

Paper No. ____

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIKING DRILL & TOOL, INC.
Petitioner

v.

HONGJIA WANG
Patent Owner

Case IPR2023-00473

U.S. Patent No. 11,007,583

PETITIONER'S REPLY

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37 C.F.R. § 42.24	30

UPDATED EXHIBIT LIST

Exhibit No.	Exhibit Description
1001.	U.S. Patent No. 11,007,583
1002.	Prosecution history of U.S. Patent No. 11,007,583
1003.	File history of Re-examination Proceeding No. 90/014,941
1004.	Expert Declaration of Dr. Steven R. Schmid
1005.	<i>Curriculum Vitae</i> of Dr. Steven R. Schmid
1006.	U.S. Patent No. 2,193,186 (“Bannister”)
1007.	Chinese Patent Application Publication No. 103084629 (“Zhou”)
1008.	U.S. Patent No. 2,276,532 (“Welty”)
1009.	U.S. Patent Application Publication No. 2018/0133808 (“Wang”)
1010.	U.S. Patent No. 8,029,215 (“Gentry”)
1011.	U.S. Patent No. 10,058,929 (“Durfee”)
1012.	U.S. Patent No. 4,582,458 (“Korb”)
1013.	U.S. Patent No. 5,452,971 (“Nevills”)
1014.	G.B. Patent No. 2,405,820 (“Sheldon”)
1015.	J.P. Patent No. 63,016,912 (“Shibata”)
1016.	U.S. Patent No. 38,119
1017.	Society of Manufacturing Engineers, Tool and Manufacturing Engineers Handbook, Fourth Edition (1983), Volume I, Chapter 9

1018.	Prosecution history of U.S. Patent Pub. No. 2018/0133808
1019.	PCT Pub. No. WO 2017136966 (PCT Application PCT/CN2016/073767)
1020.	Proof of Service of Summons in Civil Action No. 21-cv-02759 dated January 16, 2022
1021.	Patent Owner's and Petitioner's Joint Claim Construction Statement in Civil Action No. 21-cv-02759 dated October 24, 2022
1022.	Patent Owner's Supplemental Infringement Contentions in Civil Action No. 21-cv-02759 dated July 8, 2022
1023.	Viking Drill & Tool Product Catalog published in 2014
1024.	Matco Tools, Hyper-Step Drill Bits brochure published in 2018
1025.	Aerospace Industries Association, National Aerospace Standard 907 published in 1997
1026.	Declaration of Saukshmya Trichi
1027.	Declaration of Katherine Chen
1028.	Proposed Protective Order
1029.	Protective Order – Redline
1030.	District Court Amended Protective Order
1031.	Petitioners Timeline of Events
1032.	Patent Owner's Expunged Response (November 1, 2023)
1033.	Expunged Declaration of Dr. William J. Endres Excerpts (October 31, 2023)
1034.	RESERVED
1035.	Endres Deposition Transcript Excerpts (November 21, 2023)

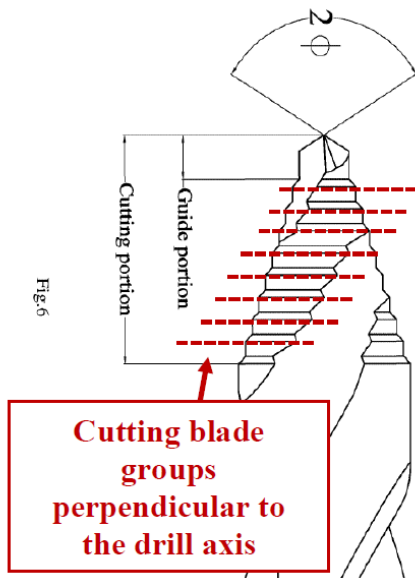
1036.	Fisher Deposition Transcript Excerpts (November 28, 2023)
1037.	Parties' correspondence with Board
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1041.	Parties' correspondence re. Petitioner's Motion to Strike
1042.	Patent Owner's November 4 email re. Endres November 4 Declaration
1043.	Patent Owner's Service Email re. Exhibits 2050, 2053 and 2054
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1049.	Wang Deposition Transcript from Civil Action No. 21-cv-02759 (April 3, 2023)
1050.	Angelos Markopoulos, Finite Element Method in Machining Processes, in SpringerBriefs in Applied Sciences and Technology, Chapters 1 and 2

This paper is submitted in reply to Patent Owner's ("PO's") Corrected Response of Nov. 7, 2023 (Paper 28, hereinafter "Response"), regarding the invalidity of certain claims of U.S. Patent No. 11,007,583 ("the '583 patent", Ex-1001).

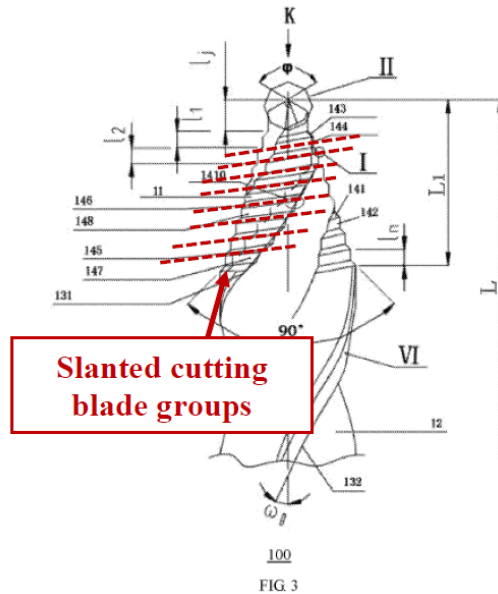
I. GROUND 1

PO does not dispute that if Wang (Ex-1009) is prior art, then it renders all challenged claims of the '583 patent unpatentable as obvious. Because the '583 patent claims priority to Wang as a continuation-in-part, the question of whether Wang is prior art turns on whether Wang provides written description support for the claims of the '583 patent.

Wang fails to provide support for the limitation "a plurality of composite cutting blade groups formed...spirally" found in independent claims 1 and 8. In filing the continuation-in-part application that led to the '583 patent, PO omitted multiple figures from Wang showing cutting blade groups perpendicular to the drill axis (including Figure 6 shown below), and added new Figure 3 showing the cutting blade groups slanted relative to the drill axis:



Wang FIG. 6



'583 patent, FIG. 3

Ex-1001 FIG. 3; Ex-1009, FIGs. 5-6, 8. PO also added new language teaching that the composite cutting blade groups “spirally extend along the rake face.” Ex-1001 6:10-13.

In its institution decision, the Board preliminarily agreed that Wang fails to provide support for the “formed...spirally” limitation, and considered Wang to be prior art. Paper 13 at 19. PO’s arguments to the contrary are not persuasive.

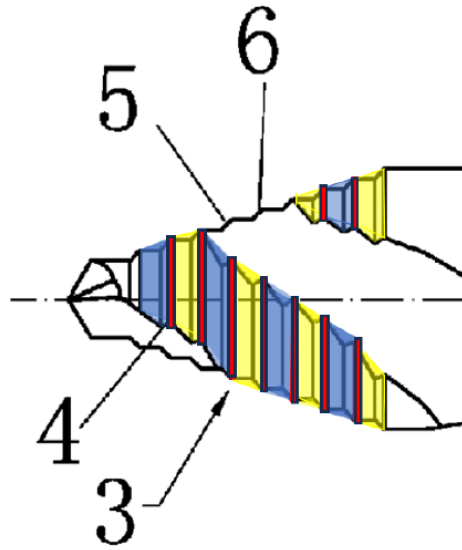
PO argues that a person of skill in the art (POSA) would interpret the “...formed...spirally” limitation to be part of Wang’s disclosure because “axial relief is so ubiquitous and such a conventional element that a POSA would readily infer it or assume it without an illustration.” Response, 9. This argument fails both

legally and factually. As a legal matter, the knowledge of one skilled in the art cannot make up for an absence of disclosure. See *Lockwood v. Am. Airline, Inc.* 107 F.3d 1565, 1571-2 (Fed. Cir. 1997) (“[e]ntitlement to a filing date does not extend to subject matter which is not disclosed, but would be obvious over what is expressly disclosed. It extends only to that which is disclosed.”). It does not matter how “ubiquitous” axial relief was in the art; if PO wanted to expressly claim such relief, it needed to be disclosed.

As a factual matter, PO’s argument that a POSA would simply infer the presence of axial relief is belied by PO’s prior arguments. During the first reexamination of the ’583 patent, the “...formed...spirally” limitation was the key limitation PO relied on to overcome the prior art. Ex-1003, 481-482, 488-492, 509-511, 526. Having relied on this limitation to obtain allowance of its claims, PO cannot now argue that the feature is so old and ubiquitous that it didn’t even need to be disclosed. Further, the prior art references relied upon in this IPR show that when axial relief is relevant, it is shown and discussed explicitly. See Ex-1010, FIG. 1, 1:52-60; Ex-1011, FIG. 2, 11:27-53; Ex-1006, FIG. 1, p.2, 1:75-2:4; Ex-1012, FIG. 5, 2:60-3:7; Ex-1044 ¶9. PO’s attempt to rely on the knowledge of a POSA to overcome the lack of disclosure in Wang is without merit.

PO next argues that Wang discloses the “...spirally...formed” limitation in the phrase “the connection lines of the flutes form a spiral structure” (Wang, ¶¶10

and 35). See Response, 11-18. In particular, PO argues that “connecting lines” can only mean the line marking the boundary between the two long edges of adjacent flutes (marked in red in the illustration taken from PO’s Response, below):



Response, 12; Ex-2034, ¶¶16-19.

This argument also fails. As the Board recognized in its Decision Granting Institution, because Wang’s flutes¹ are parallel with each other, they “do not intersect,” and so “cannot have connecting lines on account of an intersection.” Paper 13 at 18. In fact, the “only thing about the flutes that could seemingly be said

¹ As the Board correctly recognized, Wang uses “flute” to refer to the groove formed between what the ’583 patent calls “composite cutting blade groups.” Paper 13 at 17.

to connect are the part of the flute that are interrupted by the cutting blades.” *Id.* PO now argues, without any support from Wang’s specification, that “connecting lines” mark the boundary between two adjacent flutes. It is the patentee’s burden to describe the invention in clear, concise and exact terms (35 U.S.C §112(a)), a burden that has not been carried here. Having failed to clearly describe in Wang what is meant by a “connecting line,” PO cannot now use hindsight to argue that it must have meant what was later disclosed and claimed in the ’583 patent. Ex-1044, ¶10.

PO further argues that a “POSA would have no reason to interpret ‘connecting **line**’ to refer to a point.” Response, 15. This mischaracterizes Petitioner’s position, which is that the “connecting lines of the flutes” could refer to the lines along the leading edges of the cutting blade groups. Paper 2 (“Petition”) at 29-30. The Board preliminarily agreed. Paper 13 at 18. Further, PO’s position that “connecting line” can only be where two surfaces intersect (Response, 15), is belied by Wang’s use of “connecting line” to describe other features. Referring to FIG. 8, Wang describes an “angle b formed by **the connecting lines** of the top endpoints of the first cutting blades 5.” Ex-1009, ¶[0032] (emphasis added). The “connecting lines” forming angle b are shown in Figure 8.

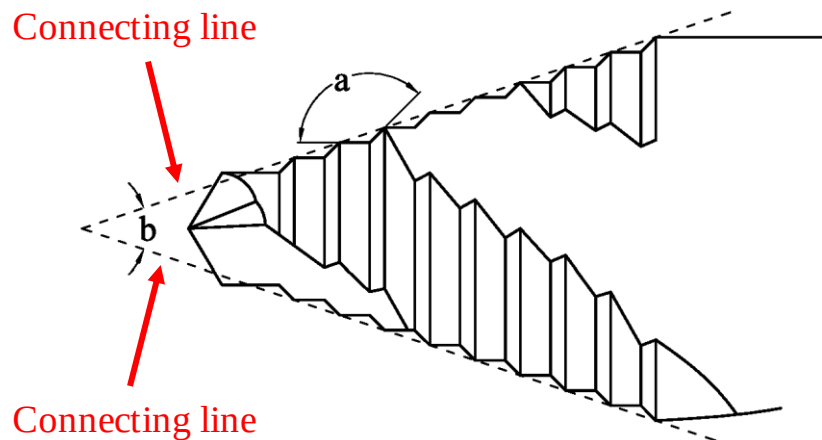


Fig.8

Id., FIG. 8 (red annotations added). The “connecting lines” shown in FIG. 8 connect between **points** on adjacent steps of the step-like structure. Ex-1044, ¶11. PO’s expert admitted as much. Ex-1046, 34:10-35:7. Thus, Wang flatly contradicts PO’s assertion that a “connecting line” must be where one surface intersects another.

PO also mischaracterizes the prosecution history of the ’900 application, of which Wang is the publication. The Examiner rejected dependent claim 5, which recited “[t]he drill bit of claim 1, wherein the connecting lines of the flutes form a spiral structure,” based on FIG. 3 of Shibata (Ex-1015). Ex-1018 at 145. FIGs. 1 and 3 from Shibata are shown below, with FIG. 3 being a cross-section taken at line 3-3 in FIG. 1.

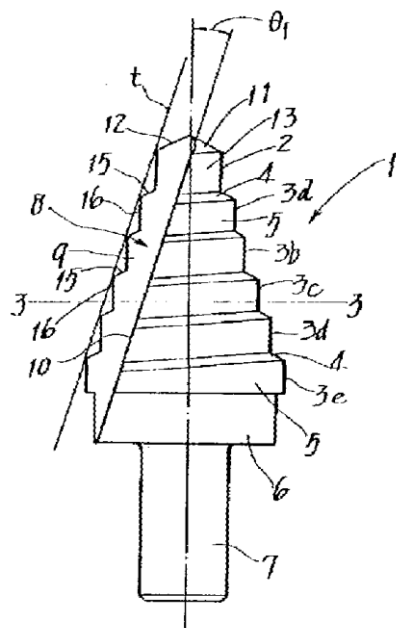


FIG. 1

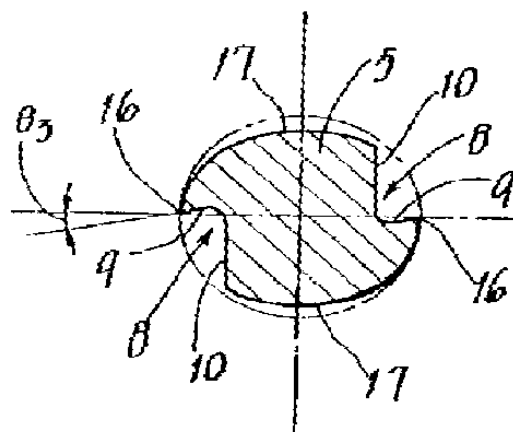


FIG. 3

Ex-1015. PO argues that the Examiner understood “connecting lines of the flutes form a spiral structure” to refer to the axial relief shown in FIG. 1. Response 18-20. But if that’s what the Examiner understood, he would have said so! The Examiner instead used FIG. 3, which shows a cross-sectional view of the drill with radial relief. Accordingly, the reasonable inference is that the Examiner understood “connecting lines of the flutes form a spiral structure” to refer to radial relief, not axial relief. Ex-1044, ¶¶12-14.

In a last-ditch effort to save its claims from invalidity, PO conflates the two types of relief, stating “[r]adial relief just as readily gives rise to a spiral formation as axial relief.” Response, 20. This contradicts the claim construction for

“spirally” advocated by PO during reexamination and in the Litigation, and adopted here by the Board, which only covers cutting blades that are arranged non-perpendicular to the drill axis, as is the case with axial relief. Paper 13 at 11; Ex-1003, 509-510; Ex-1022, 7-8. Axial relief and radial relief are different, and one may be present on a drill without the other. Ex-1044, ¶15. The presence of radial relief does not satisfy the construction of “spirally.” *Id.*

Because PO has not met its burden of proving that Wang provides written description support for “...formed...spirally” in claims 1 and 8 of the ’583 patent, Wang is prior art to the ’583 patent under 35 U.S.C. §102(b). PO has not disputed that, if Wang qualifies as prior art, it renders obvious each of the challenged claims. Accordingly, the challenged claims should be held unpatentable under Ground 1.

II. GROUND 2

Claims 1, 2, 5, 7, 8, 12, 14, 15, and 19 of the ’583 patent are unpatentable because they would have been obvious over Bannister (Ex-1006) in view of Zhou (Ex-1007), Welty (Ex-1008) and/or the knowledge of a POSA.

A. Perpendicular versus conical steps on the conical portion

PO argues that it would not have been obvious to make Bannister’s intermediate cutting edges 22, 23 conical instead of perpendicular to the axis because Bannister teaches that the outer, beveled cutting edges 24 are used to generate long chips, which carry out any fine chips created by the straight

intermediate blades. Response, 22-23. However, there have been significant developments in the understanding of drilling mechanics and chip formation in the 75+ years since Bannister was issued, and a POSA even as early as 2016 would recognize that Bannister's description of long chips carrying out fine chips is likely not accurate. Ex-1044, ¶¶20-21. Moreover, Bannister expressly states the intermediate cutting edges are only "preferably" substantially normal to the axis of the drill and does not require them to be perpendicular. Ex-1006 at p. 2, col. 1:7-9. Because conical cutting surfaces were both known and known to have advantages, a POSA would have been motivated to employ them in Bannister's drill. Ex-1004, ¶203.

That is particularly so here, where only two different configurations are possible: perpendicular to the axis and non-perpendicular to the axis, i.e. conical.² Ex-1044, ¶19. A solution is obvious if a POSA can choose from a finite number of identified, predictable solutions with a reasonable expectation of success. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). In this case, there are only two possible solutions, perpendicular to the drill axis or conical. A POSA would

² PO's expert confirmed that the intermediate cutting blades can only be perpendicular or conical. Ex-1046, 68:17-23.

understand from either Zhou or Welty that it would be reasonable to expect success using conical cutting blades. Ex-1004, ¶203; Ex-1044, ¶19.

Thus a POSA would have been motivated to modify Bannister according to Zhou or Welty, resulting in the drill of claims 1 or 8. Paper 2 at 46-57.

B. “Configured to crush cutting chips into finer chips”

PO wrongly asserts that “each composite cutting blade group is not configured to to crush cutting chips into finer chips” in Bannister’s drill because the beveled cutting edge is used “to produce long spiral chips that carry the short chips.” Paper 28 at 24-25.

First, PO confuses the meaning of the term “crush” as used in Bannister and in the ’583 patent. See Petition at 25. A goal of Bannister is to “reduce to a minimum the metal to be crushed during the drilling operation. Ex-1006 at 1, col. 1:16-17. Thus Bannister’s “crushing” relates to the removal of material by the central point of the drill, not by a cutting blade group.³ *Id.* at 1:45-50. Ex-1044, ¶23. PO’s reliance on Bannister’s goal of reduced “crushing” as evidence that Bannister does not practice the claimed “crushing” limitation is without merit. *Id.*

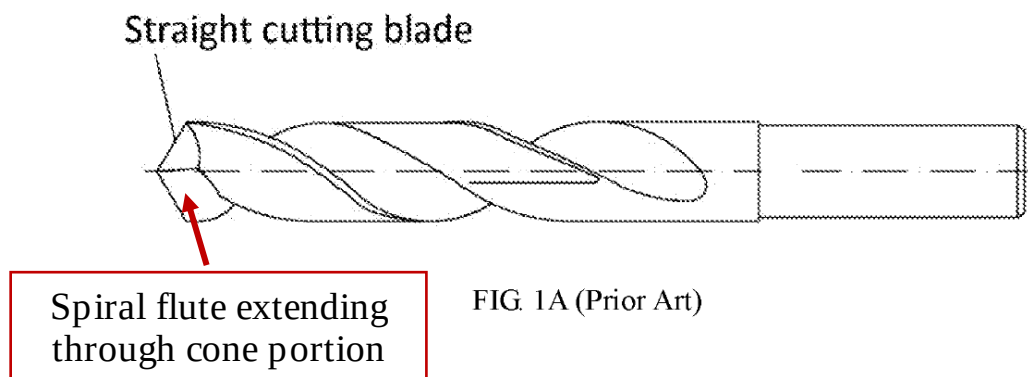
³ PO’s expert confirmed that the use of “crush” in Bannister is unrelated to the type of “crushing” referred to in the claims. Ex-1046, 70:6-71:12; 74:8-21.

Second, PO's argument is contrary to the claim construction that it advocated for in the Litigation and that it has not disputed in this IPR. In the Litigation, PO argued that "configured to crush cutting chips into finer chips" should be construed to mean "each composite cutting blade group is small relative to the single major cutting edge that the cone portion would have if there were not composite cutting blade groups on the cone portion of the twist drill," thus creating chips that are smaller than they would be if the drill did not have composite cutting blade groups. Petition at 23-24, Ex-1021 at 4. Bannister has a series of stepped cutting blade groups that produce chips narrower than those produced by a conventional drill of similar outer diameter, thereby producing smaller chips than if no stepped cutting blades were present. Ex-1004, ¶100; Ex-1044, ¶22-26. Bannister's drill, therefore, meets this limitation. *Id.*

C. The claims do not require curved major and minor cutting edges

PO argues that Bannister fails to disclose "curved" major and minor cutting edges. These are not elements of the independent claims, which say nothing about the cutting edges being curved. See Ex-1001, Claims 1 and 8. There is no requirement that a reference teach unclaimed features. See *Respironics, Inc. v. Zoll Med. Corp.*, 656 F. App'x 531, 535 (Fed. Cir. 2016) ("the fact that an unclaimed element may be necessary for a device to function as claimed does not, standing alone, allow courts to treat the unclaimed element as a claim limitation.").

PO asserts that curved cutting edges necessarily result from the intersection of the sidewall of a spiral flute and the respective step surfaces. This is incorrect. A drill of the type shown in the '583 patent does not inherently have curved cutting edges. Ex-1044, ¶28. Further, there is no requirement that the leading wall of the claimed spiral flute spirals along the entire length of the flute. Rather, the claims are broad enough to allow a spiral flute that, as in Bannister, has a portion of its sidewall that is straight on the leading edge of the cone portion while still maintaining its generally spiral shape. Ex-1044, ¶31. Indeed, even the prior art “normal twist drill” shown in Figures 1A-1C of the '583 patent has spiral flutes that extend all the way to the tip of the drill, including the cone-shaped portion formed by the straight cutting blades.



Straight cutting blades

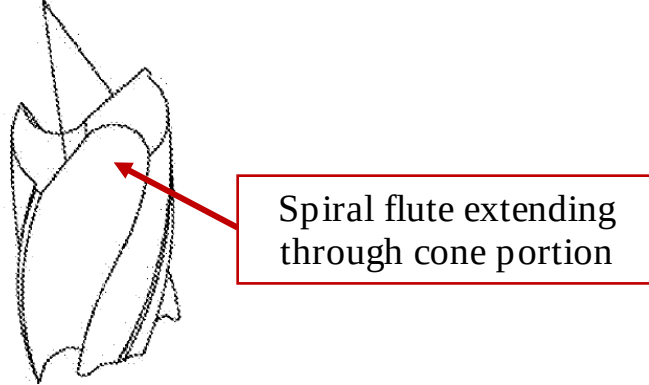
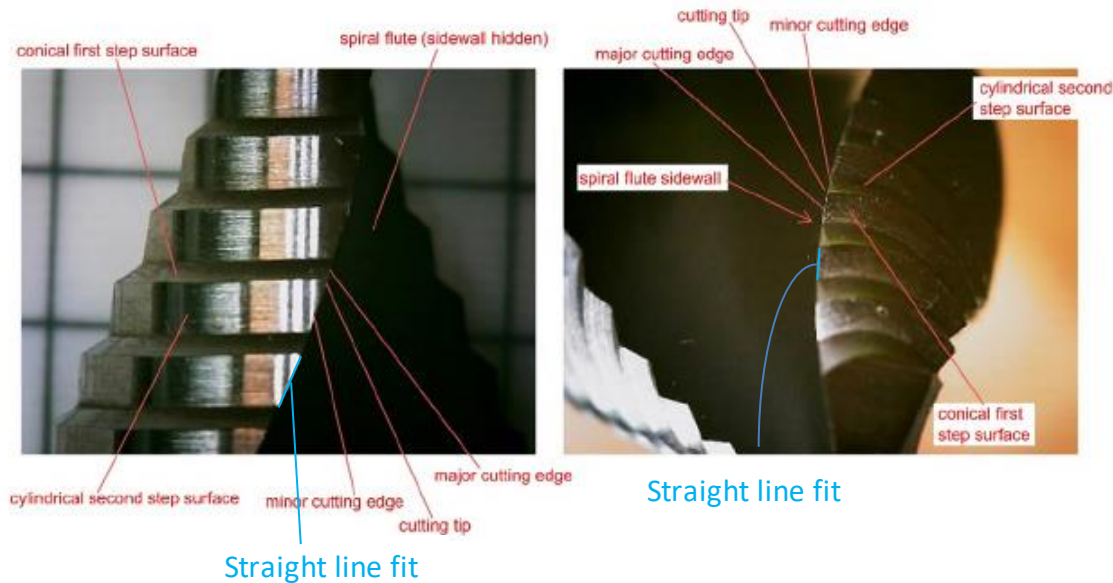


FIG. 1C (Prior Art)

Ex-1001 at FIGs. 1A-1C; Ex-1044, ¶30. PO does not challenge that Bannister has a spiral flute extending along the cone portion.

Further, the photos provided by PO to show that such a drill has curved edges (Response, 29) fail to clearly show the shape of the cutting edges, which apparently fit well to straight lines, as shown below in blue. Ex-1044, ¶29.



PO's attempt to distinguish its claims based on unclaimed features is without merit and should be rejected. Moreover, even if the Board were to agree that such curved cutting edges are inherent in the independent claims, modifying Bannister's flute so that the leading wall of the spiral flute spirals along the entire length of the flute would have been obvious for the same reasons discussed in Ground 3 of the Petition and below relative to claims 18 and 22. Ex-1004, ¶¶251-254; Ex-1044, ¶32.

D. References may be combined even though they have similar advantages

PO argues a POSA would not be motivated to combine Bannister with either Zhou or Welty because they discuss advantages allegedly redundant to the advantages discussed in Bannister. Response, 31-42. PO's argument should be rejected as unsupported by evidence; the paragraphs of PO's expert declaration that

are relied on in this section of PO's Response were stricken by the Board. Paper 41 (striking Ex-2034, ¶¶108-120). PO's argument should also be rejected as unpersuasive. PO would have the Board believe that a POSA around 2016 or later could not conceive of being able to improve upon Bannister's 75 year-old design. This is not credible. Ex-1044, ¶33.

Nor does it agree with established case law. "It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980); *see also Belden Techs., Inc. v. Superior Essex Communs. LP*, 802 F. Supp. 2d 555, 572 (D. Del. 2011) (finding motivation to combine two references because they shared interrelated technologies); *In re Johnson* 435 F.3d 1381, 1385 (Fed. Cir. 2006) (finding that "many factors are relevant to the motivation to combine aspect of the obviousness inquiry, including the extent to which the references are in the same or related fields of technology"). Here, motivation to combine Bannister with Zhou and/or Welty **is provided** by the fact these references all teach drills having stepped front portions that provide improved drill performance. Ex-1004, ¶203; Ex-1044, ¶33.

The Board should find that claims 1, 2, 5, 7, 8, 12, 14, 15, and 19 of the '583 patent are unpatentable as obvious over Bannister modified by Zhou and/or Welty.

III. GROUND 3

Ground 3 adds Korb for the obviousness of dependent claim 13 (minor cutting edge of top blade longer than those of composite cutting blade groups) and dependent claims 18 and 22 (cutting tips formed spirally on cone portion). PO's arguments in response are not persuasive.

A. Primary Factors

First, PO argues that Bannister cannot be modified to produce a spiral arrangement of cutting tips because "a plurality of cutting tips would have to number four or five to arguably form a spiral of any sort." Response, 42. This is yet another unclaimed limitation that should be ignored. *See supra*, §II(C). PO's expert admits that the minimum number of steps on a drill covered by the claims is two, not four or five. Ex-1046, 79:21-80:6. And regardless, Bannister expressly teaches that more steps may be used if desired. Ex-1006, p.2, 2:70-p.3, 1:2.

Second, PO argues that step drills are used differently from twist drills and that a POSA would never consider combining a step drill with a twist drill. Response, 42-43. PO has put this tired, old argument before the Patent Office on several occasions, which the Patent Office has rightfully rejected. *See* Ex-1002 at 200-214; Ex-1003 at 498, 515. Step drills are not limited to drilling holes in thin

materials. Ex-1044, ¶38. Moreover, a POSA looking to improve a twist drill would consider adding features from any type of drill, so long as they were compatible with the function of the twist drill. Ex-1044, ¶37; *see also* Ex-1004, ¶201.

Third, PO criticizes the idea that the drill described in the '583 patent could be considered a step drill since the axial dimension of each step is so small. Response, 43. This is yet another unclaimed feature. Moreover, PO's own advertising literature lauds the step drill-like nature of its drills, stating "[t]he multi-stepped tip acts like a step drill, allowing for laser like holes through sheet metal." Ex-2041. PO cannot have it both ways. Furthermore, a POSA would have known that a step drill could be used (and are used) to drill through a workpiece thicker than the step height of the step drill. Ex-1044, ¶38; Ex-1046, 178:7-9; *see* Ex-1045, ¶25.

Finally, PO argues that the "unique tip geometry of Mr. Wang's patented design" removed the problem of "walking" when a large diameter enters a workpiece, thus removing the need for a pilot hole. Response, 43-44. This is wrong; as discussed below in connection with alleged secondary considerations, the problem of "walking" was solved well before the '583 patent by the development of the split-point tip. Ex-1004, ¶¶48-49; Ex-1044, ¶43; Ex-1045, ¶¶18-19. PO has not disputed in connection with Ground 2 that it would have been obvious to add a

split-point tip to Bannister to provide its well-known advantages. *See* Petition at 74-75.

PO has failed to overcome the *prima facie* case that claims 13, 18 and 22 would have been obvious based on Bannister in view of Zhou or Welty, and further in view of Korb.

B. Secondary Considerations Do Not Refute the Obviousness of the Claims

For Ground 3 only,⁴ PO argues that objective indicia show that the challenged claims were not obvious. Response, 44-60. PO's arguments should be rejected. PO's evidence of alleged objective indicia is extremely weak, and "simply cannot overcome the strong showing of obviousness." *Becton, Dickinson & Co. v. Baxter Corp. Englewood*, 998 F.3d 1337, 1345 (Fed. Cir. 2021) (citation omitted). Furthermore, secondary considerations arguments require a nexus between the evidence and the claimed invention. *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995). PO has not established the necessary connection between success of the device to specific features of the patent claims.

⁴ Patent Owner does not allege secondary considerations in its response to Grounds 1 and 2. *See* Response, 6-40. Regardless, the following arguments are equally applicable to Grounds 1 and 2.

1. Patent Owner's Evidence is Weak and Does Not Show Non-Obviousness

a. Commercial Success

PO trumpets that [REDACTED]

[REDACTED]. Response, 56. Even in the abstract, this is not impressive. PO has cited no case where a [REDACTED] in annual sales was sufficient to show commercial success.

Moreover, PO's analysis regarding commercial success is fatally flawed because PO has not contextualized these sales to unpatented products and/or the twist drill industry as a whole. *See In re Applied Materials, Inc.*, 692 F.3d 1289, 1300 (Fed. Cir. 2012); *In re Ben Huang*, 100 F.3d 135, 140 (Fed. Cir.1996); *Red Diamond, Inc. v. Southern Visions, LLP*, IPR2019-01671, Paper 35 at 39-40 (PTAB Mar. 31, 2021). The overall twist drill market in the U.S. is conservatively estimated to be **over \$300 million per year**. Ex-1045, ¶16. [REDACTED]

[REDACTED] Similarly, PO points to the fact that Viking has sold [REDACTED] Vortex drills over a three-year period. Response, 57. But over the same three-year period, Viking sold [REDACTED] of non-stepped twist drills. Ex-1045, ¶15. Even assuming Viking's Vortex drills are covered by the '583 patent (which Viking disputes), [REDACTED] does not show commercial success. PO's Expert's comments on

commercial success (Ex-2034, ¶¶179-180) should be ignored by the Board because he has not shown himself to be an expert in the economics of drill bit sales in the U.S.

b. Copying

In an effort to show copying, PO points to [REDACTED]
[REDACTED]. Response, 50-52. However, [REDACTED]
[REDACTED] do not show copying because this is merely industry benchmarking. *See Caption Call, L.L.C. v. Ultratec, Inc.*, IPR2015-00637, Paper 98 at 84 (PTAB Sept. 7, 2016); *Jiaxing Super Lighting Elec. Appliance Co. v. CH Lighting Tech. Co.*, 2022 U.S. Dist. LEXIS 146033, at *15 (W.D. Tex. Aug. 16, 2022). [REDACTED]
[REDACTED]
[REDACTED] This is insufficient to show copying. *See, e.g., B/E Aero., Inc. v. C&D Zodiac, Inc.*, 709 Fed. Appx 687, 696 (Fed. Cir. 2017).

PO's allegation that Viking [REDACTED]
[REDACTED] (Response, 52) is unsupported and false. Rather than copy the Hyper-Step, Viking used its own expertise with twist drills and step drills to develop a better stepped-tip twist drill. Ex-1045, ¶¶9-14. The document that PO cites to support the alleged copying (Ex-2063) was created more than a year after introduction of the Vortex drills for the specific purpose of

showing the substantial differences between the drills. Ex-1045, ¶¶10-12. To a POSA, the differences between the products reflected in Ex-2063 are very substantial and show a lack of copying. *Id.*

PO next claims that commercial acquiescence by other companies shows nonobviousness. Response, 54-55. However, the '583 patent was only granted in May of 2021, which is not a long enough period to show industry acceptance or widespread acceptance for commercial acquiescence. *See, e.g., RCA Corp. v. Applied Digital Data Sys., Inc.*, 730 F.2d 1440 (Fed. Cir. 1984); *Cisco Systems, Inc. v. SSL Services, LLC*, IPR2015-01754, Paper 58 at 36 (PTAB Feb. 22, 2017). Moreover, commercial acquiescence is traditionally shown by licensing agreements. *See, e.g., Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004); *see also* Donald S. Chisum, *Patents* § 5.05[3]. PO presents no evidence of licensing. PO also cites no authority to show that filing of reexaminations shows acquiescence. To the contrary, Guehring's filing of reexaminations merely shows that it does not believe the '583 patent is valid. Guehring also might have any number of reasons for not entering the U.S. market, and PO cannot extrapolate nonobviousness from such limited evidence. *See Iron Grip Barbell Co.*, 392 F.3d 1324; *ABT Systems LLC v. Emerson Elec. Co.*, 797 F.3d 1350, 1361–62 (Fed. Cir. 2015).

Finally, there is a real-world explanation for why Viking and others did not introduce stepped-tip twist drills earlier that has nothing to do with copying or alleged non-obviousness: cost effective manufacturability. Historically, creating steps on a drill was a time-intensive, expensive operation. Ex-1045, ¶¶5-6.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Thus, there is no reason here to infer non-obviousness from the fact that the commercial products at issue were not introduced earlier.

c. Industry Praise

PO claims that the Hyper-Step drill bits have received “numerous accolades” in the industry. Response, 55. PO further claims that Viking’s and Kimball’s internal documents are evidence of industry praise, citing *Apple Inc. v. Samsung Elecs. Co., Ltd.* 839 F.3d 1034 (Fed. Cir. 2016). *Id.* As discussed *supra*, these internal documents are unpersuasive to show copying or industry praise. Furthermore, unlike in *Apple*, these internal documents do not praise technology captured by the challenged claims, but the product as a whole.

PO cites to a variety of online reviews and Youtube comments as evidence of industry praise, but this evidence is not reliable. Firstly, the evidence is from Youtube videos and anonymous commentors. Response, 55-56. Moreover, the videos have been stricken by the Board, and PO cannot cite to print-out of Youtube videos that are not on the record to support a finding of nexus. See Paper 41 (striking Exhibits 2050, 2053, and 2054); *Halliburton Energy Servs. V. U.S. Well Servs., LLC*, IPR2022-00610, Paper 40 at 68-69 (PTAB Aug. 30, 2023). Furthermore, the anonymous, unsubstantiated reviews and comments are unreliable hearsay – there is no basis to conclude that they are even genuine, much less that they come from people knowledgeable in the drilling industry. See *Apple*, 839 F.3d at 1054 (noting that industry praise should come from industry players).

In addition, some of the alleged “industry praise” actually criticize the drills. See Ex-2016, 7; Ex-2017, 8; Ex-2018, 4-6. It is improper for PO to pick and choose comments to support its theory, and intentionally ignore other comments from *within the same exhibit*. To the extent the Board credits any weight to the purported industry praise, it must also consider and equally weight criticisms contained in PO’s own exhibits.

d. Unexpected Results

PO conclusorily asserts that the alleged benefits of the Hyper-Step drills were unexpected. Response, 44. This is not true. In terms of their cutting operation, the

Hyper-Step drills function the same as known step drills. Ex-1045, ¶¶4, 24-25; Ex-1044, ¶¶45-51. Moreover, the supposed unexpected results were known in the prior art. Ex-1044, ¶¶45-51. For that reason, a POSA would not be at all surprised by how the Hyper-Step drills function. *Id.* PO has presented no evidence to the contrary.

e. Long-Felt Need

Lastly, PO argues that long-felt but unmet need overcomes obviousness. Response, 58-60. However, “the mere passage of time without the claimed invention is not evidence of nonobviousness;” rather, a patentee must submit “actual evidence of long-felt need.” *In re Kahn*, 441 F.3d 977, 990-91 (Fed. Cir. 2006) (citation omitted). PO presents no such evidence here, and instead relies solely on the passage of time. Response, 59.

PO’s long-felt need argument also fails for the same reason as its commercial success argument. If, as PO contends, the Hyper-Step drills were really a game-changing improvement, then one would expect them to dominate the market. But that hasn’t happened. [REDACTED]

[REDACTED]

[REDACTED] The sales evidence belies any claim of long-felt need.

The reality is that any alleged need was filled long before the Hyper-Step drills. For example, PO claims that the Hyper-Step drills resolves walking and the

necessity of drilling pilot holes. Response, 59. However, this purported need in the market was already fully solved by the well-known split-tip design already applied to existing twist drills and step drills. Ex-1045, ¶¶18-19. Indeed, drillmakers already discouraged drilling pilot holes because of the damage it causes to the cutting edge of the drill. *Id.*, ¶20. The need for reduced slippage was already resolved by three-flatted shanks, which is also old and unclaimed. Ex-2011; *Id.*, ¶21. And the benefit of faster cutting with reduced torque was already achieved by known step drills. Ex-1045, ¶24; *see also* Ex-1006, p. 2, 2:30-55. Therefore, the purported long-felt and unmet need PO claims simply did not exist.

2. There is No Nexus

The burden of establishing nexus is the patentee's. *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999). A presumption of nexus is only appropriate if "the patentee shows that the asserted objective evidence is tied to a specific product and that product embodies the claimed features, and is coextensive with them." *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (cleaned up).

PO is not entitled to a presumption of nexus. First, it has not shown that the Hyper-Step drills are covered by the challenged claims. For example, PO has presented no evidence that the Hyper-Step drills have "spirally formed" composite cutting blade groups as claimed. When asked in deposition whether the Hyper-Step

drills sold by Matco and Fisher had axial relief, Mr. Wang stated that he “cannot answer this question” and was unable to identify whether axial relief was present in the products because “this related [sic] the specific indication of the product.” Ex-1049, 81:11-83:7. Dr. Endres was similarly unable to testify that the Hyper-Step drills have axial relief because he never took measurements of the drills. Ex-1046, 33:6-8.

Second, PO has not shown that the Hyper-Step drills are co-extensive with the claims. This can be seen from the fact that the alleged differences between the claims and the prior art at issue are extremely minor and have nothing to do with the alleged commercial success and other objective indicia. For example, the alleged differences between the claims and Bannister are limited to minor differences in the geometry of the stepped surfaces. *See supra*, §§II-III. This is also true for Zhou in IPR2023-00474. Yet PO has presented no evidence that the alleged objective indicia are tied or attributable to these minor differences.

Because PO is not entitled to a presumption of nexus, it must show that nexus exists “by showing that the evidence of secondary considerations is the direct result of the unique characteristics of the claimed invention.” *Fox Factory* at 1375. The evidence must be “tied to the novel elements of the claim at issue” and “reasonably commensurate with the scope of the claims.” *Institut Pasteur & Universite Pierre Et Marie Curie v. Focarino*, 738 F.3d 1337, 1347 (Fed. Cir. 2013).

Here, there is no evidence of a connection between the alleged success of the commercial products and the specific features of the '583 patent claims. To the contrary, [REDACTED]

[REDACTED]. *See In re DBC*, 545 F.3d 1373, 1384 (Fed. Cir. 2008) (evidence of commercial success was insufficient in part, due to patentee's "aggressive network marketing"). [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

PO also failed to address the impact of [REDACTED]
[REDACTED] on commercial success for [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED] Therefore, a significant portion of the commercial success of the Hyper-Step drill can be attributed to [REDACTED].

Finally, "if the feature that creates the commercial success was known in the prior art, the success is not pertinent." *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006); *see also In re Huai-Hung Kao*, 639 F.3d 1057, 1069

(Fed. Cir. 2011) (“there must be a nexus to some aspect of the claim not already in the prior art”). Here, as discussed above, all of the advantages [REDACTED] relate to features and technology already known in the art. *Supra*, §§III(B)(1)(d-e).

Thus, even assuming there was credible evidence to find commercial success or other objective indicator of non-obviousness (which there is not), PO has not met its burden of showing a nexus between the objective evidence and the claimed invention.

IV. CONCLUSION

For these reasons, PO’s arguments are insufficient to overcome the Board’s initial findings that the challenged claims of the ’583 patent are invalid for the reasons set forth in Paper 2.

Dated: January 16, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), the undersigned hereby certifies that the foregoing PETITIONER'S REPLY contains 5,552 words, excluding parts of this Petition exempted under § 42.24(a), as measured by the word processing system used to prepare this paper.

Dated: January 16, 2024

/J. Derek Vandenburg/

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CERTIFICATE OF SERVICE

I certify that on January 16, 2024, I caused a true and correct copy of the foregoing Petitioner's Reply to be served via electronic mail on the following:

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