

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIKING DRILL & TOOL, INC.,
Petitioner,

v.

HONGJIA WANG,
Patent Owner.

IPR2023-00474
Patent 11,007,583

Before WILLIAM V. SAINDON, JAMES J. MAYBERRY, and
CYNTHIAL. 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 1, “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 11² (“Prelim. Resp.”).

We have authority 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).

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 11 is a Corrected Preliminary Response, fixing some informalities in the originally submitted Preliminary Response (Paper 9).

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 13, 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 13, 1; Pet. 5. The '583 patent is also the subject of IPR2023-00473, 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

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, 8, 13–15, 19	102	Zhou
1, 2, 5, 7, 8, 12–15, 18, 19, 22	103	Zhou, Bannister, Gentry, Durfee
1, 2, 7, 19, 22	103	Welty, Bannister, Durfee, Korb
5, 8, 12–15, 18	103	Welty, Bannister, Durfee, Korb, Zhou

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 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.

³ We use Petitioner’s added pagination for Exhibit 1017.

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 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 drill that is configured like step drill bit. Figure 3, reproduced below, is illustrative.

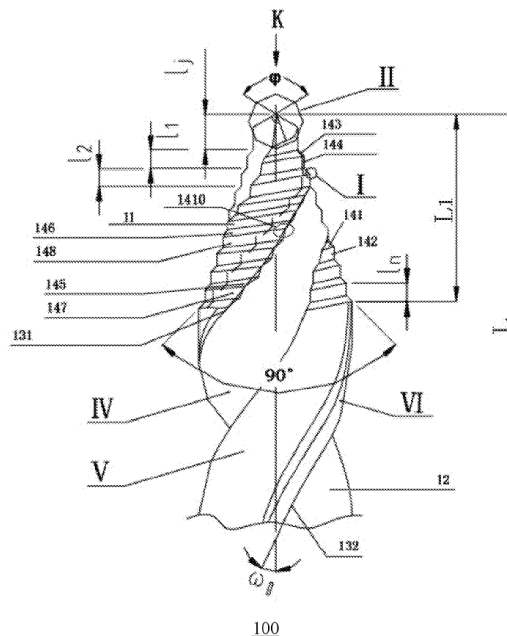


Figure 3 of the '583 patent depicts a cone portion (L1) at the end of a cylindrical portion of a twist drill bit. The cone portion is formed by a series

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 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.

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

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

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 could have been raised in this IPR” (Pet. 91), we do not discretionarily deny institution under *Fintiv*, for the reasons set forth in the Director’s Memo.

B. Multiple Petitions

Patent Owner asserts we should deny because Petitioner filed 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 2. 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. We have a dispute over the priority date of the ’583 patent as it relates to the Wang reference in IPR2023-00473. This issue is not present here. 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=Tri alPracticeGuideConsolidated>.

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 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 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 (internal citations omitted); *see also* 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. 1021⁶). 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 litigation infringement contentions similarly indicate that “spirally” means that the cutting blade groups are “slanted,” i.e., not perpendicular to the rotational

⁶ The parties do not indicate whether the district court has issued a claim construction order.

axis. *Id.* at 21–22. Petitioner further asserts that a cutting surface with axial relief⁷ 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.” *Id.* 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.

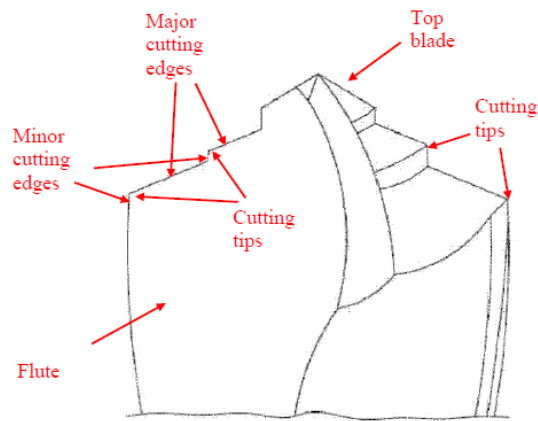
*D. Asserted Anticipation by Zhou
(Claims 1, 2, 5, 8, 13–15, and 19)*

Petitioner asserts that claims 1, 2, 5, 8, 13–15, and 19 are anticipated by Zhou. Pet. 36–52. We first provide a brief overview of the asserted art and ground, then our analysis.

⁷ *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.

1. *Zhou (Ex. 1007)*

Petitioner provides a marked-up version of Figure 3 of Zhou, reproduced below.



Pet. 42. Figure 3 depicts a twist drill bit with the conical section at the end. The conical section is labeled with a top blade and several cutting tips identified as having major and minor cutting edges.

2. *Analysis of Petitioner's Ground*

We focus our analysis on claim 1. With respect to claim 1, Petitioner addresses how each limitation is met. Pet. 46–58. Patent Owner disputes that claim 1 is anticipated. Prelim. Resp. 13–15. Patent Owner first argues that Zhou is not operative. *Id.* at 13–14. Specifically, Patent Owner asserts that Zhou's configuration would lead to wobble, but even assuming that is so, it is unclear why that would mean Zhou is not operative. It would still cut a hole, presumably, especially if used in a drill press or similar machine. Patent Owner next argues that Zhou does not teach “spirally oriented cutting edges.” *Id.* at 14. However, Patent Owner does not identify which claim limitations are not met. Based on our claim construction above, the “spirally” limitations appear to be referring to the angle of the cutting surface relative to the rotational axis, e.g., axial relief. Patent Owner's

argument, on the other hand, appears to be discussing something different, where the edges of the cutting tips are compared to their angle around the rotational axis of the drill bit.⁸ Accordingly, Patent Owner's argument does not appear to be directed to any particular language required in claim 1. Patent Owner also asserts that Zhou does not disclose the cone portion of claim 1, but beyond simply asserting it is so, Patent Owner doesn't present any arguments (e.g., a claim construction) that would explain why Petitioner's identification of the cone portion in Zhou is deficient. At least facially, the tip of Zhou's drill bit appears conical (e.g., the tip of the two-dimensional image of the bit shown in Figure 1 appears generally triangular). *See, e.g.*, Ex. 1007, Fig. 1.

3. Conclusion for Zhou Anticipation Ground

Reviewing the Petition and the Preliminary Response, we find that Petitioner has sufficiently identified where Zhou discloses each limitation of claim 1. Accordingly, we determine that Petitioner has established a reasonable likelihood of showing that claim 1 is anticipated.

E. Alleged Obviousness in View of Zhou, Bannister, Gentry, and Durfee (Claims 1, 2, 5, 7, 8, 12–15, 18, 19, and 22)

Petitioner's Zhou-based obviousness ground, as it relates to claim 1, provides a backup position to the extent that Zhou is not considered to teach spirally formed cutting blade groups. Pet. 56–57. To that end, Petitioner

⁸ We note that claim 1 requires a “spiral flute,” but it is not clear on this record that a spiral flute could not have a straight cutting edge. *See, e.g.*, Ex. 1001, Figs. 1A–C (depicting a twist drill with spiral flutes and a straight cutting blade).

offers Bannister to teach spirally formed cutting blade groups (e.g., axial relief). *Id.*

Patent Owner's argument regarding the Zhou obviousness ground focuses on Zhou and Bannister not teaching a cone portion, but similar to the Zhou anticipation ground, it fails to explain how Zhou or Bannister's seemingly conically shaped tips are not a cone portion as claimed. Prelim. Resp. 16–17.

Patent Owner also argues that it was not obvious to combine features of a step drill bit in a twist drill bit. Prelim. Resp. 18. For example, Patent Owner asserts that prior to the '583 patent, it was necessary to drill a pilot hole then switch out to larger diameter bits. *Id.* at 18–19. The record indicates that this problem was recognized and solutions were offered long ago. For example, Bannister describes how a small hole needed to be drilled first before a larger hole, which could lead to quality problems. Ex. 1006, 2, 1:65–2:31. Bannister's solution was to provide a tip that presented a series of wider drilling units in a single bit. *Id.* at 2, 2:31–49. Similarly, Gentry teaches that it was known to use step drill bits for the benefit of having one bit instead of having to swap out multiple bits. Ex. 1010, 1:16–23. As stated in one textbook, an advantage of twist drills with a helical point (i.e., cone tip) “include[s] a self-centering capability and some reduction of thrust. Their use also results in better hole geometry and improved hole size.” Ex. 1017, 49. Thus, we are not persuaded on this record that it was unknown to combine the features of various types of drill bits.

Patent Owner also makes assertions regarding objective indicia of non-obviousness (Prelim. Resp. 19–21), but these miss the mark for the

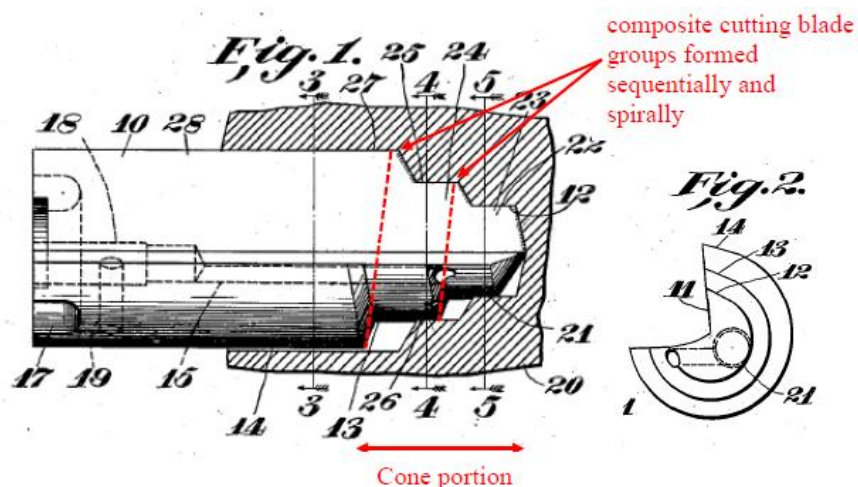
reasons we discussed in IPR2023-00473, issued concurrently with this Decision.

*F. Alleged Obviousness in View of Welty, Bannister, Durfee, and Korb
(Claims 1, 2, 7, 19, and 22)*

*Alleged Obviousness in View of Welty, Bannister, Durfee, Korb, and
Zhou
(Claims 5, 8, 12–15, and 18)*

Petitioner asserts that claims 1, 2, 7, 19, and 22 would have been obvious in view of Welty, Bannister, Durfee, and Korb. Pet. 68–82. Petitioner also asserts that claims 5, 8, 12–15, and 18 would have been obvious in view of Welty, Bannister, Durfee, Korb, and Zhou. *Id.* at 83–88. We focus our analysis on independent claim 1.

Petitioner asserts that Welty teaches each limitation of claim 1, with the exception that Welty discloses a straight flute rather than the claimed spiral flute. *Id.* at 70. Reproduced below is Figure 1 of Welty, with Petitioner's annotations, as well as Figure 2 of Welty.



Pet. 72; Ex. 1008, Fig. 2. Figure 1, on the left, is a plan view of the drill bit, shown inside the material being drilled. Ex. 1008, 1, 1:26–27.⁹ Petitioner has identified a cone portion at the tip, wherein composite cutting blade groups have been formed sequentially and spirally into a tapered point. Pet. 72. Figure 2, on the right, is an end view of the drill bit of Figure 1. Ex. 1008, 1, 1:28–29. Notably, the cutting edge is adapted to a single position with respect to the axis of rotation, i.e., with a straight flute. *Id.* at Fig. 2.

Although Welty discloses a straight flute, Petitioner asserts that spiral flutes were well-known in the art, especially for evacuation of chips. Pet. 70 (citing Ex. 1004 ¶¶ 212–213). Petitioner also points out that Korb discloses that, even for a given drill bit design, one had a choice of cutting flutes spirally or longitudinally at a fixed angle. *Id.* (citing Ex. 1012, 2:41–44). Accordingly, Petitioner asserts that it would be obvious to modify Welty’s straight flute to be a spiral flute. *Id.* at 70–71.

Petitioner also asserts that, to the extent Welty does not disclose “spirally” formed cutting blade groups, Bannister and Durfee disclose this feature and it would have been obvious to use such a shape to provide axial relief. *Id.* at 72–73; *see also* Ex. 1006, 2, 1:72–2:6 (stating that “the plane of the surface behind each edge is inclined to the axis of the drill, as shown in Fig. 1, in order to provide axial clearance for the drill”), Fig. 1; Ex. 1011, Fig. 2, 11:27–53 (describing making each step section to have a helical pitch in order to provide axial relief).

Patent Owner argues against the Welty obviousness grounds. Prelim. Resp. 21–24. Patent Owner argues that Welty does not teach the cutting tips

⁹ Our citation format for this older style of patent will be: Ex.<exhibit number>, <original page>, <column number on page>:<lines>.

arranged in a spiral pattern. *Id.* at 22. However, as with the Zhou ground discussed above, it is not clear what claim limitation Patent Owner is addressing here, as it is not apparent how claim 1 specifies the location of the cutting blade edges relative to their angular position around the axis of rotation.

Patent Owner also argues that the drill bits of the prior art references are different types, and for that reason a person of ordinary skill in the art would not combine their features. *Id.* at 23–24. However, this argument does not address the fact that Petitioner has provided specific reasons to combine the noted features, which Patent Owner fails to address.

IV. CONCLUSION

As explained above, we find that Petitioner has established a reasonable likelihood of success in showing that claim 1 would have been anticipated by Zhou. 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

IPR2023-00474
Patent 11,007,583

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.

IPR2023-00474
Patent 11,007,583

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