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571-272-7822

Paper 13
Date: July 10, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIKING DRILL & TOOL, INC.,
Petitioner,

v.

HONGJIA WANG,
Patent Owner.

IPR2023-00473
Patent 11,007,583

Before WILLIAM V. SAINDON, JAMES J. MAYBERRY, and CYNTHIA L. MURPHY, *Administrative Patent Judges*.

SAINDON, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background and Summary

Viking Drill & Tool, Inc. ("Petitioner") filed a Petition (Paper 2, "Pet.") requesting *inter partes* review of claims 1, 2, 5, 7, 8, 12–15, 18, 19, and 22 of U.S. Patent No. 11,007,583 (Ex. 1001, "the '583 patent")[1]. Counsel for the listed inventor of the '583 patent, Hongjia Wang ("Patent Owner"), filed a Preliminary Response. Paper 9[2] ("Prelim. Resp.").

We have authority to enter this decision granting institution of *inter partes* review ("Decision") under 35 U.S.C. § 314(b) and 37 C.F.R. § 42.4(a) (2020). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless "there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

For the reasons provided below, we determine that Petitioner has satisfied the threshold requirement set forth in 35 U.S.C. § 314(a). Because Petitioner has demonstrated a reasonable likelihood that at least one claim of the '583 patent is unpatentable, we institute an *inter partes* review of all challenged claims based on all grounds raised in the Petition. 37 C.F.R. § 42.108(a).

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[1] The '583 patent comprises the originally-issued U.S. Patent No. 11,007,583 B2 as well as U.S. Pat. No. 11,007,583 C1, an *ex parte* reexamination certificate confirming the patentability of original claims 1–14 and adding claims 15–22. Ex. 1001, pp. 16–17.

[2] Paper 9 is a Corrected Preliminary Response, correcting some informalities in the originally submitted Preliminary Response (Paper 7).

Our findings of fact, conclusions of law, and reasoning discussed below are based on the evidentiary record developed thus far, and made for the sole purpose of determining whether the Petition meets the threshold for initiating review. This decision to institute trial is not a final decision as to the patentability of any challenged claim or the construction of any claim limitation. Any final decision will be based on the full record developed during trial.

B. Real Parties in Interest

Patent Owner identifies Hongjia Wang as real party in interest. *See* Paper 5, 1 (Patent Owner's Mandatory Notice). Petitioner identifies Viking Drill & Tool, Inc., a/k/a Consolidated Toledo Drill, as real party in interest. Pet. 5.

C. Related Matters

The '583 patent has been asserted against Petitioner in *Tsteigen, Inc. d/b/a/ Tec-Spiral; Hongjia Wang v. Viking Drill & Tool, Inc. d/b/a Consolidated Toledo Drill*, No. 21-cv-002759 (D. Minn.). *See* Paper 5, 1; Pet. 5. The '583 patent is also the subject of IPR2023-00474, filed by Petitioner and decided concurrently with this Decision.

D. Prior Art and Asserted Grounds

Petitioner's grounds rely on the following prior art references:

Name	Reference	Exhibit No.
Bannister	US 2,193,186, iss. Mar. 12, 1940	1006
Welty	US 2,276,532, iss. Mar. 17, 1942	1008
Korb	US 4,582,458, iss. Apr. 15, 1986	1012
Gentry	US 8,029,215 B2, iss. Oct. 4, 2011	1010
Durfee	US 10,058,929 B2, iss. Aug. 28, 2018	1011
Zhou	CN 203356678 U, iss. Dec. 25, 2013	1007

Name	Reference	Exhibit No.
Wang	US 2018/0133808 A1, pub. May 17, 2018	1009

Petitioner asserts that claims 1, 2, 5, 7, 8, 12–15, 18, 19, and 22 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 2, 5, 7, 8, 12–15, 18, 19	103	Wang, Gentry, Durfee
1, 2, 5, 7, 8, 12, 14, 15, 19	103	Bannister, Zhou, Welty
13, 18, 22	103	Bannister, Zhou, Welty, Korb

E. Technical Background and Overview of the '583 Patent

The '583 patent is directed to a drill bit. There are many types of drill bits, with two types relevant to this proceeding being a twist drill bit and a step drill bit. According to a textbook definition, twist drill bits are "rotary end-cutting tools having one or more cutting lips and one or more helical or straight flutes for the passage of chips and the admission of a cutting fluid." Ex. 1017, 21.[3] The textbook further explains that a step drill bit is a type of twist drill bit, having portions of different diameters. *Id.* at 25. This allows a step drill bit to cut to close tolerances, because the steps tend to center the bit. *Id.* Some step drill bits are specifically designed for cutting holes in materials such as sheet-metal panels, wherein different diameters are provided so that a single bit can be used to cut different sized holes (i.e., instead of having to swap in progressively larger fixed-size drill bits to make a large hole). *See, e.g.*, Ex. 1010, 1:16–23.

The abstract of the '583 patent characterizes the disclosed invention as follows:

> The present invention provides a twist drill. A cone portion is provided at a front end of the operating portion, and an

[3] We use Petitioner's added pagination for Exhibit 1017.

> exterior surface of the operating portion is provided with a spiral flute for shunting cutting chips. The exterior surface of the cone portion is provided with a plurality of composite cutting blade groups which are sequentially enlarged in diameter from the front end to the rear end of the cone portion. The cone portion is provided with a top blade on the tip. In use, the top blade is used for positioning, and the cutting process is carried out by the top blade and the composite cutting blade groups.

Ex. 1001, code (57).

The '583 patent describes a twist drill bit having a cone portion at the tip of the bit that is configured like step drill bit. Figure 3, reproduced below, is illustrative.

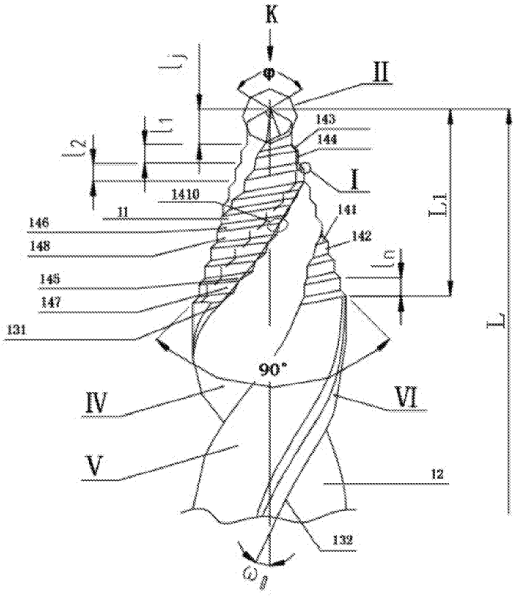

FIG. 3

Figure 3 of the '583 patent depicts a cone portion (L1) at the end of a cylindrical portion of a twist drill bit. The cone portion is formed by a series of first and second step surfaces (141, 142) defining a conical surface and a cylindrical surface, respectively. Ex. 1001, 5:9–29. A cutting edge (1410) is located where those surfaces intersect a spiral flute (IV). *Id.*

F. Challenged Claims

Claims 1, 2, 5, 7, 8, 12–15, 18, 19, and 22 are challenged. Claims 1 and 8 are independent. Claim 1 is reproduced below.

1. A twist drill, comprising:

an operation portion comprising a cone portion and a cylinder portion axially fixed to the cone portion;

a shank portion axially fixed to the cylinder portion opposite the cone portion;

a spiral flute formed on an exterior surface of the operating portion extending from a front end of the cone portion and at least partway up the cylinder portion, the spiral flute having a sidewall;

a plurality of composite cutting blade groups formed sequentially and spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion, each of the plurality of composite cutting blade groups comprising:

a conical first step surface;

a cylindrical second step surface adjacent to the conical first step surface,

a major cutting edge defined by the intersection of the conical first step surface and the sidewall of the spiral flute;

a minor cutting edge defined by the intersection of the cylindrical second step and the and the [sic] sidewall of the spiral flute; and

a cutting tip defined by the intersection of the major cutting edge, the minor cutting edge, and the sidewall of the spiral flute; and

a top blade provided on the front end of the cone portion;

wherein a diameter of each of the plurality of composite cutting blade groups increases sequentially from the front end of

> the cone portion to the rear end of the cone portion; and each of the plurality of composite cutting blade groups is configured to crush cutting chips into finer chips and the spiral flute is configured to shunt the finer chips; and
>
> wherein at least one cylindrical second step surface is immediately adjacent to a conical first step surface of a next composite cutting blade group; and the diameter of the last composite cutting blade group located at the rear end of the cone portion immediately adjacent to the cylinder portion is equal to the cylinder portion diameter.

Ex. 1001, 10:2–43.

II. DISCRETIONARY ANALYSIS

A. Fintiv

Patent Owner asserts that we should deny institution under *Fintiv*. Prelim. Resp. 5–12; *see Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 11–12 (PTAB Mar. 20, 2020) (precedential). Our analysis under *Fintiv* is guided by the USPTO Director's Memorandum issued on June 21, 2022, titled "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation"[4] ("Director's Memo"). Pursuant to the Director's Memo, we "will not discretionarily deny institution . . . where a petitioner presents a [*Sotera*] stipulation." Director's Memo at 3 (citing *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A)). Because Petitioner has offered a stipulation like in *Sotera*, i.e., "to not pursue in the Litigation the Grounds asserted herein or any other grounds that reasonably

[4] *Available at* https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

could have been raised in this IPR" (Pet. 87), we do not discretionarily deny institution under *Fintiv*.

B. Multiple Petitions

Patent Owner argues that the Petition should be denied on account of multiple petitions. Prelim. Resp. 2–5. Petitioner filed two Petitions challenging the '583 patent and, as required in our Consolidated Trial Practice Guide (Nov. 2019)[5] ("CTPG"), submitted an explanation of why two petitions were necessary. Paper 3. According to the Consolidated Trial Practice Guide, "the Board recognizes that there may be circumstances in which more than one petition may be necessary, including, for example, . . . when there is a dispute about priority date requiring arguments under multiple prior art references." CTPG 59. It also states that "the patent owner may seek to avoid additional petitions by proffering a stipulation that . . . certain references qualify as prior art." *Id.* at 61. Here, we have a dispute over the priority date of the '583 patent as it relates to the Wang reference. This issue is not present in IPR2023-00474. Therefore, we have a situation recognized by the Consolidated Trial Practice Guide where multiple petitions are permitted. Accordingly, we do not discretionarily deny institution based on multiple petitions.

[5] *Available at* https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf?MURL=TrialPracticeGuideConsolidated.

III. MERITS ANALYSIS

A. Burdens of Proof

"In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")); *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

Although the burden of proof for showing unpatentability remains on a petitioner, the patent owner may have a burden of production. For example, a patent owner has the burden for showing it is entitled to priority. *Dynamic Drinkware*, 800 F.3d at 1379 (discussing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)); *see also In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016) ("[A] patentee bears the burden of establishing that its claimed invention is entitled to an earlier priority date than an asserted prior art reference.").

B. Level of Ordinary Skill in the Art

Petitioner asserts the following level of ordinary skill in the art:

> A POSA[6] with respect to the '583 patent would have been an individual educated in mechanical engineering with a bachelor's degree and at least one or two years of experience in the development of drill bits, or an associate's degree and at least five years of experience in the development of drill bits. A

[6] Person of ordinary skill in the art.

> POSA would typically work in a team with machinists and would be aware of developments in the field of machine tools, particularly drill bits, for example by attending trade shows, and by reading patents and trade journals.

Pet. 25. Petitioner does not cite any evidence in support of its proposed level of skill. However, this appears to be an oversight because the language quoted above is found, nearly verbatim, in the declaration testimony of Petitioner's expert, Steven R. Schmid, Ph.D. Ex. 1004 ¶ 14.

Patent Owner does not appear to challenge this proposed level of skill or offer its own. We adopt Petitioner's definition for purposes of this Decision, which appears consistent with the '583 patent and prior art.

C. Claim Construction

Petitioner states that the parties have submitted a joint claim construction statement in district court. Pet. 17 (citing Ex. 1021[7]). Petitioner presents in its Petition four terms from that joint statement. *Id.* at 17–24. The only one that appears to have relevance to the case as it now stands is for the term "spirally" in independent claims 1 and 8. In particular, claims 1 and 8 each recite, "a plurality of composite cutting blade groups formed sequentially and spirally on a cone portion exterior."

Petitioner states that the term "spirally" is not described in the specification of the '583 patent. Pet. 20. Petitioner notes, however, that Figure 3 of the '583 patent shows the cutting blade groups in an angled (i.e., not perpendicular) orientation relative to the longitudinal/rotational axis of the drill bit. *Id.* Petitioner also notes that Patent Owner's infringement

[7] The parties do not indicate whether the district court has issued a claim construction order.

contentions similarly indicate that "spirally" means that the cutting blade groups are "slanted," i.e., not perpendicular to the rotational axis. *Id.* at 21–22. Petitioner further asserts that a cutting surface with axial relief[8] would not be perpendicular to the rotational axis. *Id.* at 23.

Patent Owner does not offer a position on claim construction.

We apply the claim construction standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b). That is, "the words of a claim 'are generally given their ordinary and customary meaning' . . . . that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Phillips*, 415 F.3d at 1312–13. We adopt Petitioner's construction for purposes of this Decision, based on the visual disclosure in Figure 3 of the '583 patent and the paucity of any further description. Specifically, we construe "spirally" formed cutting blades to be cutting blades that are not perpendicular to the drill bit's rotational axis, which would include a cutting blade with axial relief.

D. Asserted Obviousness in view of Wang, Gentry, and Durfee (Claims 1, 2, 5, 7, 8, 12–15, 18, 19, and 22)

Petitioner asserts that claims 1, 2, 5, 7, 8, 12–15, 18, 19, and 22 would have been obvious in view of Wang, Gentry, and Durfee. Pet. 46–64. At a high level, and focusing on claim 1, Petitioner asserts that Wang discloses each limitation except for the cutting blade groups being formed "spirally"

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[8] *Axial relief* is a technique known in the art of drill bits whereby a cutting surface is inclined relative to the axis of rotation in order to provide clearance behind the cutting edge in the axial direction. *See, e.g.*, Ex. 1010, 1:52–63; Ex. 1004 ¶¶ 50–54. Relief provides clearance for the cutting blades and prevents rubbing. Ex. 1004 ¶ 50.

on the cone section of the drill bit, which is instead allegedly taught in Gentry or Durfee. *See id.* at 49–50. We first provide a brief overview of the asserted art and ground, then our analysis.

1. Wang (Ex. 1009)

Figure 5 of Wang is reproduced below.

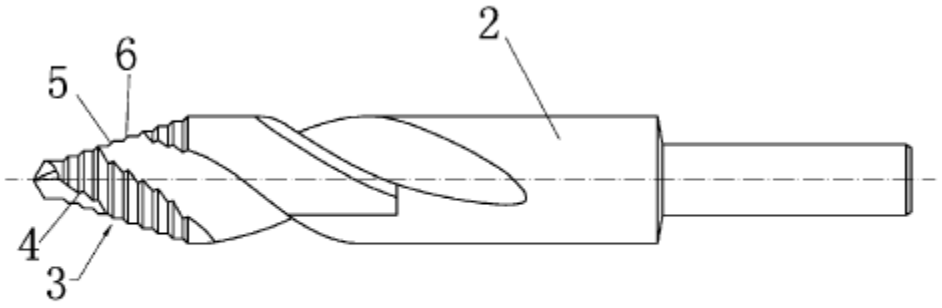


Fig.5

Figure 5 of Wang describes a twist drill bit with a conical tip section substantially identical to that described in the '583 patent, but with the flutes that define the first and second cutting edges of the conical portion being perpendicular to the axis of rotation of the drill bit. Ex. 1009 ¶ 6; *compare* Ex. 1009, Fig. 5, *with* Ex. 1001, Fig. 3.

2. Gentry (Ex. 1010) and Durfee (Ex. 1011)

Figure 1 of Gentry is reproduced below on the left and Figure 2 of Durfee is reproduced below on the right.

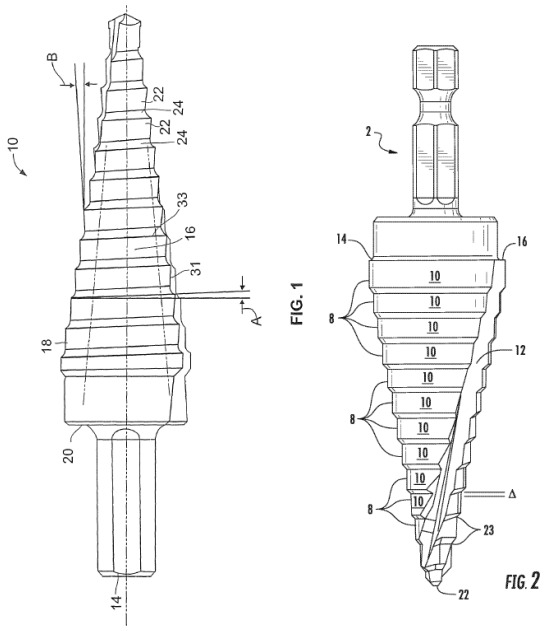


Figure 1 of Gentry depicts a conventional step drill bit having axial relief A to provide clearance along axis 26 for cutting surface 22. Ex. 1010, 1:52–63. Similarly, Figure 2 of Durfee depicts a step drill bit provided with axial relief Δ. Ex. 1011, 11:27–53.

3. Petitioner's Ground

Petitioner asserts that Wang discloses a drill bit satisfying each limitation of claim 1 except for the "spirally" formed blade groups, which instead are formed perpendicular to the axis of rotation in Wang. Pet. 49; *see generally id.* at 46–58. Petitioner asserts that it would have been obvious to modify Wang's perpendicular cutting blade groups to be non-perpendicular, in order to provide axial relief as taught in Gentry and Durfee. *Id.* at 49–50. Petitioner asserts that axial relief is a common and well-known technique used to reduce torque and rubbing. *Id.* at 50 (citing, e.g., Ex. 1004 ¶¶ 150–151).

4. Priority Issue

Patent Owner's arguments against the Wang ground are based on its assertion that Wang is not prior art. Prelim. Resp. 13; *see generally id.* at 13–20; *but see* Pet. 25–33 (arguing that Wang is prior art because the '583 patent cannot find support for the "spirally" limitation in Wang). Wang is a pre-grant publication of an application to which the '583 patent claims priority. Ex. 1001, code (63).

Patent Owner argues, "it is [Petitioner's] burden to show . . . that Mr. Wang should lose his claim of priority." Prelim. Resp. 20. As we noted earlier, however, a patent owner bears a burden of production regarding its claims of priority. *Dynamic Drinkware*, 800 F.3d at 1379; *In re Magnum Oil Tools*, 829 F.3d at 1376. This would especially appear to be the case with a continuation *in part*. Ex. 1001, code (63) (noting that the '583 patent claims to be a continuation-in-part of application 15/847,900); Ex. 1009, code (21) (noting that Wang was application number 15/847,900); *see also* Manual of Patent Examining Procedure § 201.08 ("A continuation-in-part is an application . . . adding matter not disclosed in the prior-filed application."). Setting aside the burdens, however, Petitioner has the stronger position on the present record.

The parties' arguments focus on several paragraphs in Wang, reproduced below:[9]

[9] Although priority must be shown relative to the application, we adopt the parties' practice of citing to Exhibit 1009 and using the formatting and pagination therein, for convenience and being unaware of any reason why Exhibit 1009 would not be an accurate representation of application 15/847,900.

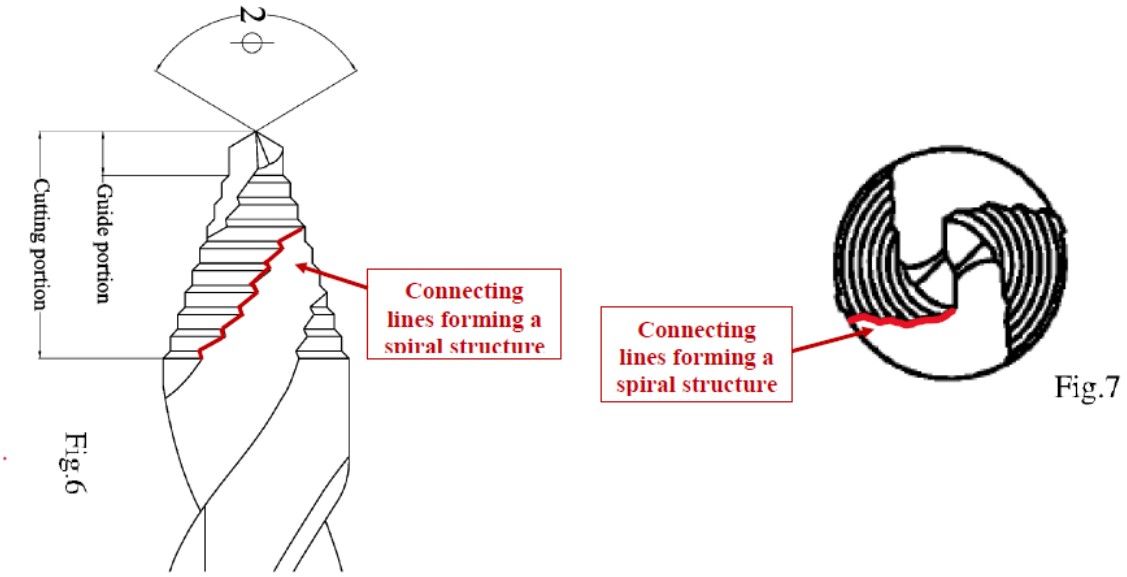
> [0006] An efficient twist drill for layered drilling comprises a drill bit body, wherein the drill bit body comprises a shank portion and an operation portion; the shank portion is connected with the operation portion; the operation portion has a cutting portion at a front end, wherein *a plurality of flutes distributed in parallel* and at intervals are symmetrically arranged along a flank surface of the cutting portion; the flutes divide main cutting blades into a plurality of first cutting blades and second cutting blades; and *connecting lines of the first cutting blades and the second cutting blades form a step-like structure*.
>
> [0010] Preferably, *connecting lines of the flutes form a spiral structure*.
>
> [0031] An efficient twist drill for layered drilling of the present disclosure comprises a drill bit body 2 which can be the ordinary twist drill. The drill body 2 usually comprises a shank portion and an operation portion; the operation portion has a cutting portion at a front end and a guide portion at a rear end; and the shank portion is connected with the guide portion. *A plurality of flutes 4 distributed in parallel* and at intervals are symmetrically arranged along a flank surface 3 of the cutting portion; the flutes 4 divide main cutting blades into a plurality of first cutting blades 5 and second cutting blades 6; and *connecting lines of the first cutting blades 5 and the second cutting blades 6 form a step-like structure* (which can also be called a ladder-like structure), i.e., the main cutting blades of the present disclosure are step-like structures . . . .
>
> [0035] *The flutes of the present disclosure may be arc-shaped flutes adapted to a radian of the flank surface, or the connecting lines of the flutes form a spiral structure . . . .*

Ex. 1009 ¶¶ 6, 10, 31, 35 (emphases added).

Petitioner's position is that none of Wang's disclosures describe the cutting blades being non-perpendicular to the rotational axis of the drill bit. *See* Pet. 25–33. Petitioner asserts that when Wang describes spiral flutes, it

is talking about either (1) the shape of the connecting lines as they wind up the length of the bit (*id.* at 30) or (2) radial relief (*id.* at 31–32).

Petitioner bases its connecting-lines position on the fact that this relationship is depicted in, e.g., Figures 6 and 7 of Wang, which are reproduced below with Petitioner's added annotations:



Pet. 30.

Figure 6 of Wang depicts a side prospective view of a drill bit. Petitioner has marked in red connecting lines that it asserts form a spiral structure, which can be seen by way of connecting lines continuing the spiral shape of the flutes on the cylindrical body of the drill bit. Figure 7 of Wang depicts a top prospective view looking down the rotational axis of the drill bit. Again, the connecting lines cutting blades are depicted as continuing the spiral shape of the larger flutes.

Petitioner bases its radial-relief position on the prosecution history of the patent. Pet. 31–32. Specifically, Petitioner asserts that the Examiner

read the "spirally" limitation on the radial-relief features[10] of a prior art reference. *Id.* Petitioner asserts that the Applicant did not challenge that reading of the claim. *Id.* at 32.

Patent Owner begins its analysis by noting that Wang uses the term *flutes* to describe the material that is removed in the cone portion of the drill bit to form the first and second cutting blades. Prelim. Resp. 13, 15–16 (noting especially the shaded areas on Patent Owner's markup of Figure 5 of Wang on page 16). Patent Owner asserts that Wang describes the connecting lines of the cutting blades as forming a step-like structure, which it asserts means that Wang is talking about a different structure when talking about the connecting lines of the *flutes*. *Id.* at 17–19. Thus, according to Patent Owner, comparing paragraphs 6 and 10, as well as 31 and 35, would lead one of ordinary skill in the art to conclude that the latter paragraphs state that the flutes are not perpendicular to the rotational axis of the bit. *Id.* at 16–20.

On this preliminary record, we consider Petitioner to have the better argument. Looking at paragraphs 6 and 10 of Wang, we agree with Patent Owner's characterization of the term *flute* here being a reference to the material removed in order to form the two cutting blades. *See also* Prelim. Resp. 16 (noting the blue triangles that create the conical and cylindrical

[10] *Radial relief* is relief in a radial direction measured in the plane of rotation. Ex. 1004 ¶ 55. Radial relief is often measured by the amount of drop at a given radius in a given amount of angular rotation (i.e., how quickly the radius decreases). *Id.* (citing Ex. 1017, 117 (defining various types of relief)).

shapes defining the two cutting blades).[11] Although paragraph 6 describes how the connecting lines of the *cutting blades* form a step-like structure, paragraph 10, in contrast, is describing the connecting lines of the *flutes*. Given that paragraph 6 has already told us that the flutes are parallel with one another, we know that they do not intersect. Because they do not intersect, they cannot have connecting lines on account of an intersection. Instead, the only thing about the flutes that could seemingly be said to "connect" are the parts of the flute that are interrupted by the cutting blades. That is what is shown in Petitioner's markup of Figures 6 and 7 of Wang, where the intersections of the flutes with the cutting surface are depicted as having a spiral shape. We note that we disagree with Patent Owner to the extent it is arguing that Petitioner's position conflates two different connecting lines. The connecting lines of the cutting blades form a step-like structure relative to the distance from the rotational axis (i.e., the radius of the bit), but that does not constrain their angular position around the axis (i.e., the clock hand position around the axis of rotation). Therefore, even though the stair-step and spiral shapes are measured at the same place, the shapes are independent in that they are being measured with respect to different things (radial distance vs. angle).

Paragraphs 31 and 35 of Wang effectively are describing the same thing as paragraphs 6 and 10, this time using a few identification numerals. The chief difference appears to be that the first sentence of paragraph 35

[11] However, we note in this respect that usage of the term *flute* in the '583 patent is at times contrary to that term's accustomed meaning in the art. On this record, a *flute* appears to be understood in the art as something cut *into the body* of the bit. *See, e.g.*, Ex. 1017, 21.

states that the flutes can be adapted to a radian of the flank surface *or* a spiral structure. The spiral structure would seemingly be the one we already discussed above, also described in paragraph 10 and shown in Figures 6 and 7. The "adapted to a radian" configuration does not appear to have its own figure. However, that configuration does appear to be shown in Figure 2, albeit on a prior art bit. That is, each of the two cutting blades 1 in Figure 2 are adapted to, or fixed at, a particular radian, here 0 and π (0° and 180°). *See also* Prelim. Resp. 27 (contrasting spiral vs. straight arrangements of cutting tips in the prior art). Thus, we understand the "spiral" or "radian" configurations described in paragraph 35 to be telling us that the cutting tips of the stair-step shape formed by the flutes may be presented in a straight or spiral configuration as measured with the axis of rotation as the center point. *Accord* Ex. 1017, 21 (demonstrating a common understanding in the art that twist drills can have "helical or straight flutes for the passage of chips"). On this preliminary record, we do not find support for the "spirally" limitation of the '583 patent in Wang.

5. Conclusion for the Wang, Gentry, and Durfee Ground

In conclusion, on the present record, we are not persuaded that the '583 patent can claim priority to Wang's application, and thus consider Wang prior art for the purposes of determining whether Petitioner has met its burden on institution. Patent Owner presents no other substantive arguments against the Wang ground. After review of Petitioner's evidence and analysis, on this record, we determine that Petitioner has sufficiently shown that a person of ordinary skill in the art would have considered it obvious to modify Wang to have non-perpendicular cutting blades, such as shown in Gentry and Durfee, to provide the known benefits of axial relief.

Thus, reviewing the Petition and Preliminary Response, as well as the evidence cited therein, we are persuaded that Petitioner has established a reasonable likelihood that claim 1 of the '583 patent would have been obvious in view of Wang, Gentry, and Durfee.

E. Asserted Obviousness in View of Bannister, Zhou, and Welty (Claims 1, 2, 5, 7, 8, 12, 14, 15, and 19) Bannister, Zhou, Welty, and Korb (Claims 13, 18, and 22)

Petitioner asserts that claims 1, 2, 5, 7, 8, 12, 14, 15, and 19 would have been obvious in view of Bannister, Zhou, and Welty. Pet. 64–81. Petitioner asserts that claims 13, 18 and 22 would have been obvious in view of Bannister, Zhou, Welty, and Korb. *Id.* at 82–85. At a high level, and focusing on claim 1, Petitioner asserts that Bannister discloses each claim limitation except for a conical first step surface, which is instead allegedly taught in Zhou or Welty. *See id.* at 68–69. We first provide a brief overview of the asserted art and ground, then our analysis.

1. Bannister (Ex. 1006)

Bannister is directed to a twist drill bit, where the tip of the bit is ground such that it presents a series of increasingly sized steps. Ex. 1006, 1, 1:1–17. Figures 1 and 2 of Bannister are reproduced below.

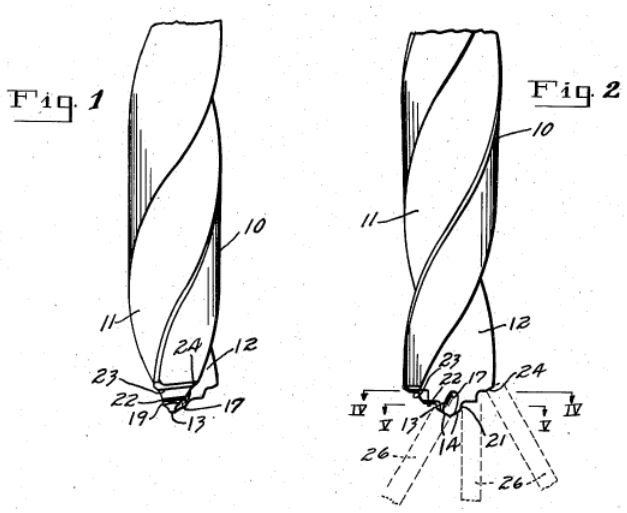


Figure 1 of Bannister, on the left, shows the working end of a twist drill bit, most notably depicting that cutting surface 21 has radial relief. *Id.* at 2, 1:72–2:6. Figure 2 of Bannister, on the right, depicts the same twist drill bit as Figure 1, but rotated 90°, and more clearly shows the series of cutting edge surfaces. *Id.* at 2, 1:27–40. Ghosted outlines 23 show how the drill bit is cut in order to form the steps. *Id.* at 2, 2:19–24. Notably, the first step is cut such that it is normal to the axis of rotation, whereas the last step is cut to form a conical section. *Id.* at 2, 1:72–2:6.

2. Zhou (Ex. 1007), Welty (Ex. 1008)

Zhou and Welty are provided for their depictions of conical sections at the tip of a drill bit. Below, Figure 1 of Welty is reproduced on the left and Figure 1 of Zhou is reproduced on the right.

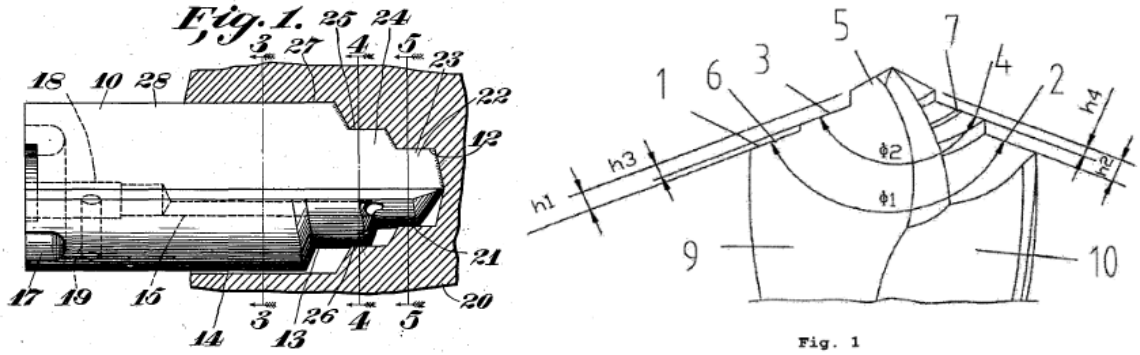


Figure 1 of Welty, on the left, depicts the tip of a drill bit with a series of conical steps. Figure 1 of Zhou, on the right, depicts a spirally wound cutting tip having a conical profile.

3. Korb (Ex. 1012)

Figure 7 of Korb is reproduced below.

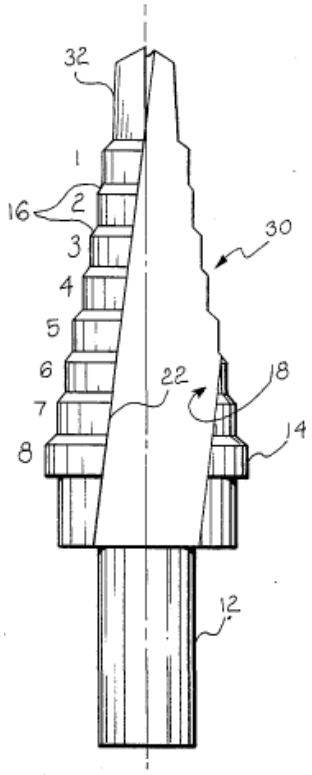


Figure 7 of Korb depicts a step drill bit, particularly having split-tip pilot drill point 32. Ex. 1012, 3:21–27.

4. Petitioner's Ground

Petitioner asserts that Bannister discloses a drill bit satisfying each limitation of claim 1 except for the conical first step surface, which instead in Bannister is formed perpendicular to the axis of rotation. Pet. 68. Petitioner notes that the other first step surface in Bannister is conical, and asserts that it would have been obvious to modify Bannister's perpendicular step surface to be conical in order to reduce drilling resistance, as taught in Zhou and Welty. *Id.* at 68–69. Petitioner asserts that use of such conical step surfaces are a common and well-known technique used to reduce cutting edge wear and resistance. *Id.* at 69 (citing, e.g., Ex. 1004 ¶ 203).

5. Analysis

We have reviewed Patent Owner's arguments regarding the Bannister-Zhou-Welty ground and find them unpersuasive on this record. Patent Owner's arguments regarding this ground chiefly argue the references in isolation and are, for that reason, unpersuasive. Prelim. Resp. 21–27. In particular, as we noted above, Petitioner proposes to incorporate certain features into Bannister for particular reasons, and Patent Owner does not address that position. Patent Owner does offer an argument that a person of ordinary skill in the art would not modify Bannister's cutting edge because Bannister specifically requires the first cutting edge to be perpendicular. *Id.* at 24. Again, however, Petitioner has offered particular reasons why a person of ordinary skill in the art would have modified Bannister, and Patent Owner's argument, unsupported by evidence, does not address that position. On this record, Petitioner has established a reasonable likelihood that a person of ordinary skill in the art would have considered it obvious to modify Bannister as taught in Zhou and Welty in order to, for example, reduce drilling resistance.

With respect to Petitioner's Bannister-Zhou-Welty-Korb ground, Patent Owner again merely argues the references in isolation and does not address Petitioner's stated ground. Prelim. Resp. 27–29. In this ground, however, Patent Owner also offers what appears to be arguments regarding objective indicia of non-obviousness. *Id.* at 29–31. Patent Owner's analysis here, however, would benefit from development during trial. For example, Patent Owner offers no nexus analysis for any of the alleged objective indicia. *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016) ("[T]here is no nexus unless the evidence presented is 'reasonably

commensurate with the scope of the claims.'") (quoting *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)). Patent Owner appears to assert that there were unexpected benefits to the claimed invention, but its analysis is underpinned by what appears to be an interested party (a business partner, *see* Ex. 2002 ¶ 2), rather than, for example, a person with knowledge of the level of ordinary skill in the art. Prelim. Resp. 29; *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 294 (Fed. Cir. 1985) (noting that a witness's interest in the outcome of the case is a factor in assessing the probative value of a witness's opinion). Patent Owner mentions Matco Tools, Hyper-Step, and Tsteigen, Inc., but fails to establish the relationship between Patent Owner and these entities, and fails to establish that any of their devices read on the claimed invention.[12] Prelim. Resp. 29. Patent Owner discusses exhibits that appear to be offered as praise, but we have no record of what was said in any of the various videos cited. *Id.* at 29–30; *In re Am. Acad. Of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) ("[T]he Board is entitled to weigh the declarations and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations."); *see also* 37 C.F.R. § 42.63(a) ("Evidence consists of

[12] Patent Owner alternatively describes the Hyper-Step drill bits as belonging to the inventor or Matco. *See, e.g.*, Prelim. Resp. 29 (describing "Mr. Wang's patented Hyper-Step drill bits" but then "Matco's patented DH29HSG Hyper-Step drill bits"). Patent Owner also discusses "Mr. Wang and *his company*, Tsteigen, Inc." (*id.* at 31, emphasis added). Altogether, Patent Owner's statements make it hard to weigh the value of the evidence as it relates to the '583 patent, and also potentially makes it unclear who might be the real party in interest.

affidavits, transcripts of depositions, documents, and things.").[13] Patent Owner asserts that it was awarded a prize, but offers no evidence that tells us why or how the prize was awarded (e.g., criteria for evaluation), let alone that it was awarded to Patent Owner or regarding something resembling the claimed invention. Prelim. Resp. 30; *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) ("For objective evidence of secondary considerations to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the *claimed invention*." (bracketing and citation omitted)). Similarly, Patent Owner asserts that various entities have copied its design, but it provides no analysis that would tend to show that any of the designs are similar to the claimed invention, let alone that they have *copied* the claimed invention. Prelim. Resp. 30; *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1028 (Fed. Cir. 1985) ("more than the mere fact of copying . . . is needed to make that action significant to a determination of the obviousness issue"), *overruled on other grounds by Midwest Indus., Inc. v. Karavan Trailers, Inc.*, 175 F.3d 1356, 1358–61 (Fed. Cir. 1999) (en banc); *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) ("Not every competing product that arguably falls within the scope of a patent is evidence of copying. Otherwise every infringement suit would automatically confirm the nonobviousness of the patent."). Although we consider all evidence offered as objective indicia, the evidence offered as

[13] With reference to 37 C.F.R. § 42.63(a), we note that although an exhibit containing a picture of a video ostensibly qualifies as a *document*, that document contains no information about what was said or shown in the video. Further, we do not consider a video a *thing*, which we would instead understand to be a physical object.

objective indicia as it now stands provides little to no reason to come to a different conclusion regarding the likelihood that Petitioner will show that the challenged claims would have been obvious.

IV. CONCLUSION

As explained above, we find that Petitioner has established a reasonable likelihood of success in showing that claim 1 would have been obvious in view of Wang, Gentry, and Durfee. Accordingly, we institute *inter partes* review on all challenged claims on all asserted grounds. 37 C.F.R. § 42.108(a) ("When instituting . . . review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.").

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that an *inter partes* review of claims 1, 2, 5, 7, 8, 12–15, 18, 19, and 22 of the '583 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of the '583 patent is hereby instituted commencing on the entry date of this Decision, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

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