.

Additionally, the Supreme Court informs us that “[a] person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421.

Petitioner asserts that a person of ordinary skill in the art at the relevant time would have had “at least a bachelor’s degree in chemical engineering or a similar discipline, and three years of experience in the research, design, or implementation of systems for controlling the feed rates of multiple components.” Pet. 27 (citing Ex. 1003 ¶ 70). Dr. Rockstraw repeats *verbatim* the identical one-sentence conclusion stated by Petitioner. Ex. 1003 ¶ 70. Dr. Rockstraw does not provide any facts, data, or analysis to support his opinion. His opinion on the level of ordinary skill is entitled to no probative weight. 37 C.F.R. § 42.65 (a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Merely repeating a conclusory argument from the Petition in the declaration testimony of a proposed expert does not give that argument enhanced probative value.

Patent Owner does not propose a level of ordinary skill, nor does Patent Owner comment on Petitioner’s proposed ordinary level of skill.

The asserted prior art reflects knowledge of chemistry, chemical engineering, mechanical engineering (such as pumps and sensors), electrical engineering (signal communication), and computer science (such as computer processors).

Accordingly, consistent with the uncontested level of ordinary skill adopted in our Decision to Institute this proceeding, and based on the asserted prior art in the record before us, we determine a person of ordinary skill in the relevant technology at the relevant time would have had a bachelor's degree in one or more of the areas of chemistry, chemical engineering, mechanical engineering, electrical engineering, or computer science, and two years of relevant experience. A recipient of other academic degrees may qualify as a person of ordinary skill if they have taken coursework or have experience in the pertinent technology. Additional education, such as an advanced degree, could offset less work experience; additional work experience could offset less education or coursework.

B. Claim Construction

We construe each claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b) (2021). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (*en banc*).

Petitioner asserts that the claims do not require construction. Pet. 27–28.

Patent Owner does not propose any claim constructions.

Given the lack of dispute on this record, we need not construe the claims. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (claims are construed only to the extent necessary to resolve a dispute).

*C. Ground 1
Claims 1–5, 11, 17–20
Based on Kogelbauer*

1. Kogelbauer (Ex. 1006)

We make the following findings concerning Kogelbauer.

Kogelbauer is an Austrian published patent application. *See* Exs. 1005 (Austrian published application in German), 1006 (certified English translation), 1007 (Translator's Declaration). We cite to the certified English translation, Ex. 1006.

Kogelbauer discloses a device “for conveying, metering and dispensing at least two material components (A, B) under pressure.” Ex. 1006, Abstract. The disclosed process involves conveying the material components from respective sources, such as containers; preparing the material components with regard to pressure and temperature; metering and, optionally, mixing the components; and finally dispensing the material components in separate or mixed form and applying the components to any surfaces or construction elements. *Id.* at 1:13–19.¹¹ The application is preferably carried out by spraying. *Id.*

Kogelbauer states that the device disclosed is “continuously adjustable,” thus allowing metering ratios for “an unlimited number of

¹¹ Citations are to page:line number.

material components.” *Id.* at 2:19–22. In particular, these material components include “liquid and viscous material components, e.g., paints and varnishes as well as various plastics (polyester, polyurethane, various synthetic resins, etc.), further gaseous material components (e.g. CO₂) and solid components (e.g. quartz powder) and mixtures of [these] components.” *Id.* at 2:23–28.

Figure 1 from Kogelbauer, annotated by Petitioner, is reproduced below.

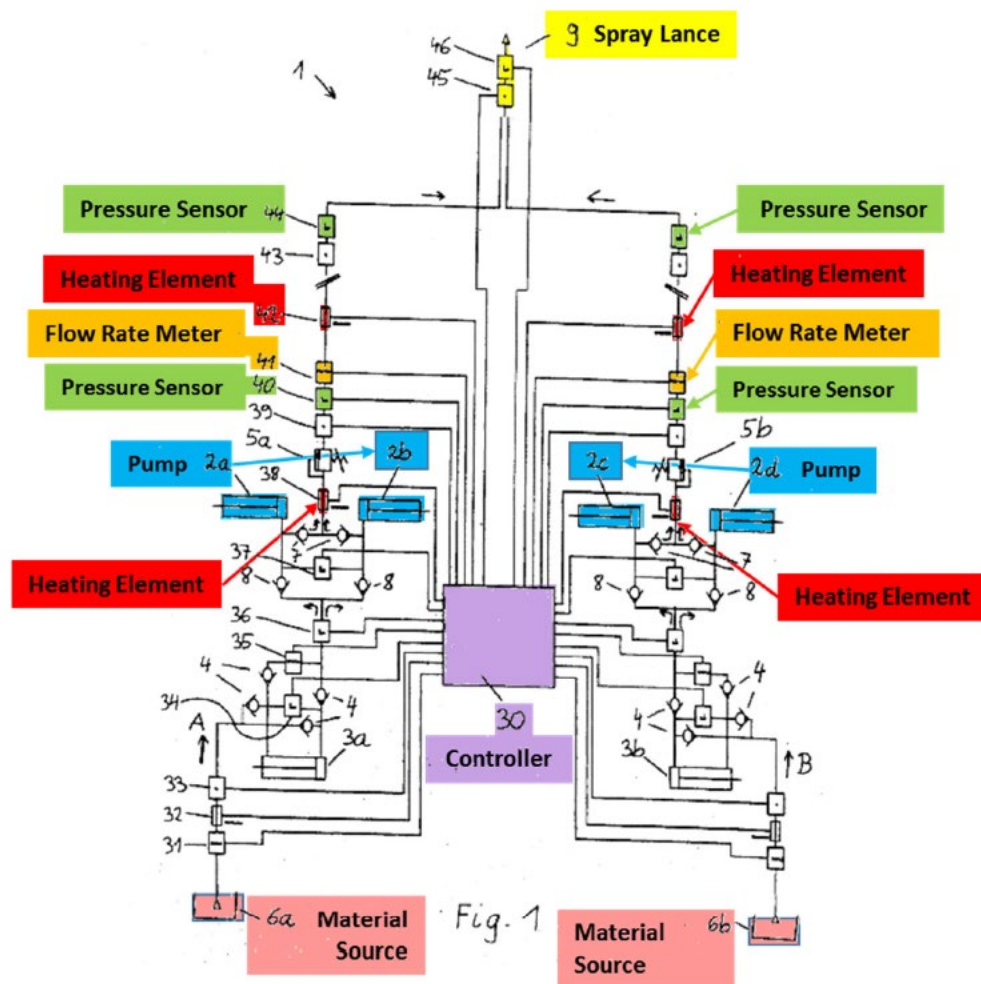


Fig. 1 from Kogelbauer, annotated by Petitioner (Pet. 21), is a schematic view of an embodiment of Kogelbauer's disclosed device. Ex. 1006, 8:12–13.

As shown in Figure 1, material components A and B each have their own material sources 6a and 6b¹², respectively. The two branches for processing materials A, B are illustrated as symmetrical. Ex. 1006, 9:7–8.

¹² Kogelbauer refers to material components A and B, with capital letters, but refers to the structures for processing each material component, as shown in Figure 1, with lower case letters.

The disclosed device includes “at least one piston cylinder pump for each material component.” *Id.* at 3:25–26. In a preferred disclosed embodiment, “two piston cylinder pumps are provided for each material component.” *Id.* at 4:12–14.

To be able to set and regulate the temperature of the material components independently of one another, Kogelbauer provides heating elements installed in the feed lines. *Id.* at 6:11–15. Material components A, B from the material sources are preheated by heating elements 32 designed as heat exchangers. *Id.* at 9:18–19. These heating elements can independently heat the respective material components A, B. *Id.* at 9:20–21.

Respective pump 3a, 3b is provided for each material component A, B. *Id.* at 9:26–27. These pumps draw material components A, B from material source 6a, 6b and bring each component to a first pressure level, which is measured by means of pressure sensor 34. *Id.* at 9:27–30.

After material components A, B pass pump 3a, 3b, each component is fed into “main pumps” 2a, 2b (for component A) and 2c, 2d (for component B), in which the mixing ratio and output pressure of material components A, B are set. *Id.* at 10:8–19. According to Kogelbauer, “the metering ratios do not change during operation.” *Id.* at 4:5. Kogelbauer also discloses, however, that a feature of the disclosed device is that “[t]he metering ratios of the different material components are continuously adjustable and also adjustable during operation.” *Id.* at 15:24–26.

Components A, B then pass through heating element 38, temperature sensor 39, pressure sensor 40, flow rate meter 41, heating element 42, temperature sensor 43, and pressure sensor 44. *Id.* at 10:22–27. Thereafter,

material components A, B are dispensed jointly by a dispensing device 9, such as a spray lance. *Id.* at 10:27–29.

Controller 30 evaluates the signals from all temperature and pressure sensors and controls the heating elements, pumps, ventilation, and other parameters. *Id.* at 11:8–15; *see also id.* at 21:16–17 (“electronic control device (30) is provided for processing the output signals of the sensors”).

2. *Analysis* *Independent Claims 1 and 20*

Petitioner provides a clause-by-clause analysis of independent claim 1, asserting where each element or limitation is disclosed or suggested in Kogelbauer so as to render each claim obvious. Pet. 28–45.¹³ A similar analysis is provided for independent method claim 20 (*id.* at 56–69), as well as for the challenged dependent claims. In its Preliminary Response, Patent Owner presents no persuasive argument or evidence contesting Petitioner’s analysis and conclusions, except for clause 1[n] and the corresponding clause in claim 20, clause 20[i]. Prelim. Resp. 5, 9 (“Kogelbauer does not disclose or render obvious independent claim element 1[n]’s requirement of ‘a processor . . . configured to vary the output of the second pump in real time’ or claim element 20[i]s requirement of ‘controlling the second pump in real time’”).

Clause 1[n] is the last clause in claim 1 and requires:

a processor connected to the first pump, the second pump, the first pressure sensor, the second pressure sensor, the third pressure sensor, the fourth pressure sensor, the first flow rate

¹³ Petitioner identifies each clause of the challenged claims, following the preamble, with a lettered designation. *See* Ex. 1004. For claim 1, the lettered paragraphs are designated “1[a]–1[n].” Ex. 1004, 1. We will refer to these designated clauses when helpful to do so.

sensor, and the second flow rate sensor and configured to vary the output of the second pump in real time in response to signals from the pressure sensor, the first flow rate sensor and the second flow rate sensor.

Ex. 1001, 5:24–31; Ex. 1004, 1. Petitioner acknowledges that “Kogelbauer does not explicitly state that controller 30 adjusts pumps 2a-2d in response to the signals received from the flow rate sensors.” Pet. 44 (claim 1), 69 (claim 20). Petitioner asserts, however, that “Kogelbauer discloses that the flow rate sensors are connected to the controller . . . and that ‘[e]xcellent operational safety and usability of the application device . . . are achieved by providing sensors in the flow paths of the material components that detect the presence of material.’” Pet. 44, 69 (citations omitted). Petitioner then argues that “[a] POSA^[14] would have understood that flow rate meters are used to detect the presence of material and, if not inherent in Kogelbauer, would have found it obvious to have controller 30 receive and analyze the signals sent by those sensors and, in real time in response, vary the output of pumps 2a-2d.” *Id.* at 44–45 (citing Ex. 1003 ¶ 91); *id.* at 69 (citing Ex. 1003 ¶¶ 91, 141).

Dr. Rockstraw’s opinion testimony supports Petitioner’s assertions.

Dr. Rockstraw testifies that:

A POSA would have understood that controller 30 is connected to the first and second pumps, the first, second, third, and fourth pressure sensors, and first and second flow rate sensors because Kogelbauer explains that the controller 30 “evaluates the signals

¹⁴ An acronym commonly used in patent law jargon to mean a person of ordinary skill in the art. *See* 35 U.S.C. § 103 (stating a requirement for patentability is whether “the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains”).

from *all* temperature and pressure sensors and controls the heating elements, the pumps, the ventilation, etc.”

Ex. 1003 ¶ 89 (citing Ex. 1006, 11:7–10, 11:20–21, Fig. 1). Dr. Rockstraw then testifies that “[i]t is my opinion that a POSA would have further understood that for a controller to evaluate or control a device, it has to be connected to that device.” *Id.* Dr. Rockstraw also testifies that “annotated Fig. 1 [included with his testimony] illustrates certain representative connections between the controller 30 and pressure sensors, flow rate sensors, and temperature sensors.” Ex. 1003 ¶ 89 (citing Ex. 1006, Fig. 1, 11:7–10, 11:20–21). Dr. Rockstraw’s annotated Figure 1 of Kogelbauer is reproduced below.

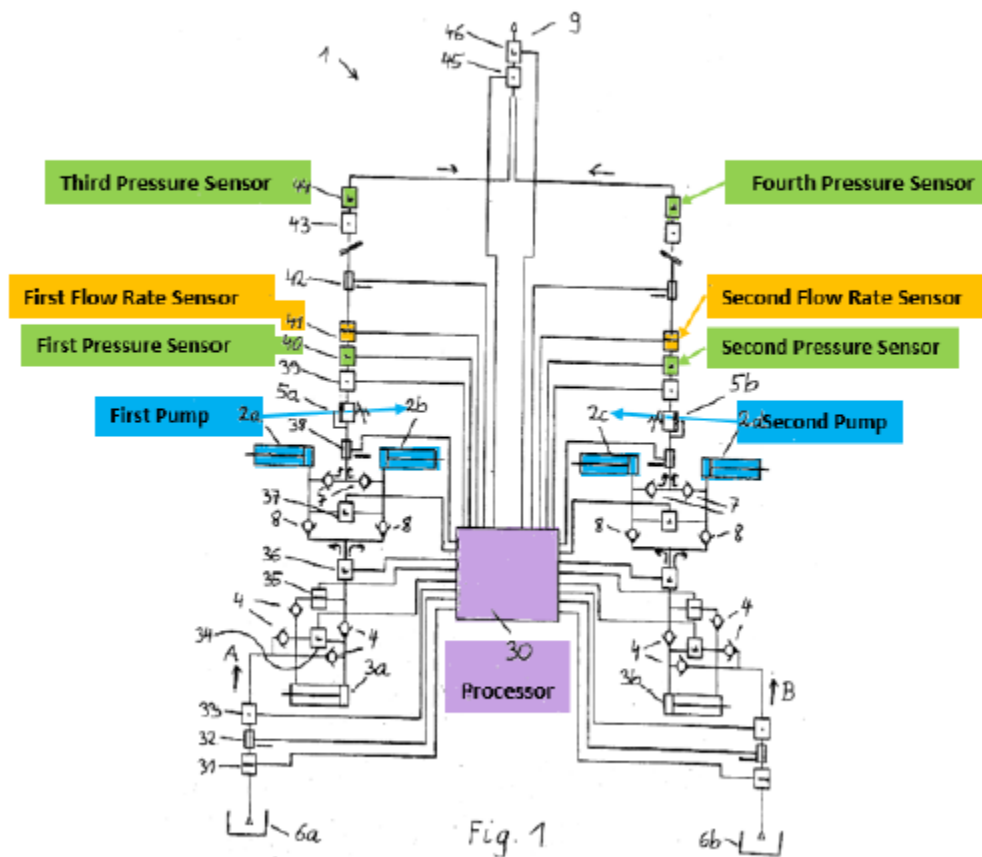


Fig. 1 from Kogelbauer (Ex. 1006), annotated by Dr. Rockstraw in Ex. 1003 ¶ 89, is a schematic view of an embodiment of Kogelbauer’s disclosed device.

Additionally, Dr. Rockstraw testifies that “Kogelbauer also discloses that the pumps are continually adjusted during operation of the application device for accurate metering ratios of material components.” Ex. 1003 ¶ 90 (citing supporting disclosures in Kogelbauer, e.g., Ex. 1006, 15:24–26 (“The metering ratios of the different material components are continuously adjustable and also adjustable during operation.”)).

As an initial matter, we determine that Patent Owner has waived all arguments in its Preliminary Response as Patent Owner did not file a brief during the trial phase. *See In re NuVasive, Inc.*, 842 F.3d 1376, 1380–81 (Fed. Cir. 2016) (“NuVasive challenged the public accessibility of the prior

art references during the preliminary proceedings of the inter partes review . . . but failed to challenge public accessibility during the trial phase NuVasive waived its arguments on this issue.”). In the alternative, and under the unique and specific circumstances of this proceeding, where Patent Owner has not filed a response, but also specifically stated it is not abandoning this contest, we also acknowledge Patent Owner’s arguments from the Preliminary Response to provide context for our determinations that Petitioner has met its burden of proof in this proceeding.

In its Preliminary Response, Patent Owner takes a different view of the evidence. According to Patent Owner, Petitioner’s “analyses of all challenged claims ultimately depend on its arguments and evidence that Kogelbauer renders obvious independent claim 1 (for that claim and all the dependent claims) and independent claim 20.” Prelim. Resp. 5. Patent Owner argues that Petitioner:

has failed to show that Kogelbauer renders obvious at least two key elements of those claims [claims 1 and 20]: (1) real time adjustment or control of the output of the second pump; and (2) controlling the output of the second pump in response to the flow rate sensors or the measured flow rates.

Id. (citing Ex. 1001, 5:24–31, 6:56–59). Based on this argument Patent Owner concludes Petitioner “has failed to show a reasonable likelihood that it will prevail as to any challenged claim.” Prelim. Resp. 5. Patent Owner did not submit any evidence to support its argument. Based on the evidence of record, we disagree with Patent Owner’s characterization of Kogelbauer’s disclosure.

Patent Owner concedes that both Kogelbauer and the invention disclosed and claimed in the ’996 patent use “positive displacement pumps,

such as piston pumps, to pump the ‘A’ and ‘B’ liquids.” Prelim. Resp. 2–3. Patent Owner, however, focuses selectively on isolated passages from Kogelbauer regarding a preferred embodiment of the piston pumps’ operation without recognizing the broader disclosures in Kogelbauer. For example, Patent Owner argues that:

Kogelbauer’s invention works by changing the stroke length of its piston pumps. Kogelbauer teaches adjusting the “metering ratios” (the relative flow rates of each liquid) between its piston cylinder pumps used for its liquids A and B by using two interlocking bars.

Prelim. Resp. 5. Patent Owner concludes that:

Kogelbauer discloses an apparatus for adjusting the stroke length (and thus the pumping rate) of the “A” pumps and the stroke length of the “B” pumps at the same time, to maintain a constant, set ratio between the flow of material A and the flow of material B. Kogelbauer is clear that the metering ratios (and therefore the pumped flow rate or pump output) are adjusted by adjusting the specific hinge point of the extendable bar section. Kogelbauer does not disclose any other method of adjusting the pump output. The only method Kogelbauer teaches to adjust the pumped flow rates is thus via changing the stroke length of each pump by adjusting the length of bar 13.

Prelim. Resp. 7 (citations omitted). According to Patent Owner, “Kogelbauer does not disclose or render obvious independent claim element 1[n]’s requirement of ‘a processor . . . configured to vary the output of the second pump in real time’ or claim element 20[i]s requirement of ‘controlling the second pump in real time’” *Id.* at 9.

Patent Owner argues that “Kogelbauer’s references to ‘continuous’ adjustment have nothing to do with on-the-fly, real time adjustment; rather, ‘continuous’ adjustment refers to the ability to select almost any metering ratio via continuous adjustment of the lever ratio between the two

interlocked bars.” Prelim. Resp. 10. Patent Owner cites no persuasive evidence to support this argument. *See Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1359 (Fed. Cir. 2018) (rejecting attorney argument as to the alleged understanding of one of skill in the art on an issue when no evidence was presented). Patent Owner concedes, however, that “Kogelbauer does teach that the controller 30 ‘controls the pumps.’” Prelim. Resp. 12. Patent Owner argues that “Kogelbauer does not teach that it [controller 30] *adjusts the pumped flow rate* by controlling the pumps; adjustment is done solely by extending or retracting bar 13.” *Id.* (emphasis added).

Patent Owner speculates that “Kogelbauer’s reference to controlling the pumps *likely* references cycling them ‘on’ or ‘off’ as required when the spray lance trigger is depressed or released.” Prelim. Resp. 12 (emphasis added). Again, Patent Owner does not cite any persuasive evidence to support its speculation.

As discussed above, Kogelbauer discloses that “*controller 30* evaluates the signals from all temperature and pressure sensors and *controls* the heating elements, *the pumps*, the ventilation,” and other parameters. Ex. 1006, 11:8–15 (emphases added). Also, contrary to Patent Owner’s argument, Dr. Rockstraw testifies that “Kogelbauer also discloses that the pumps are continually adjusted during operation of the application device for accurate metering ratios of material components.” Ex. 1003 ¶ 90 (citing supporting disclosures in Kogelbauer, e.g., Ex. 1006, 15:24–26 (“The metering ratios of the different material components are continuously adjustable and also *adjustable during operation*.” (emphasis added))).

Patent Owner states that to “sum up” its arguments, “nothing in Kogelbauer supports [Petitioner’s] contention that the controller 30 adjusts the output of Kogelbauer’s pumps in real time.” Prelim. Resp. 14. Patent Owner also argues that the lack of a connection between controller 30 and the “optional bar adjustment motor” indicates that “it is impossible for Kogelbauer’s controller to control or adjust the output of the second pump in real time,” as required by independent claims 1 and 20. *Id.* at 15.

The term “real time” appears only twice in the ’996 patent, once in claim 1 (Ex. 1001, 5:29) and once in claim 20 (*id.* at 6:56). The term “real time” does not appear in the written description. We recognize that in determining that claims 1 and 20 were patentable, the Examiner stated “[a]fter further consideration and search, Examiner was not able to find a system that teaches a processor that makes use of two flow sensors, and four pressure sensors to control two pumps and adjust their input in real time, as claimed.” Ex. 1002, 194.

It is Petitioner’s position that Kogelbauer discloses the claimed “real time” limitation. Pet. 17 (“In the reasons for allowance, the Examiner stated he ‘was not able to find a system that teaches a processor that makes use of two flow sensors, and four pressure sensors to control two pumps and adjust their input in real time, as claimed.’” (citation omitted)). According to Petitioner, Kogelbauer, “teaches each of these limitations.” *Id.* Petitioner asserts that “flow rate meters are used to detect the presence of material and, if not inherent in Kogelbauer, would have found it obvious to have controller 30 receive and analyze the signals sent by those sensors and, *in real time in response*, vary the output of pumps 2a-2d.” *Id.* at 45 (emphasis added; citing Ex. 1003 ¶ 91).

Dr. Rockstraw testifies:

Kogelbauer discloses that the flow rate sensors are connected to controller 30, Ex. 1006, at 7:12-21, 20:20-26, 21:15-17, and that “[e]xcellent operational safety and usability of the application device ... are achieved by providing sensors in the flow paths of the material components that detect the presence of material” Ex. 1006, at 7:12-21.

Ex. 1003 ¶ 91. Based on his analysis of Kogelbauer, Dr. Rockstraw concludes:

In my opinion, a POSA would have understood that flow rate meters are used to detect the presence of material in a fluid path. Thus, to the extent this limitation is not inherent in Kogelbauer, a POSA would have found it obvious to have controller 30 receive and analyze the signals sent by those sensors and, *in real time in response*, vary the output of pumps 2a-2d.

Id. (emphasis added); *see also* ¶¶ 140–141 (opining on claim 20).

Dr. Rockstraw also testifies that “[i]t is common practice to use a controller to monitor in real time one or more operating characteristics of a plural component mixing system for spray polyurethane foam using various sensors, and then, based on the reading of the sensors, adjust one or more operating characteristics.” Ex. 1003 ¶ 55 (citations omitted). As an example, Dr. Rockstraw testifies “a controller that is connected to flow rate meters downstream of pumps may adjust the drive assembly of the pumps in response to material component flow through the flow rate meters.” *Id.*

3. Conclusion for Claims 1 and 20 Based on Kogelbauer

We agree with and adopt Petitioner’s uncontested assertions and Dr. Rockstraw’s uncontested opinions concerning claims 1 and 20.

Our analysis above applies to the apparatus in independent claim 1, and the method in independent claim 20. Based on the evidence and

analysis above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1 and 20 would have been obvious based on Kogelbauer.

*4. Dependent Claims 2–5, 11, 17–19
Based on Kogelbauer*

Petitioner provides an element-by-element analysis of where each element in dependent claims 2–5, 11, and 17–19 is disclosed in, or would have been obvious in view of, Kogelbauer. Pet. 45–55. Petitioner also provides a reason why it would have been obvious to modify Kogelbauer with a reasonable expectation of success, as proposed by Petitioner. *Id.* Petitioner also relies on the testimony of Dr. Rockstraw (Ex. 1003) for evidentiary support.

Patent Owner did not address any of dependent claims 2–5, 11, 17–19.

Claim 2, dependent from claim 1, recites that “at least one of the first and second flow rate sensors is responsive to volume flow rate.” Ex. 1001, 5:32–34. Claim 3, dependent from claim 1, recites that “at least one of the first and second flow rate sensors is responsive to mass flow rate.” *Id.* at 5:35–37.

Petitioner acknowledges that Kogelbauer does not specify the type of flow rate, such as volume or mass flow rate, the flow rate meters respond to. Pet. 45. Petitioner asserts, however, a “POSA would have understood that flow rate for the physical quantities of a liquid is commonly a volume flow rate. *Id.* at 45–46 (citing Ex. 1003 ¶¶ 95, 98; Ex.1010). Dr. Rockstraw testifies that a “POSA would have understood that flow rate for the physical quantities of a liquid is commonly” either “a volume flow rate” (Ex. 1003 ¶ 95) or a “mass flow rate” (*id.* ¶ 98).

Dependent claim 4 recites that the “preselected flow rates are equal.” Ex. 1001, 5:38–39. Petitioner acknowledges that Kogelbauer does not disclose the flow rates or metering ratio of material component A, a viscous synthetic resin, and material component B, a liquid or viscous hardener for the synthetic resin. Pet. 45–46. Petitioner asserts, however, that this ratio would have been obvious based on the material being applied. Pet. 46–47 (citing Exs. 1003, 1006, 1011, 1013). For example, Petitioner asserts that Kogelbauer discloses that its disclosed application device may be used for dispensing material components for polyurethane. Ex.1006, 1:9–12, 2:22–26, 16:1–3); Ex.1003 (¶101). According to Petitioner, when dispensing material components for polyurethane, “a POSA would have understood that the flow rates of the material components are ideally the same to achieve a metering ratio of 1:1.” Pet. 47. Dr. Rockstraw’s testimony supports Petitioner’s conclusion. Ex. 1003 ¶ 101.

Dependent claim 5 recites that “at least one of the first and second pumps is a positive displacement pump.” Ex. 1001, 5:40–41. Petitioner asserts that a “POSA would have understood that the piston cylinder pumps of Kogelbauer are positive displacement pumps.” Pet. 47–48 (citing Ex. 1003 ¶ 104). Dr. Rockstraw testifies that it is his “opinion that a POSA would have understood that the piston cylinder pumps of Kogelbauer are positive displacement pumps.” Ex. 1003 ¶ 1004 (citing Ex. 1010, 284, 291, 304–305).

Exhibit 1010 includes selected definitions of terms from the Oxford Dictionary of Chemical Engineering. The cited excerpts on which Dr. Rockstraw relies define well-known structures and features of a piston

pump, positive displacement pump, and pumps, in general. These excerpts support Dr. Rockstraw's opinion testimony.

Moreover, as noted above, Patent Owner concedes that both Kogelbauer and the invention disclosed and claimed in the '996 patent use "positive displacement pumps, such as piston pumps, to pump the 'A' and 'B' liquids." Prelim. Resp. 2–3.

Dependent claim 11 recites that the claimed apparatus further includes "at least one low-pressure transfer pump having an inlet in fluid communication with at least one of the first container and the second container and an outlet in fluid communication with at least one of the inlet of the first pump and the second pump." Ex. 1001, 5:53–58.

Petitioner relies on the following annotated Figure 1 from Kogelbauer for the disclosure the claimed apparatus in claim 11.

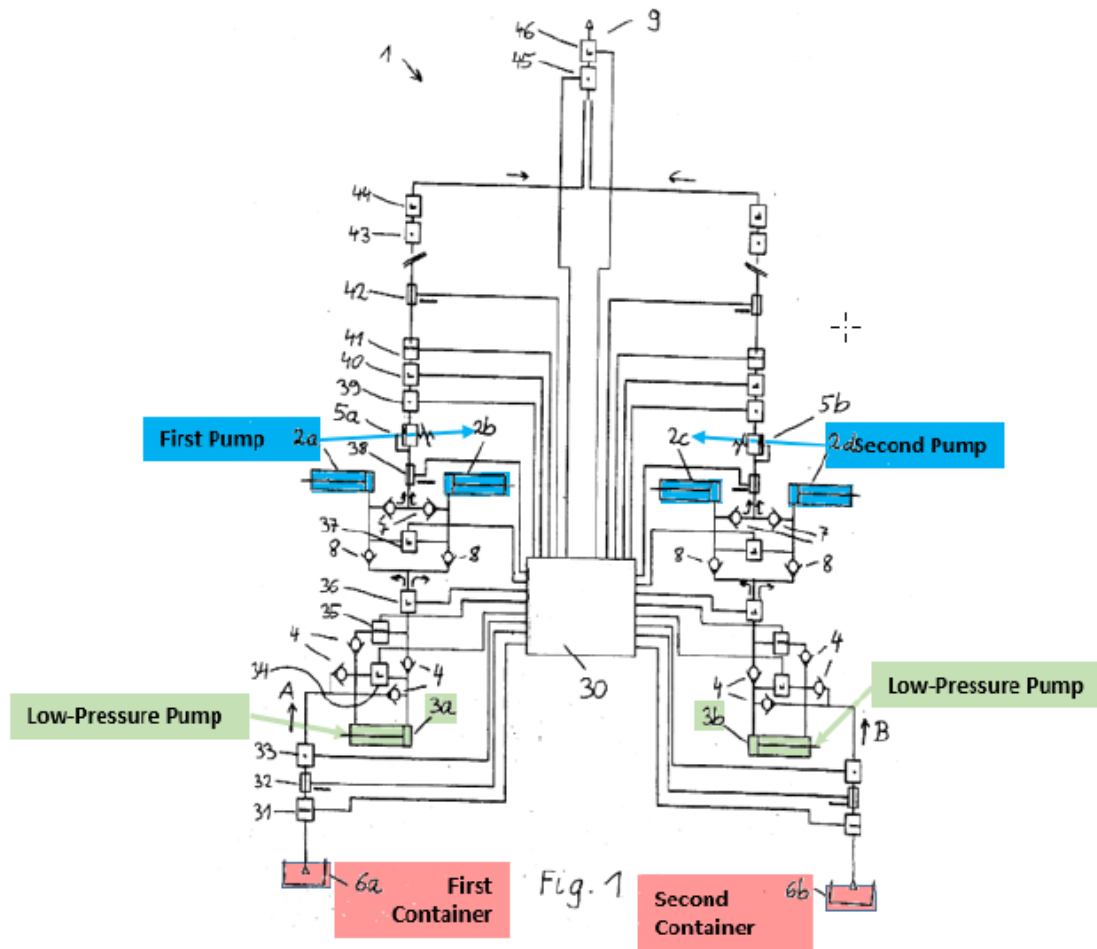


Fig. 1 is a schematic diagram of the Kogelbauer disclosed device.

Petitioner asserts backing pump 3a is a low-pressure transfer pump having an inlet in fluid communication with material source 6a (a first container) and an outlet in fluid communication with the inlet of piston cylinder pumps 2a and 2b (a first pump). Pet. 48. Portioner also asserts backing pump 3b also is a low-pressure transfer pump having an inlet in fluid communication with material source 6b (a second container) and an outlet in fluid communication with the inlet of piston cylinder pumps 2c and 2d (a second pump), as shown in annotated Fig. 1. *Id.* at 48–49. The

backing pumps are provided to “draw[] the material components A, B from the material source 6a, 6b and brings it to a first pressure level.” *Id.* at 49 (citing Ex.1006, 9:26–29; Ex.1003 ¶ 108). Petitioner also asserts “a POSA would have understood that the backing pumps are low transfer pumps.” *Id.* (citing Ex.1003 ¶ 108).

Claim 17, dependent from claim 1, adds the following additional limitations to claim 1:

- a fluid delivery hose having an inlet at one end in fluid communication with the outlet of at least one of the first pump and an outlet at an opposing end thereof;

- a first pressure sensor responsive to fluid pressure at the inlet of the fluid delivery hose; and

- a second pressure sensor responsive to fluid pressure at the outlet of the fluid delivery hose, the first and second pressure sensors in signal communication with the processor.

Ex. 1001, 6:11–20.

Petitioner relies on the following annotated Figure 1 to illustrate its analysis of claim 17:

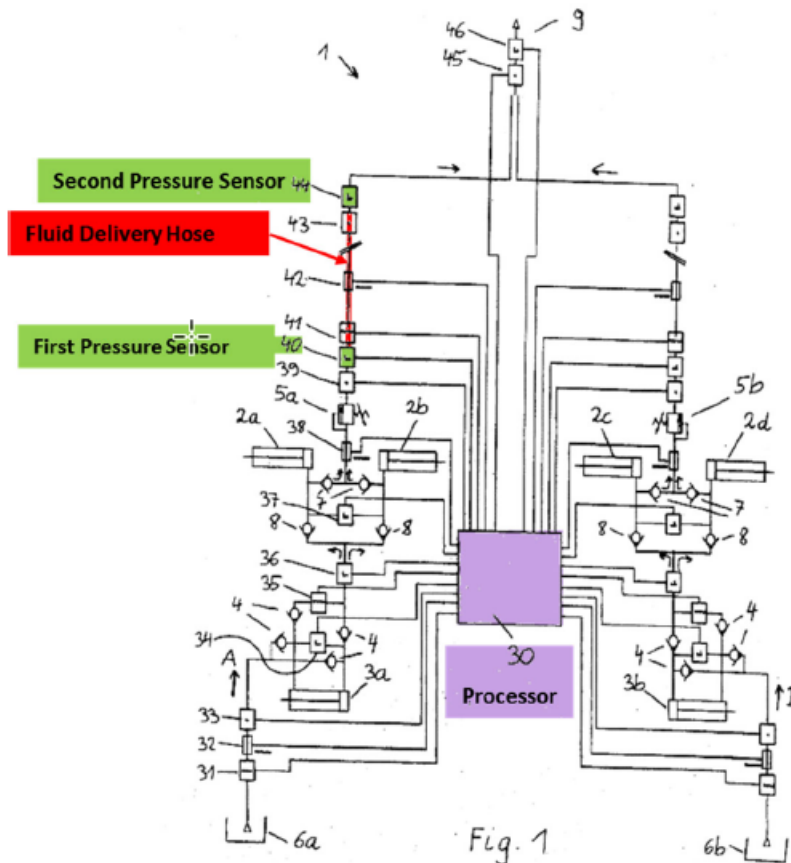


Figure 1 from Kogelbauer annotated by Petitioner
to illustrate a fluid delivery hose
connecting first and second pressure sensors. Pet. 53.

Petitioner asserts that Kogelbauer discloses Kogelbauer discloses a fluid delivery hose having an inlet at one end in fluid communication with the outlet of at least one of piston cylinder pumps 2a and 2b (i.e., a first pump) and an outlet at an opposing end thereof, as shown in annotated Figure 1. Pet. 50 (citing Ex. 1006, 10:19–27; Ex. 1003 ¶ 112). Petitioner also asserts that Kogelbauer discloses the first and second pressure sensors as recited in claim 17. *Id.* 51–52 (citing Ex. 1006, 10:19–11:10; Ex. 1003 ¶¶ 113, 114). The cited evidence supports Petitioner’s assertions.

Claim 18, dependent from claim 17, states that the “fluid delivery hose is heated.” Ex. 1001, 6:21–22. Claim 19, dependent from claim 18,

states that “at least one temperature sensor responsive to a temperature of fluid within the fluid delivery hose and in signal communication with the processor.” Ex. 1001, 6:23–26.

Petitioner asserts that Kogelbauer discloses that the fluid path (i.e., fluid delivery hose) is heated by heating element 42 and that the “heating element is used to ‘set and regulate the temperature of the material components independently’ and ‘can heat the material components to temperatures of up to 120 °C.’” Pet. 53–54 (citing Ex.1006, 6:11–15, 10:11–15; Ex. 1003 ¶ 117). The cited evidence supports Petitioner’s assertions.

*5. Conclusion for Claims 2–5, 11, 17–19
Based on Kogelbauer*

We agree with and adopt Petitioner’s uncontested assertions and Dr. Rockstraw’s uncontested opinions concerning unpatentability of claims 2–5, 11, and 17–19 based on Kogelbauer.

Based on the evidence and analysis above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 2–5, 11, and 17–19 would have been obvious based on Kogelbauer.

*D. Grounds 2
Claims 8–10, 13–16
Based on Kogelbauer and Cline*

1. Cline (Ex. 1017)

We make the following findings concerning Cline.

Cline is a U.S. patent titled “Method and Apparatus for Accurately Dispensing Liquids and Solids.” Ex. 1017, code (54). The disclosed method and apparatus is a system for metering and dispensing single and plural component liquids and solids. Ex. 1017, Abstract. The dispensing

system uses a microprocessor-based controller and volumetrically efficient non-reciprocating pumps, which provide control of component ratios, shot sizes, flow rates, and dispense durations. *Id.*

As disclosed in Cline,

Systems for mixing and dispensing Singular and multi-component materials are well known in the art. Such systems typically include pumping mechanisms for pumping and metering separate materials, such as a base material and an accelerator material, in a prescribed ratio to a mixing device that thoroughly mixes these materials together. The mixed composition then flows out of a dispensing nozzle directly to the surface or point of application where the composition is desired.

Ex. 1017, 1:10–19.

Cline also discloses:

Ideally, a dispensing System should be able to accurately control the ratio of each constituent material dispensed, the flow rate of each constituent material dispensed, the flow rate of the resulting composition, and the amount of the constituent materials and the resulting composition dispensed and be able to maintain Such accuracy over time and various operating conditions.

Id. at 2:52–58.

2. Claims 8–10

Claim 8, dependent from claim 5, states that the positive displacement pump “is an axial screw-type pump.” Ex. 1001, 5:46–47.

Claim 9, also dependent from claim 5, states that the “positive displacement pump comprises a sensor configured to generate a signal corresponding to movement of the pump.” *Id.* at 5:48–50.

Claim 10, dependent from claim 9 states that “the sensor comprises a rotary encoder.” *Id.* at 5:51–52.

Petitioner asserts, generally, that the claimed elements are well-known, commonly used elements in pump systems and the use of these specific components would have been an obvious design choice to a person of ordinary skill because they provide improved performance in known contexts in which they would be helpful. Pet. 72–74. Essentially, Petitioner asserts that a degreed engineer with two years of pertinent experience in a relevant technology would choose the right pump or other known components for the job to be performed. *Id.* at 74 (asserting that these “design choices were known to yield predictable results” with “a reasonable expectation of success in implementing these design choices” based on the disclosures in the references). Petitioner also relies on the testimony of Dr. Rockstraw, who testifies that

A POSA would have been thus motivated to turn to Cline for additional disclosures on these implementation options. Furthermore, my opinion is that a POSA would have understood that, in light of the Kogelbauer disclosures regarding the configuration and functionality of the piston pumps and ‘controller 30,’ it would have required minimal modifications to the Kogelbauer system to incorporate the teachings of Cline and a POSITA would have had a reasonable expectation of success in doing so.

Ex.1003 ¶ 151.

Petitioner asserts that Cline discloses “that the pumps used in its system are ‘progressive cavity pumps’” and a “POSA would have understood that a ‘progressive cavity pump’ is an ‘axial screw-type pump.’” Pet. 74 (citing Ex. 1017, 9:22–23 (Cline’s disclosure of “progressive cavity pumps 34, 36”); Ex. 1020, 4 (disclosing that “Single screw pumps are called progressing cavity pumps and consist of a single center screw with a single thread helix and an outer stator that has a double thread helix. This design

creates pockets or cavities of liquid that move through the pump and hence the name progressing cavity.”); Ex.1003 ¶ 154 (Dr. Rockstraw’s testimony that “[a] POSA would have understood that a ‘progressive cavity pump’ is an ‘axial screw-type pump.’”)).

Regarding claim 9, Petitioner asserts a “a POSA would have been motivated to combine Kogelbauer and Cline’s teachings of including a sensor in the pumps to monitor and control the pumps’ operation.” Pet. 75 (citing Ex.1003 ¶ 157).

Petitioner states that Cline teaches “motor controllers 30, 32 [that] count the ticks received from absolute position encoders 38, 40 over time to manage the rotational speed or acceleration of the pumps 34, 36.” *Id.* (citing Ex. 1017, 5:11–19); Ex. 1003 ¶ 157). Cline further teaches that “[t]he encoders 38, 40 send pulses (i.e., a number of ticks over time) representing the shaft position information to the motor controllers 30, 32.” Ex. 1017, 5:17–19. Dr. Rockstraw testifies that this “position information” corresponds to movement of the pump. Ex.1003 ¶ 157.

Regarding claim 10, Cline discloses that the sensor is “a rotary encoder.” Pet. 76 (citing Ex. 1017, 5:11–19; Ex. 1003 ¶ 160).

3. *Claims 13–16*

Claims 13–16 each depend from claim 1. Claim 13 states the processor is a microprocessor. Claim 14 states that the processor is a programmable logic controller. Claim 15 states the processor is a floating gate array. Claim 16 states that the processor is an application-specific integrated circuit. *See* Ex. 1001, 6:3–10.

Petitioner relies on Cline for the disclosure of these claimed, known processors. Pet. 76–78. Petitioner asserts it would have been obvious to a

person of ordinary skill to use these known processors because they represent design choices that provide known benefits in specific contexts, with a reasonable expectation of success. *Id.* at 71–74.

4. *Conclusion for Claims 8–10, 13–16
Based on Kogelbauer and Cline*

We agree with and adopt Petitioner’s uncontested assertions and Dr. Rockstraw’s uncontested opinions concerning unpatentability of claims 8–10 and 13–16 based on Kogelbauer and Cline.

Based on the evidence and analysis above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 8–10 and 13–16 would have been obvious based on Kogelbauer and Cline.

*E. Ground 3
Claim 7
Based on Kogelbauer and Kropfield*

1. *Kropfield (Ex. 1014)*

We make the following findings concerning Kropfield.

Kropfield is a U.S. patent titled “Low Pressure Polyurethane Spraying Assembly.” Ex. 1014 code (54).

Kropfield discloses:

A low pressure spraying assembly for mixing and initiating the reaction of a first liquid reactive polymeric material, such as an isocyanate terminated compound, with a second liquid reactive polymeric material, such as an hydroxyl terminated compound or polyol resin, to form a two part polymer, such as polyurethane, and spraying the polymer onto a surface. The spraying assembly includes a material circulating system and a spray gun assembly. The material circulating system comprises separate multiple diaphragm pumps, drive assemblies, flow meters and feedback controllers for each material.

Id., Abstract. Kropfield also discloses the importance of accurate metering pumps to ensure that the required “very specific” percentage ratios of the material components of the sprayed polyurethane material are maintained.

Kropfield discloses:

These two part polyurethanes require very specific percentage ratios of the two material components. Any significant variation, typically greater than two or three percent, will not produce a polyurethane with the desired characteristics. The polyurethane may not adhere effectively, cure effectively or as quickly, or may not have the desired durability. Hence, a consistent and accurate metering pump is required for each material supplied to the system. Accurate metering pumps ensure that the desired percentage ratio is maintained.

Ex. 1014, 1:30–39.

As further disclosed in Kropfield, “[m]etering cylinders or gear pumps are two examples of metering pumps that are *usually used* to obtain the desired accuracy.” *Id.* at 1:40–42 (emphasis added). Kropfield further discloses some “deficiencies” of both gear pumps (*id.* at 1:53–67) and diaphragm pumps (*id.* at 2:18–25).

2. Claim 7

Claim 7, dependent from claim 5, states that the “positive displacement pump” recited in claim 5 “is a gear-type pump.” Ex. 1001, 5:44–45.

Petitioner acknowledges that Kogelbauer “does not specify that the pump is a gear-type pump.” Pet. 80. Petitioner asserts, however, that a “POSA would have been motivated to turn to Kropfield for additional teachings related to pump design choices, and those design choices were known to yield predictable results. *Id.* at 80–81 (citing Ex. 1003 ¶ 169). Petitioner also asserts “a POSA would have had a reasonable expectation of

success in implementing the pump design choices.” *Id.* at 81.

Dr. Rockstraw’s testimony support’s Petitioner’s assertion. Ex. 1003 ¶ 169 (“[A] POSA would have been thus motivated to turn to Kropfield for additional disclosures regarding gear-type pumps when determining which type of pump to implement in Kogelbauer.”).

As recognized by the Federal Circuit,

[w]hen 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. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

Uber Techs., Inc. v. X One, Inc., 957 F.3d 1334, 1338–39 (Fed. Cir. 2020) (quoting *KSR*, 550 U.S. at 421). Here, Kropfield disclosed the use of both gear pumps and diaphragm pumps in the context of a sprayed application of two chemicals that requires consistent and accurate metering pumps to ensure that the desired percentage ratio of each chemical is maintained. Ex. 1014, 1:30–39.

We determine that the choice of a gear pump or other type of pump would have been an obvious design choice based on the disclosures of Kogelbauer and Kropfield.

3. Conclusion for Claim 7 Based on Kogelbauer and Kropfield

We agree with and adopt Petitioner’s uncontested assertions and Dr. Rockstraw’s uncontested opinions concerning unpatentability of claim 7 based on Kogelbauer and Kropfield.

Based on the evidence and analysis above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 7 would have been obvious based on Kogelbauer and Kropfield.

*F. Ground 4
Claims 6, 12
Based on Kogelbauer and Kukesh*

1. Kukesh (Ex. 1021)

We make the following findings concerning Kukesh.

Kukesh is a U.S. patent titled “Plural Component Application System.” Ex. 1021 code (54).

Kukesh discloses:

An apparatus and method for manufacturing plural component materials, especially rigid urethane structures, from reactive components. The system includes a source of a first component, a source of a second component, a sprayer for mixing the components and for dispensing the mixture therefrom, and a delivery system for delivering the components to the sprayer. The delivery system . . . includes positive displacement piston pumps simultaneously driven by a single motor. The system further includes means for calibrating the rates of flow of the components in the delivery system.

Id., Abstract. Kukesh also discloses that the disclosed system includes:

a first positive displacement pump in the first delivery system for delivering the first component to the mixing and dispensing device, a second positive displacement pump in the second delivery system for delivering the second component to the mixing and dispensing device, and a common drive means for simultaneously driving said first and second positive displacement pumps while achieving independently adjustable component flow rates.

Id. at 3:10–22. Although Kukesh discloses that the pumps preferably are “piston pumps” (*id.* at 3:23–24), Kukesh also discloses that “some materials

do not handle well with high and varying pressures, and with such materials the positive displacement pumps are preferably vane pumps” (*id.* at 3:48–50). Kukesh discloses that the benefit of vane pumps are that they “operate in a continuous manner and are controllable to maintain constant, unfluctuating pressures in the delivery systems.” *Id.* at 3:50–53. The disclosed benefit of the vane pumps is that they produce “controllable and uniform spray patterns and more uniformly sized component mixture particles at the outlet of the mixing and dispensing device which permits the manufacture of rigid urethane structures having improved properties.” *Id.* at 3:53–57.

Kukesh further discloses the use of “standard” 55-gallon drums to store the component materials. *Id.* at 4:6–8. Kukesh notes that:

Use of the 55-gallon drums in the system as the first and second component sources can eliminate the separate storage tanks provided in prior systems, further reducing the cost of the system, *although accumulators are preferred in the system* to ensure a supply of the components adjacent the proportioning pumps. The attention of the operator to separate, smaller storage tanks can also be eliminated, eliminating a source of operating problems due to operator inattention.

Id. at 4:15–23.

2. Claims 6 and 12

Claim 6, dependent from claim 5, states that the “positive displacement pump” recited in claim 5 “is a vane-type pump.” Ex. 1001, 5:42–43.

Claim 12, dependent from claim 11, states that the claimed apparatus further includes “an accumulator in fluid communication with both the outlet of the at least one low-pressure transfer pump and the inlet of the at least one of the first pump and the second pump.” *Id.* at 5:59–6:2.

Regarding the “accumulator” recited in claim 12, the written description states “The outlet of each low pressure transfer pump 21 may be in pressure communication with an accumulator 23. The low pressure transfer pumps 21 and accumulators 23 maintain a minimum pressure in the inlet to each applicator pump P1, P2 so as to reduce the possibility of cavitation therein.” Ex. 1001, 3:5–10.

Regarding claim 6, Petitioner acknowledges that Kogelbauer “does not specify that the pump is a vane-type pump.” Pet. 83. Similar to our analysis above for a specific pump-type recited in claim 7, Petitioner asserts it would have been obvious to use a well-known vane pump, as disclosed in Kukesh based on a design choice of the disclosed advantages of vane pumps for certain applications. *Id.* at 82–85 (citing Ex. 1003 ¶ 179).

Regarding claim 12, Kukesh discloses the use of an “accumulator tank 167” between the outlet of pump 161, connected to one component source, and delivery pump 122. Ex. 1021, 16:39–46. Accumulator 167 ensures that a supply of liquid is present at the input to delivery pump 122. *Id.* at 49–51. Petitioner asserts an accumulator is a known way of reducing pressure surges. Pet. 84 (citing Ex. 1029, 1:33–42). Petitioner asserts that the motivation to use the disclosed accumulator from Kukesh in the Kogelbauer system is “implicit from the prior art” to gain known benefits of an accumulator. *Id.* at 83–87 (citing Ex. 1003 ¶¶ 177–179, 185).

3. Conclusion for Claims 6, 12 Based on Kogelbauer and Kukesh

We agree with and adopt Petitioner’s uncontested assertions and Dr. Rockstraw’s uncontested opinions concerning unpatentability of claims 6 and 12 based on Kogelbauer and Kukesh.

Based on the evidence and analysis above, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 6 and 12 would have been obvious based on Kogelbauer and Kropfield.

IV. CONCLUSION¹⁵

We determine that Petitioner has established by a preponderance of the evidence that all challenged claims, claims 1–20, challenged under Grounds 1–4, are unpatentable.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–20 have been proven by a preponderance of the evidence to be unpatentable; and

FURTHER ORDERED that, because this is a final written decision, parties to this proceeding seeking judicial review of our Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

¹⁵ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–5, 11, 17–20	103	Kogelbauer	1–5, 11, 17– 20	
8–10, 13–16	103	Kogelbauer, Cline	8–10, 13–16	
7	103	Kogelbauer, Kropfield	7	
6, 12	103	Kogelbauer, Kukesh	6, 12	
Overall Outcome			1–20	

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CARLISLE FLUID TECHNOLOGIES, INC.,
Petitioner,

v.

AKURATE DYNAMICS, LLC,
Patent Owner.

IPR2021-01256
Patent 10,159,996 B2

FLAX, *Administrative Patent Judge*, CONCURRING.

I agree with the majority that Petitioner has established by a preponderance of the evidence that the challenged claims are unpatentable over the asserted prior art and so join in the majority’s ultimate decision.

As noted in the majority decision, the Panel informed Patent Owner that any arguments not made in a response could be deemed waived (*see* Paper 9, 8 (“Scheduling Order”)), and Patent Owner expressly informed the Board that it “elected not to file a Patent Owner’s Response in this proceeding.” Ex. 3002; *see also* Paper 10 (Conduct of the Proceeding Order summarizing the circumstances). As also noted in the majority decision, once a trial is instituted, the Board may decline to consider arguments set forth in a *preliminary* response unless they are raised in the patent owner response. Scheduling Order, 8; *see also In re NuVasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (patent owner waived argument from its

preliminary response not renewed in its response). This last point is well known.

Under the circumstances, where Patent Owner did not file a response and stated it was not abandoning the contest, I would consider all arguments in opposition to Petitioner's allegations in the Petition waived by Patent Owner. Patent Owner was aware of such a possibility and elected to not file a response. Therefore, I would not have considered any points made in Patent Owner's Preliminary Response here.

IPR2021-01256
Patent 10,159,996 B2

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