

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MINNESOTA**

TSTEIGEN, INC. and HONGJIA WANG,	)	
	)	
Plaintiffs,	)	
	)	No. 21-cv-2759 (KMM/JFD)
v.	)	
	)	
VIKING DRILL & TOOL, INC.,	)	JURY TRIAL DEMANDED
	)	
Defendant.	)	
	)	

**DEFENDANT, VIKING DRILL AND TOOL, INC.’S INVALIDITY AND PRIOR
ART STATEMENT AND CLAIM CHARTS CONCERNING CLAIMS 15, 18-19,
22 OF U.S. PATENT NO. 11,007,583**

Pursuant to Paragraphs 1(a) and 1(b) (Discovery Relating to Validity and Prior art) of the Court’s Pretrial Case Management Order (D.I. 21) (“Case Management Order”), Defendant, Viking Drill & Tool, Inc. (“Viking”) hereby serves the following invalidity and prior art contentions and claim charts (“Invalidity Contentions”) on Plaintiffs, Tsteigen, Inc. and Hongjia Wang (collectively “Plaintiffs”) relating to newly asserted claims 15, 18-19, 22 of U.S. Patent No. 11,007,583 (“the ’583 patent”).

Viking contends that the prior art discussed herein render asserted claims 15, 18-19, 22 of the ’583 patent invalid under 35 U.S.C. §§ 102 and 103. Exemplary prior-art citations and statements explaining the invalidity of the asserted claims 15, 18-19, 22 of the ’583 patent are specified in the following disclosure and claim charts. Viking also provides exemplary combinations of prior art and the motivation to combine such references for purposes of Viking’s obviousness defenses. Such combinations are exemplary, and Viking reserves the right to rely on any combination or combinations of

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Pursuant to Paragraphs 1(a) and 1(b) (Discovery Relating to Validity and Prior art) of the Court’s Pretrial Case Management Order (D.I. 21) (“Case Management Order”), Defendant, Viking Drill & Tool, Inc. (“Viking”) hereby serves the following invalidity and prior art contentions and claim charts (“Invalidity Contentions”) on Plaintiffs, Tsteigen, Inc. and Hongjia Wang (collectively “Plaintiffs”) relating to newly asserted claims 15, 18-19, 22 of U.S. Patent No. 11,007,583 (“the ’583 patent”).

Viking contends that the prior art discussed herein render asserted claims 15, 18-19, 22 of the ’583 patent invalid under 35 U.S.C. §§ 102 and 103. Exemplary prior-art citations and statements explaining the invalidity of the asserted claims 15, 18-19, 22 of the ’583 patent are specified in the following disclosure and claim charts. Viking also provides exemplary combinations of prior art and the motivation to combine such references for purposes of Viking’s obviousness defenses. Such combinations are exemplary, and Viking reserves the right to rely on any combination or combinations of

the prior art references cited or discussed in these disclosures. Viking has produced prior art references with its July 13, 2022 Invalidity and Prior Art Statement, and provided a sample of the Viking 00714, 00693 and 00694 drills per Plaintiffs' request during parties' September 15, 2022 meet and confer. Viking contemporaneously produces with this submission additional prior art references.

Viking further contends that asserted claims 15, 18-19, 22 of the '583 patent are invalid under 35 U.S.C. § 112 as being indefinite, and/or for lack of written description and/or enablement.

To the extent these contentions contain any information that may be protected from discovery under the attorney-client privilege, the attorney work-product immunity or any other applicable privilege or immunity, such disclosure is inadvertent and does not, nor is it intended to, constitute a waiver of any such privilege or immunity.

I. GENERAL STATEMENTS

A. Claim Construction

These Invalidity Contentions should not be interpreted as a statement of Viking's position with regard to the proper claim construction of any claim term. Instead, Viking has made certain assumptions, to the extent necessary and appropriate, with respect to the meaning of claim terms for the purpose of these Invalidity Contentions, including any claim terms that are indefinite. By making these assumptions, Viking does not admit that any claim language satisfies 35 U.S.C. § 112. Likewise, the use of claim terms herein should not be understood to suggest or imply a common, usual, ordinary, customary, plain, or accepted meaning in the art for any such term. To the extent Plaintiffs have

purported construction of claim limitations in the Supplemental Infringement Contentions and their application of those apparent constructions, nothing in these contentions and claim charts should be construed as endorsing any position taken by Plaintiffs. To the extent Viking determines that a different meaning is appropriate for any claim term, or that any claim term does not constitute a claim limitation, Viking reserves the right to assert that meaning in connection with claim construction proceedings.

B. Ongoing Discovery and Disclosures

Discovery in this case is in its early stages, and Viking's investigation, including Viking's search for prior art, is ongoing. Viking bases these Invalidity Contentions on information in their possession as of the date of these Contentions, including Plaintiffs' Complaint, Plaintiffs' statements in the Joint Rule 26(f) Report, and Plaintiffs' Patent Infringement Contentions dated June 1, 2022 as supplemented on July 8, 2022, and Plaintiffs' Second Supplemental Patent Infringement Contentions dated September 21, 2022, as modified by the parties' September 30, 2022 agreement, to assert infringement of claims 15, 18-19, 22 of the '583 patent. Viking reserves the right, subject to the Case Management Order, to further supplement or alter the positions taken and information disclosed in these Invalidity Contentions including, without limitation, the prior art and grounds of invalidity set forth herein, to consider information or defenses that may come to light as a result of these continuing efforts.

Moreover, because expert discovery has not started, Viking reserves the right, subject to the Case Management Order, to amend these Invalidity Contentions as a result of new information disclosed through the parties' experts. Therefore, Viking reserves all

rights to further supplement or amend these Invalidity Contentions if and when further information becomes available. These Invalidity Contentions are provided without prejudice to the rights of Viking to introduce at trial any subsequently discovered evidence or expert opinions relating to currently known facts and to produce and introduce at trial all evidence, whenever discovered, relating to the proof of subsequently discovered facts. Moreover, facts, documents and things now known may be imperfectly understood and, accordingly, such facts, documents and things may not be included in the following Invalidity Contentions. Viking reserves the right to conduct discovery with reference to, or offer into evidence at the time of trial, any and all facts, expert opinion testimony, documents and things notwithstanding the written statements herein. Viking further reserves the right to refer to, conduct discovery with reference to, or offer into evidence at the time of trial, any and all facts, documents and things that are not currently recalled but might be recalled at some time in the future.

The information set forth below is provided without in any manner waiving: (1) the right to object to the use of any statement for any purpose, in this action or any other actions, on the grounds of privilege, relevance, materiality, or any other appropriate grounds; (2) the right to object to any request involving or relating to the subject matter of the statements herein; or (3) the right to revise, correct, supplement or clarify any of the statements provided below at any time.

Viking's invalidity positions in these contentions may be in the alternative and do not constitute any concession or admission by Viking for purposes of invalidity, enforceability, claim construction, and/or infringement. *See, e.g., Vanmoor v. Wal-Mart*

Stores, Inc., 201 F.3d 1363, 1366 (Fed. Cir. 2000). For example, Viking’s Section 112 arguments may be in the alternative to Viking’s obviousness arguments and should not be viewed, in any way, to be concessions about the prior art or knowledge of one of ordinary skill in the art.

C. Prior Art Identification and Citation

It should be recognized that a person of ordinary skill in the art (“POSA”) would generally read a prior art reference as a whole and in the context of other publications, literature, and general knowledge in the field. To understand and interpret any specific statement or disclosure in a prior art reference, a POSA would rely upon other information including other publications and general knowledge relevant to the subject matter of asserted claims 15, 18-19, 22 of the ’583 patent. Viking therefore reserves the right to rely upon other unidentified portions of the prior art references, other publications, other relevant knowledge and expert testimony to provide context and to aid understanding and interpretation of any identified portions. Viking also reserves the right to identify additional art that is not part of the combinations upon which it relies but demonstrates the state of the art. For example, Viking reserves the right to rely on additional references including general references texts that describe the machining processes, cutting/drilling tool engineering and the characteristics and operation of machining tools. Viking also reserves the right to rely upon other portions of the prior art references, other publications, and the testimony of experts to establish that the alleged inventions were inherently disclosed in the prior art and/or would have been obvious to a POSA, including on the basis of modifying or combining certain cited references.

Viking hereby incorporates by reference any rejections made by the Patent and Trademark Office (“PTO”) during the prosecution of the applications, including leading to addition of claims 15-22 to the ’583 patent, and in *Ex parte* Reexamination Proceeding No. 90/014,941. Subject to the Case Management Order, Viking reserves the right to assert any art cited in the prosecution history of all Asserted Claims of the Asserted Patents or related applications as a basis for contending that the Asserted Claims are invalid. Viking further identifies as prior art upon which they may rely those references identified in Information Disclosure Statements during the prosecution of all Asserted Claims of the Asserted Patents. Viking also reserves the right to rely upon any admissions relating to prior art in the Asserted Patents or their respective prosecution histories, including *Ex parte* Reexamination Proceeding No. 90/014,941 and any post grant proceedings.

In addition, Viking reserves the right to rely on all prior art and all evidence of the relevant state of the art and prior sales that may be produced by Plaintiffs.

II. RESERVATION OF RIGHTS

Subject to the Case Management Order, Viking reserves all rights to modify, amend, or otherwise supplement these invalidity contentions, including with the addition of prior art references, should further discovery, the Court’s claim construction, or other circumstances so require. Viking further reserves the right to supplement and/or amend these contentions if Plaintiffs assert claim constructions different from those relied upon by Viking; if Plaintiffs are permitted to assert additional or different infringement allegations at a later date; if Plaintiffs assert an interpretation of prior art different from

that used herein, including assertions that any limitations of asserted claims 15, 18-19, 22 of the '583 patent are not disclosed in the prior art identified herein; and based upon information, documents, things, or electronically stored information produced in this or any other action or regulatory proceeding involving any of the patents at issue in this litigation (whether by Plaintiffs or a third party to this action). Viking further reserves the right to modify, amend, or otherwise supplement these invalidity contentions, including the addition of prior art references, in accordance with the Federal Rules of Civil Procedure, the Local Rules of the Court, the Case Management Order, any agreement of the parties, or any order of the Court.

Nothing in this statement of contentions should be construed as limiting Viking's statutory rights under 35 U.S.C. § 282 to provide notice of "the country, number, date, and name of the patentee of any patent, the title, date, and page numbers of any publication to be relied upon as anticipation of the patent in suit or, except in actions in the United States Court of Federal Claims, as showing the state of the art, and the name and address of any person who may be relied upon as the prior inventor or as having prior knowledge of or as having previously used or offered for sale the invention of the patent in suit" thirty days before trial. 35 U.S.C. § 282(c).

Plaintiffs have the burden to establish that asserted claims 15, 18-19, 22 of the '583 patent are entitled to the priority date of any earlier-filed application. *See Dynamic Drinkware, LLC v. National Graphics, Inc.* 800 F.3d 1375, 1380 (Fed. Cir. 2015). To establish an earlier priority date, each earlier application in the chain must fully disclose the claimed invention by meeting all requirements of 35 U.S.C. §112. *In re NTP, Inc.*,

654 F.3d 1268, 1277 (Fed. Cir. 2011). Viking reserves the right to (i) challenge asserted claims 15, 18-19, 22 of the '583 patent's entitlement to priority to previous applications, (ii) challenge any alleged date of conception or reduction to practice; and (iii) identify additional prior art thereto.

III. INVALIDITY LEGAL STANDARDS

A. Anticipation

The law of anticipation denies patent protection for subject matter that is already known or disclosed to the public, and therefore not novel. A claim is invalid for anticipation if “a prior art reference discloses every limitation of the claimed invention, either explicitly or inherently.” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1381 (Fed. Cir. 2007). The Federal Circuit relies on the maxim “that which would literally infringe if later anticipates if earlier.” *Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368, 1378 (Fed. Cir. 2001). Further, the question of anticipation is considered from the perspective of one of ordinary skill in the art, where a reference is considered anticipatory if “it discloses the claimed invention ‘such that a skilled artisan could take its teachings in combination with his own knowledge of the particular art and be in possession of the invention.’” *In re Graves*, 69 F.3d 1147, 1152 (Fed. Cir. 1995) (quoting *In re Legrice*, 301 F.2d 929, 936 (CCPA 1962)).

B. Obviousness

Patent claims are invalid if the “differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.”

35 U.S.C. § 103(a); *see Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161–62 (Fed. Cir. 2007); *TQ Delta, LLC v. DISH Network LLC*, 929 F.3d 1350, 1360 (Fed. Cir. 2019).

Invalidity under 35 U.S.C. § 103 is a legal conclusion based on the following factual inquiries: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art at the time when the invention was made; and (4) any other evidence of obviousness or nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see also TQ Delta*, 929 F.3d at 1360 (“Obviousness is a question of law based on underlying findings of fact.”) (internal citation and quotations removed).

To determine the level or ordinary skill in the art, the relevant field of art must be identified; courts accomplish this by looking to “the nature of the problem confronting the inventor.” *Verizon Servs. Corp. v. Cox Fibernet Va., Inc.*, 602 F.3d 1325, 1338 (Fed. Cir. 2010) (quoting *Bancorp Servs., L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1375 (Fed. Cir. 2004)); *see also Ruiz v. A.B. Chance Co.*, 234 F.3d 654 (Fed. Cir. 2000) (“The determination of the level of ordinary skill in the art is an integral part of the *Graham* analysis.”). A person of ordinary skill in the identified art is presumed to have knowledge of all pertinent prior art. *Custom Accessories*, 807 F.2d at 962. “A reference qualifies as prior art for an obviousness determination under § 103 only when it is analogous to the claimed invention.” *In re Klein*, 647 F.3d 1343, 1348 (Fed. Cir. 2011); *In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986) (quoting *In re Wood*, 599 F.2d 1032, 1036 (C.C.P.A. 1979)); *see also In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992) (“A

reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.”).

The legal test for obviousness is a flexible inquiry focused on the objective reach of the claims. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-16, 419 (2007) (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”); *see also Indivior Inc. v. Dr. Reddy's Labs., S.A.*, 930 F.3d 1325, 1352 (Fed. Cir. 2019) (“obviousness demands a more expansive and flexible approach”) (internal quotations and citation removed).

Importantly, obviousness must be evaluated as of the time of invention so as not to improperly inject hindsight bias into the inquiry. *See Graham*, 383 U.S. at 36 (instructing courts to “resist the temptation to read into the prior art the teachings of the invention in issue” and “guard against slipping into use of hindsight”) (quoting *Monroe Auto Equip. Co. v. Heckethorn Mfg. & Supply Co.*, 332 F.2d 406, 412 (6th Cir. 1964)); *Para-Ordnance Mfg., Inc. v. SGS Imps. Int'l, Inc.*, 73 F.3d 1085, 1087 (Fed. Cir. 1995) (“Obviousness may not be established using hindsight . . .”). A patent may be proved obvious under the “teaching, suggestion, or motivation” (“TSM”) test “if some motivation or suggestion to combine the prior art teachings can be found in the prior art, the nature of the problem, or the knowledge of a person having ordinary skill in the art.” *KSR*, 550 U.S. at 407 (internal citation and quotation marks omitted). Conversely, “when the prior art teaches away from combining certain known elements, discovery of a

successful means of combining them is more likely to be nonobvious.” *Id.* at 416 (citing *United States v. Adams*, 383 U.S. 39, 51–52 (1966)).

An obviousness determination, however, does not require application of the TSM test. Rather, the inquiry must also “take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418–19. Moreover, a patent may be found obvious when the combination of elements was obvious to try. *Id.* at 420. When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103.

Id. at 421. Conversely, the obvious to try standard is not met when “the inventor would have had to try all possibilities in a field unreduced by direction of the prior art.” *Bayer Schering Pharma AG v. Barr Labs., Inc.*, 575 F.3d 1341, 1347 (Fed. Cir. 2009); *In re O’Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988) (foreclosing an obvious to try analysis when the patentee simply “var[ies] all parameters or tr[ies] each of numerous possible choices until [arriving] at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful”); *see also Allergan, Inc.*, 754 F.3d at 972–73.

Generally, where the limitations of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Applied Materials, Inc.*, 692 F.3d 1289, 1295 (Fed. Cir. 2012). Formulators routinely optimize such variables during development of a new formulation. *Id.*; *see also Titanium*

Metals Corp. v. Banner, 778 F.2d 775, 783 (Fed. Cir. 1985). Discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 617 F.2d 272, 276 (C.C.P.A. 1980).

Importantly, courts must consider all objective evidence of nonobviousness (also called secondary factors or considerations)—such as unexpected results, commercial success, long-felt need, licensing by competitors, and failure of others—before making an obviousness determination. *In re Cyclobenzaprine*, 676 F.3d at 1075–76. Still, the burden of production is shifted to require the patentee to produce evidence of nonobviousness, which may include objective evidence of nonobviousness, “after the challenger has successfully made his prima facie case demonstrating that the patent might be obvious.” *Novo Nordisk*, 719 F.3d at 1353. In some cases evidence of secondary considerations “simply cannot overcome a strong prima facie case of obviousness.” *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010).

C. Indefiniteness

“[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). “[A] patent must be precise enough to afford clear notice of what is claimed, thereby apprising the public of what is still open to them.” *Id.* at 2129 (quotations and citations omitted). The analysis to determine if a claim is invalid for indefiniteness examines the claims, specification, and prosecution history “to ascertain if they convey to one of skill in the art with reasonable

certainty the scope of the invention claimed.” *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1341 (Fed. Cir. 2015); *see also Horizon Pharma Ireland Ltd. v. Actavis Labs., UT, Inc.*, No. 14-7992, 2016 WL 4408990, at *8 (D.N.J. Aug. 17, 2016) (applying definiteness requirement to “consisting essentially of”).

D. Lack of Written Description

To satisfy the written description requirement, “the patent specification must clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479 (Fed. Cir. 1998) (internal quotations and citation omitted). This means that “the disclosure must. . . convey with reasonable clarity to those skilled in the art that. . . [the inventor] was in possession of the invention.” *Purdue Pharma L.P. v. Faulding Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000) (internal quotations and citation omitted) (affirming district court’s finding that the patent claims were invalid); *see also Capon v. Eshhar*, 418 F.3d 1349, 1357 (Fed. Cir. 2005); *In re Curtis*, 354 F.3d 1347, 1350-52 (Fed. Cir. 2004) (affirming Board’s finding that a prior application “did not provide an adequate written description of the later-claimed genus of friction enhancing coatings”); *Purdue Pharma L.P. v. F.H. Faulding & Co.*, 48 F.Supp.2d 420, 427 (D. Del. 1999); *Agilent Techs., Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1383 (Fed. Cir. 2009) (“[T]he purpose of the written description requirement is to prevent an applicant from later asserting that he invented that which he did not . . .”); *Centocor Ortho Biotech, Inc. v. Abbott Labs.*, 636 F.3d 1341, 1348 (Fed. Cir. 2011) (written description requirement is satisfied only if the inventor “convey[s] with reasonable clarity to those skilled in the art that, as of the filing date sought, he or

she was in possession of the invention, and demonstrate[s] that by disclosure in the specification of the patent”). Under this requirement, the patent’s specification must describe what is claimed with sufficient detail such that a person of ordinary skill in the art can conclude that “the inventor had possession of the claimed subject matter as of the filing date.” *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed Cir. 2010) (citation omitted); see also *Carnegie Mellon Univ. v. Hoffmann-La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008) (“[T]he applicant must ‘convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention,’ and demonstrate that by disclosure in the specification of the patent.” (citation omitted)).

“[T]he hallmark of written description is disclosure. Thus, ‘possession as shown in the disclosure’ is a more complete formulation.” *Ariad*, 598 F.3d at 1351. The test for written description involves an objective inquiry into whether the specification describes the invention sufficiently to allow a person of ordinary skill in the art to understand it and know that the inventor actually invented the claimed invention. *Id.* The operative time for this determination is the date of the patent’s filing. *Id.* (“The law must be applied to each invention at the time it enters the patent process, for each patented advance has a novel relationship with the state of the art from which it emerges.”). The Federal Circuit has stated that, when determining whether a patent specification complies with the written description requirement:

[T]he level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology. For generic

claims, we have set forth a number of factors for evaluating the adequacy of the disclosure, including “the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue.

Id. (quoting *Capon*, 418 F.3d at 1359). Finally, “actual ‘possession’ or reduction to practice outside of the specification is not enough ... it is the specification itself that must demonstrate possession.” *Id.* at 1352. Where the specification fails to disclose claimed features for which a POSA “would not have thought it would work,” the claims fail to satisfy the written description requirement. *Nuvo Pharmaceuticals (Ireland) Designated Activity Co. v. Dr. Reddy’s Labs. Inc.*, 923 F.3d 1368, 1377, 1381-84 (Fed. Cir. 2019) (finding “upon [the patentee’s]’ insistence as part of its obviousness analysis that ordinarily skilled artisans would not have” had a reasonable expectation of success based on the teachings of the prior art, and subsequently concluding the claims were invalid under §112 as not described “because the specification [similarly] provide[d] no experimental data or analytical reasoning showing the inventor possessed” the claimed method).

E. Lack of Enablement

An inventor is obligated to set forth in the specification “a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out of his invention.”

“To be enabling, the specification of a patent must teach those skilled in the art

how to make and use the full scope of the claimed invention without ‘undue experimentation.’” *ALZA Corp. v. Andrx Pharm., LLC*, 603 F.3d 935, 940 (Fed. Cir. 2010) (quoting *Genentech, Inc. v. Novo Nordisk, A/S*, 108 F. 3d 1361, 1365 (Fed. Cir. 1997)); *see also Nat’l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1195-96 (Fed. Cir. 1999); *In re Goodman*, 11 F.3d 1046, 1050 (Fed. Cir. 1993); 35 U.S.C. § 112, ¶ 1. “Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations,” including the quantity of experimentation necessary and the amount of direction or guidance presented. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). Enablement of one mode of practicing the invention will not satisfy the enablement requirement if the invention is broadly claimed. *Auto. Techs. Int’l, Inc. v. BMW of N. Am., Inc.*, 501 F.3d 1274, 1285 (Fed. Cir. 2007); *Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1378-79 (Fed. Cir. 2007).

Where one of ordinary skill in the art “would have been required to engage in an iterative, trial-and-error process to practice the claimed invention even with the help of the . . . specification,” the invention is not sufficiently enabled. *Wyeth & Cordis Corp. v. Abbott Labs*, 720 F.3d 1380, 1386 (Fed. Cir. 2013) (internal quotations omitted) (affirming summary judgment of invalidity for nonenablement where evaluating claimed candidate compounds would “take technicians weeks to complete” and the “specification offer[ed] no guidance or predictions about particular substitutions that might preserve” the effects of the claimed method of treatment); *see also In re ’318 Patent Infringement Litig.*, 583 F.3d at 1327 (“Thus, at the end of the day, the specification, even read in the

light of the knowledge of those skilled in the art, does no more than state a hypothesis and propose testing to determine the accuracy of that hypothesis. That is not sufficient.”).

Whether a patent complies with the enablement requirement is a question of law and is determined from the perspective of a person of ordinary skill in the art as of the filing date of the specification. *EnzoBiochem, Inc. v. Calgene, Inc.*, 188 F.3d 1362, 1371-72 (Fed. Cir. 1999). The Court must make an enablement determination “*retrospectively*, i.e., by looking back to the filing date of the patent application and determining whether undue experimentation *would have been* required to make and use the claimed invention at that time.” *Id.* Although the enablement inquiry is viewed from the perspective of a person of ordinary skill in the art, that person’s knowledge is not a “substitute for a basic enabling disclosure.” *Genentech*, 108 F.3d at 1366 (recognizing that the specification, not knowledge of a person of ordinary skill in the art, must supply novel aspects of an invention to constitute adequate enablement).

IV. ASSERTED CLAIMS 15, 18-19, 22 OF THE ’583 PATENT

The ’583 patent, titled “Twist Drill,” issued on May 18, 2021, from U.S. Application No. 16/699,089 (“the ’089 application”), which was filed on November 28, 2019. The ’583 patent claims priority as a continuation-in-part of U.S. Application No. 15/847,900 (“the ’900 application”), filed on December 19, 2017, which published as U.S. Publication No. 2018/0133808 A1, now abandoned, and a continuation-in-part of international application no. PCT/CN2016/073767, which published as WO2017/136966 A1, filed on February 14, 2016.

In *Ex parte* Reexamination Proceeding No. 90/014,941, Plaintiff Wang, submitted new claims 15-22 on April 25, 2022 in response to an April 8, 2022 Office Action. On August 4, 2022, the PTO issued a notice of intent to issue claims 15-22, which issued on August 19, 2022.

A. Effective Filing Date

Asserted claims 15, 18-19, 22 of the '583 patent claim priority as a continuation-in-part of Application No. 15/847,900 (“the ‘900 application”), filed December 19, 2017, which was a continuation¹ of PCT/CN2016/073767, filed February 14, 2016. Any claims in the Asserted Patents that are supported under 35 U.S.C. §112 by both PCT/CN2016/073767 and the '900 application have an effective filing date of February 14, 2016. On the other hand, any claims in the Asserted Patents that are not supported under 35 U.S.C. §112 by PCT/CN2016/073767 and the '900 application have an effective filing date of November 28, 2019, the filing date of the '583 patent. These are the relevant dates for the purposes of establishing prior art.²

B. Identification of Asserted Claims

Plaintiffs’ Second Supplemental Patent Infringement Contentions and Claims Charts dated September 21, 2022, as modified by the parties’ September 30, 2022

¹ While both the Asserted Patents make claim to the '900 application being a continuation-in-part of PCT/CN2016/073767, it is noted that the '900 application was filed as a continuation of PCT/CN2016/073767. See '583 patent file history, Application Data Sheet under 37 CFR 1.76 dated November 27, 2019.

² Viking reserves the right to address and challenge any arguments by Plaintiffs as to the Asserted Patents’ entitlement to priority to previous applications, and also identify additional prior art.

agreement, assert infringement of new claims 15, 18-19 and 22 of the '583 patent.

Asserted claims 15, 18-19 and 22 of the '583 patent are as follows:

15. The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.

18. The twist drill of claim 8 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.

19. The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.

22. The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.

V. PERSON OF ORDINARY SKILL IN THE ART

Viking incorporates, as if fully stated herein, its definition of a POSA provided in its July 13, 2022 Prior Art Statement and Claim Charts.

VI. SCOPE AND CONTENT OF THE RELEVANT PRIOR ART

Pursuant to Paragraph 1(a) of the Case Management Order, Viking identifies herein the prior art known at this time that it asserts invalidates, alone or in combination, each of asserted claims 15, 18-19 and 22 of the '583 patent from the perspective of a POSA. To the extent that any of the elements of asserted claims 15, 18-19 and 22 of the '583 patent are deemed missing from the references, such elements would have been known or obvious to a POSA at the time of the invention. *See KSR, Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007). Viking also incorporates by reference its statements at the outset of these contentions concerning the supplementation or amendment of these contentions.

For any prior art patents and publications identified in these Invalidity Contentions, Viking reserves the right to rely on inherency, public use, offer for sale, and/or sale of the products described in those prior art patents or publications once Viking has had an opportunity to take discovery on these subjects.

Without limiting the contents of the prior art references on which Viking relies, Viking sets forth a summary of each prior art reference below. Where elements are disclosed at multiple locations within a single prior art reference, Viking has not necessarily identified every location in that reference. Likewise, where a reference is listed for one or more claim elements, Viking has not necessarily identified every element of that claim, or claim in that patent, to which that reference applies. Viking may rely on uncited portions of the identified prior art, references identified in the prior art disclosed herein, other documents, and expert testimony. The citations to a particular Example, Table, or Figure from a reference include the caption and description and any text relating to the same. Similarly, citations to particular text referring to an Example, Table, or Figure also include the Example, Table, or Figure and caption.

Granted Patents

Name	Patent Number	Country	Date of Issue	Bates
Bannister	2,193,186	United States	March 12, 1940	VIKINGVP_00001722-1725
Wang II	D840,449	United States	February 12, 2019	VIKINGVP_00001453-1457
Nevills	5,452,971	United States	September 26, 1995	VIKINGVP_00001736-1761

Name	Patent Number	Country	Date of Issue	Bates
Durfee I	10,058,929	United States	November 10, 2015	VIKINGVP_00001663-1678
Durfee II	9,687,915	United States	June 27, 2017	VIKINGVP_00001786-1794
Gentry	8,029,215	United States	October 4, 2011	VIKINGVP_00001762-1775
Allen	9,731,358	United States	August 15, 2017	VIKINGVP_00001795-1884
Korb	4,582,458	United States	April 15, 1986	VIKINGVP_00001730-1735
Rogalla	9,539,653	United States	January 10, 2017	VIKINGVP_00001776-1785
Mackey	3,592,555	United States	July 13, 1971	VIKINGVP_00001726-1729
Ruko	DE202011106232U1	Germany	November 9, 2011	VIKINGVP_00001459-1468

Patent Application Publications

Name	Publication Number	Country	Date of Publication	Bates
Wang I	2018/0133808	United States	May 17, 2018	VIKINGVP_00001705-1721
Wetzel	2005/0053438	United States	March 10, 2005	VIKINGVP_00001679-1690
Li	2011/0116884	United States	May 19, 2011	VIKINGVP_00001691-1704
Sheldon	2405820	United Kingdom	October 8, 2003	VIKINGVP_00001496-1502
Shiqing	CN102126039	China	July 20, 2011	VIKINGVP_00001425-1443
Tec-Spiral	WO2012/167448	PCT, China	December 13, 2012	VIKINGVP_00001872-1884

Name	Publication Number	Country	Date of Publication	Bates
Zhang	WO2008/092386	PCT, China	August 7, 2008	VIKINGVP_00001858-1871

Non-Patent Literature

Name	Author	Year of Publication	Bates
Tool and Manufacturing Engineers Handbook	Society of Manufacturing Engineers	1998	VIKINGVP_00001935-2081

Products

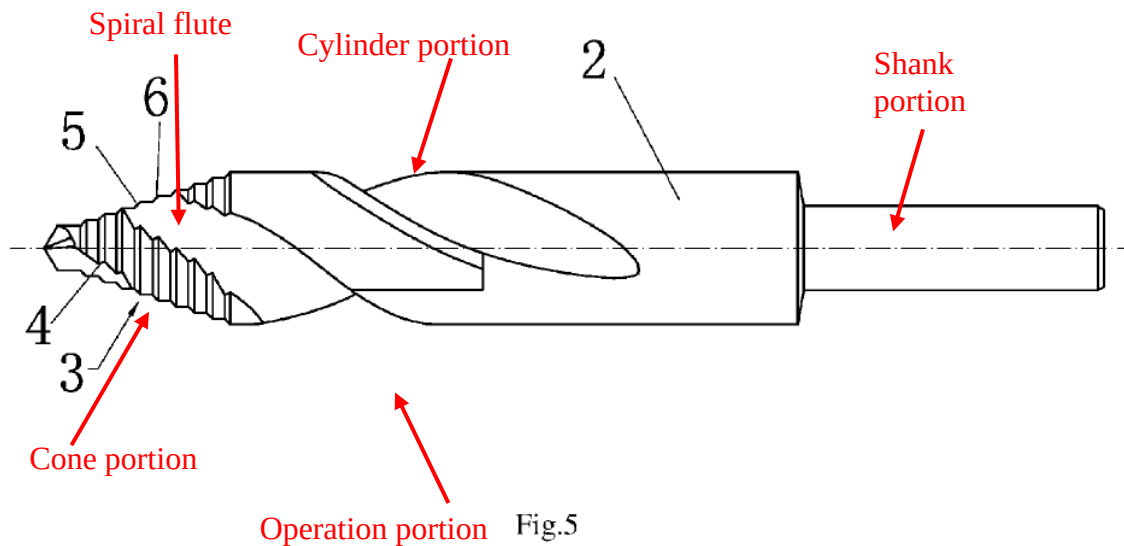
Name	Manufacturer/Seller	Public Availability (at least as early as)	Production No.
Matco Hyper-Step Drills	Matco Tools	2018	VIKINGVP_00001503-1514
Viking 00714 Drill	Viking Drill & Tool	2014	VIKINGVP_00001854-1857; VIKINGVP_00001897-1900
Viking 00693 Drill	Viking Drill & Tool	2014	VIKINGVP_00001845-1849; VIKINGVP_00001886-1889
Viking 00694 Drill	Viking Drill & Tool	2014	VIKINGVP_00001850-1853; VIKINGVP_00001893-1896

A. Granted Patents and Patent Application Publications

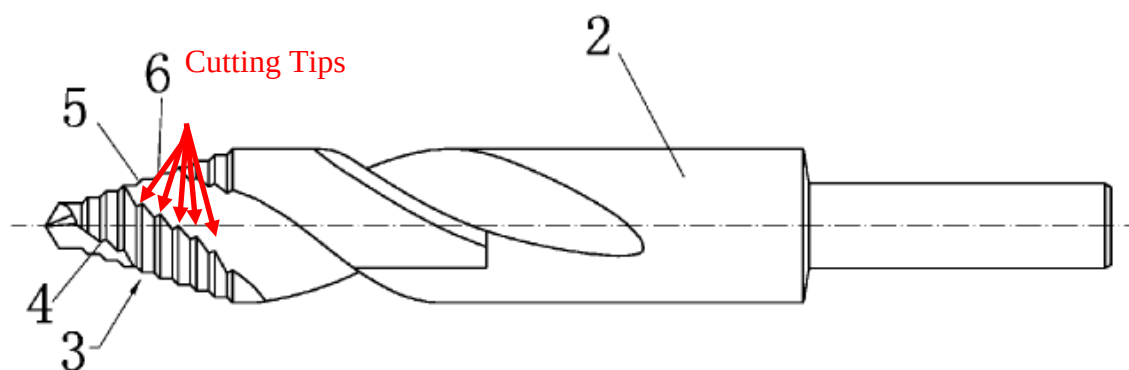
1. U.S. Patent Publication No. 2018/0133808 (“Wang I”)

Viking incorporates, as if fully stated herein, the description of U.S. Patent Publication No. 2018/0133808 (“Wang I”) provided in its July 13, 2022 Prior Art

Statement and Claim Charts. Further, Wang I discloses that the cylinder portion is longer than the cone portion. *See, e.g.*, Wang I at FIG. 5 (annotated below).



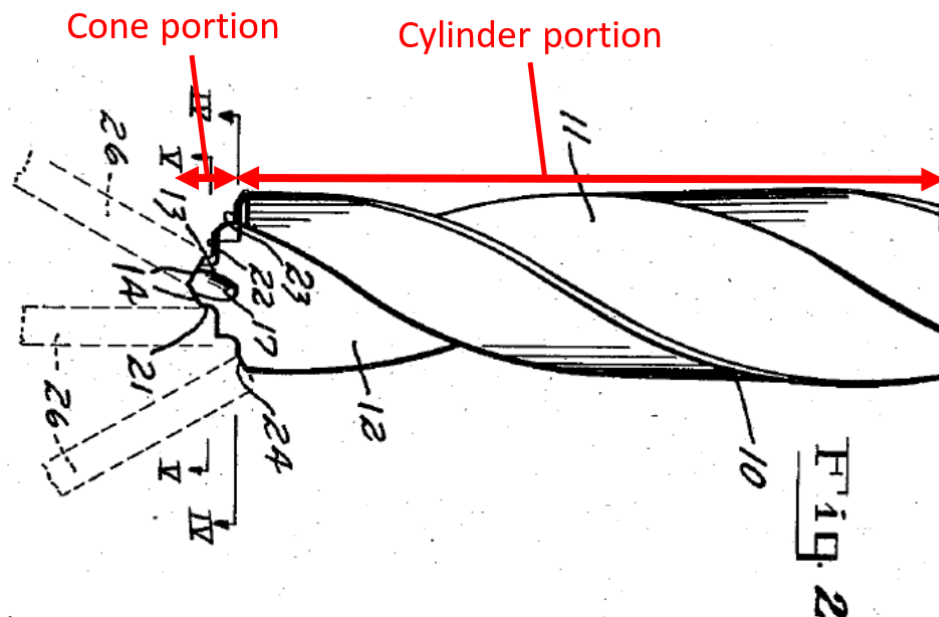
Wang I also discloses that the cutting tips of the plurality of composite cutting blade groups are formed spirally on the cone portion. *See, e.g.*, Wang I at FIG. 5 (annotated below).



2. U.S. Patent No. 2,193,186 (“Bannister”)

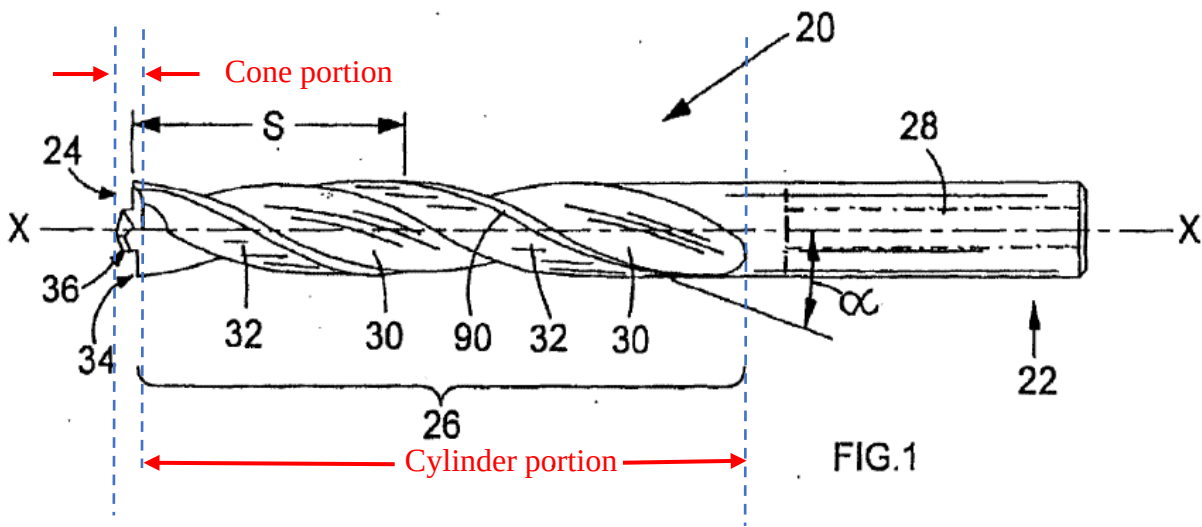
Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 2,193,186 (“Bannister”) provided in its July 13, 2022 Prior Art Statement and Claim

Charts. Further, Bannister discloses that the cylinder portion is longer than the cone portion. See, e.g., Bannister at FIG. 2 (annotated below); see also Fig. 1.



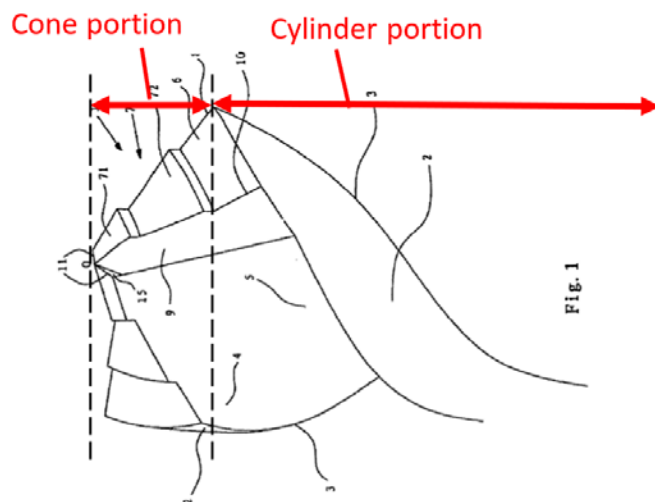
3. U.S. Patent Application Publication No. 2005-0053438 ("Wetzel")

Viking incorporates, as if fully stated herein, the description of U.S. Patent Application Publication No. 2005-0053438 ("Wetzel") provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Wetzel discloses that the cylinder portion is longer than the cone portion. See, e.g., Wetzel at FIG. 1 (annotated below).



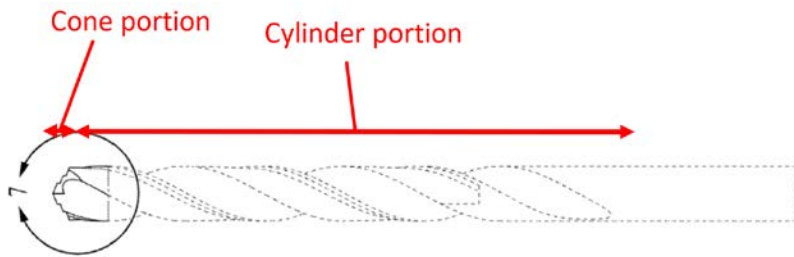
4. U.S. Patent Application Publication No. 2011-0116884 (“Li”)

Viking incorporates, as if fully stated herein, the description of U.S. Patent Application Publication No. 2011-0116884 (“Li”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Li discloses that the cylinder portion is longer than the cone portion. *See, e.g.*, Li at FIG. 1 (annotated below).



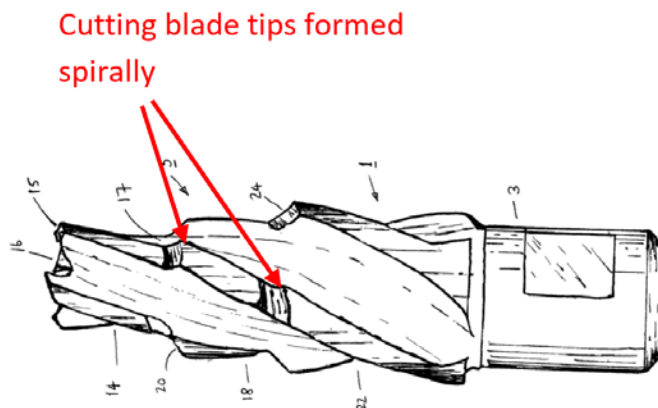
5. U.S. Design Patent No. D840,449 S (“Wang II”)

Viking incorporates, as if fully stated herein, the description of U.S. Design Patent No. D840,449 S (“Wang II”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Wang II discloses that the cylinder portion is longer than the cone portion. *See, e.g.*, Wang II at FIG. 1 (annotated below); *see also* FIGs. 2 and 3.



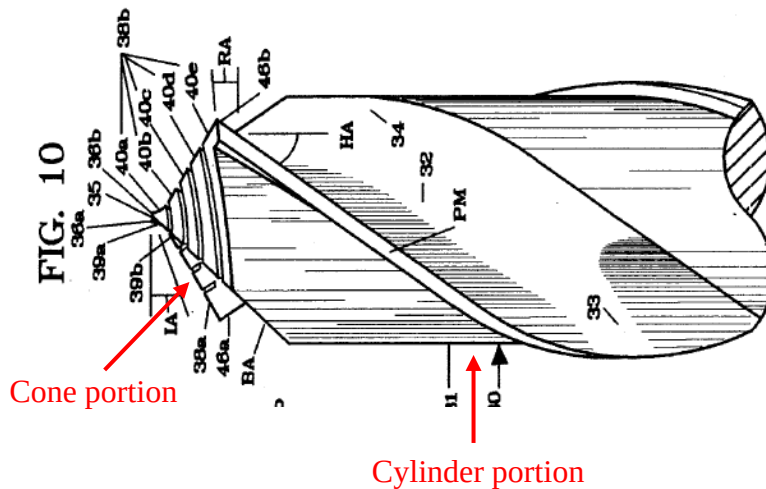
6. Great Britain Patent Application Publication No. 2405820 (“Sheldon”)

Viking incorporates, as if fully stated herein, the description of Great Britain Patent Application Publication No. 2405820 (“Sheldon”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Sheldon discloses that the cutting blade tips are formed spirally along the drill. *See e.g.* Sheldon at FIG. 1 (annotated below).



7. U.S. Patent No. 5,452,971 (“Nevills”)

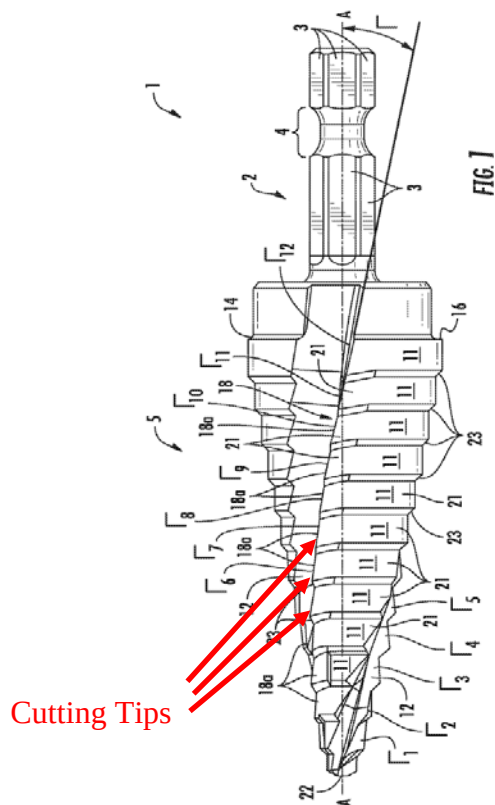
Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 5,452,971 (“Nevills”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Nevills discloses that the cylinder portion is longer than the cone portion. *See, e.g.,* Nevills at FIG. 10 (annotated below).



8. U.S. Patent No. 10,058,929 (“Durfee I”)

Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 10,058,929 (“Durfee I”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Durfee I discloses providing both radial and axial relief to the composite cutting blade groups. *See, e.g.,* Durfee I at 7:26-56, 9:66-10:11, and 11:13-12: 8.

Durfee I also discloses that the cutting tips of the plurality of composite cutting blade groups are formed spirally on the cone portion. *See, e.g.,* Durfee I at FIG. 1 (annotated below); *see also* FIG. 2.



9. U.S. Patent No. 9,687,915 (“Durfee II”)

Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 9,687,915 (“Durfee II”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Durfee II discloses providing the composite cutting blade groups with both axial and radial relief. *See, e.g.*, Durfee II at 1:50 – 2:13, and 5:45 – 7:50; FIG. 2-4.

10. U.S. Patent No. 8,029,215 (“Gentry”)

Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 8,029,215 (“Gentry”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Gentry discloses providing relief to the composite cutting blade groups. *See, e.g.*, Gentry at 1:52-2:19.

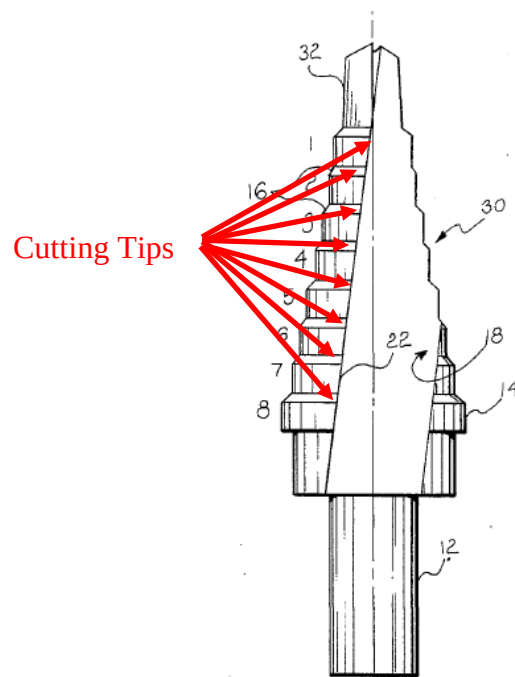
11. U.S. Patent No. 9,731,358 (“Allen”)

Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 9,731,358 (“Allen”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Allen discloses providing the composite cutting blade groups with radial and axial relief. *See, e.g.*, Allen at 2:2-3 and 6:14-58.

12. U.S. Patent No. 4,582,458 (“Korb”)

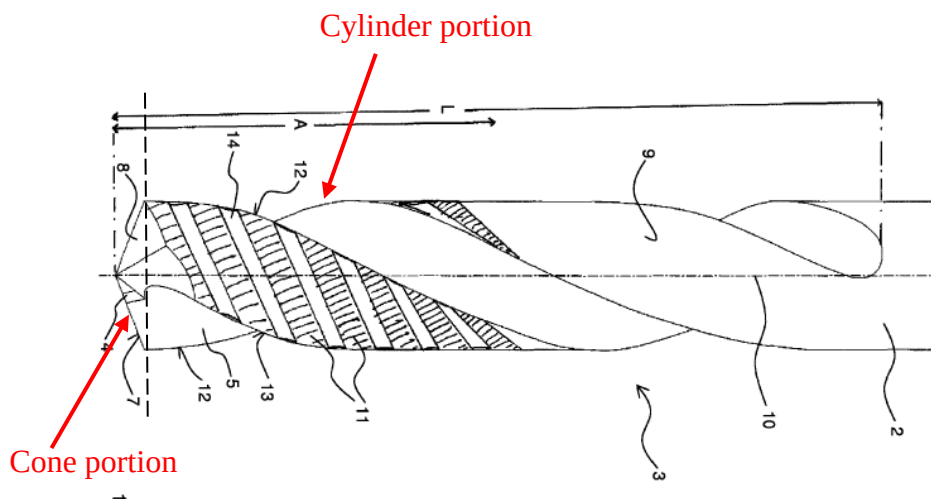
Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 4,582,458 (“Korb”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Korb discloses providing axial and radial relief to composite cutting blade groups. *See, e.g.*, Korb at 1:19-26; 1:39-47 and 2:52-59.

Korb also discloses that the cutting tips of the plurality of composite cutting blade groups are formed spirally on the cone portion. *See, e.g.*, Korg at FIG. 7 (annotated below).



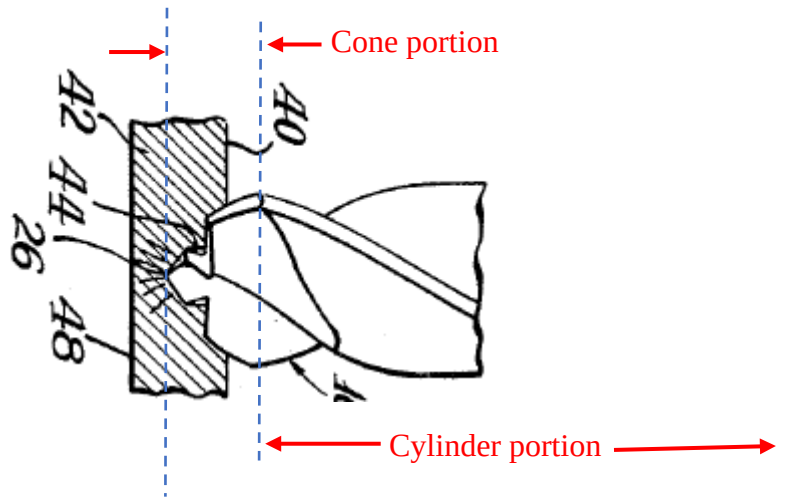
13. U.S. Patent No. 9,539,653 (“Rogalla”)

Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 9,539,653 (“Rogalla”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Rogalla discloses that the cylinder portion is longer than the cone portion. See, e.g., Rogalla at FIG. 1 (annotated below).

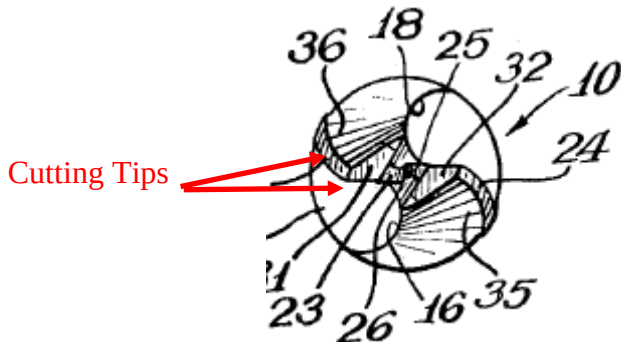


14. U.S. Patent No. 3,592,555 (“Mackey”)

Viking incorporates, as if fully stated herein, the description of U.S. Patent No. 3,592,555 (“Mackey”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Mackey discloses that the cylinder portion is longer than the cone portion. See, e.g., Mackey at FIG. 4 (annotated below).



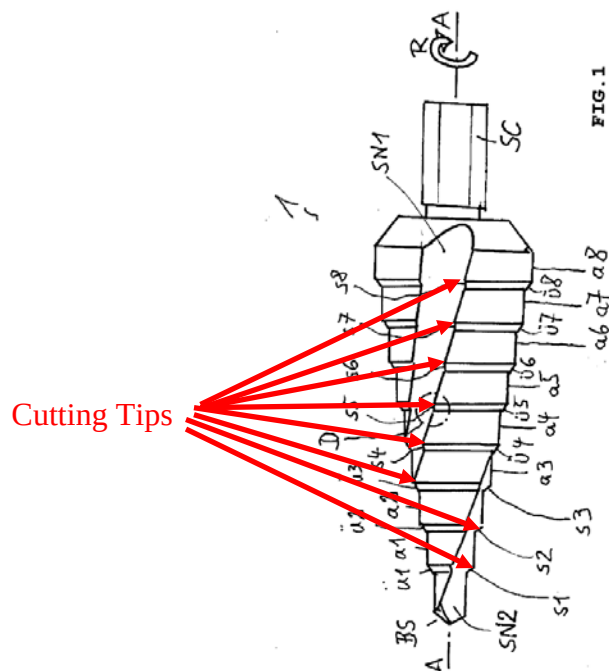
Mackey also discloses that the cutting tips of the plurality of composite cutting blade groups are formed spirally on the cone portion. See, *e.g.*, Mackey at FIG. 3 (annotated below); see also FIG. 2.



15. German Utility Patent No. 202011106232U1 (“Ruko”)

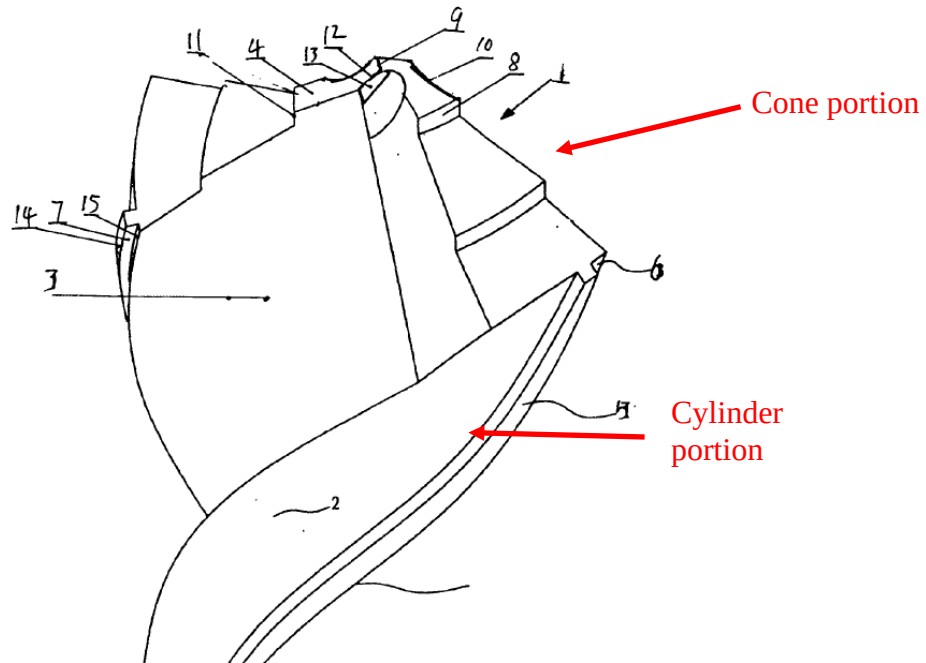
Viking incorporates, as if fully stated herein, the description of German Utility Patent No. 202011106232 (“Ruko”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Roku discloses that the cutting tips of the plurality of composite

cutting blade groups are formed spirally on the cone portion. *See, e.g.*, Roku at FIG. 1.



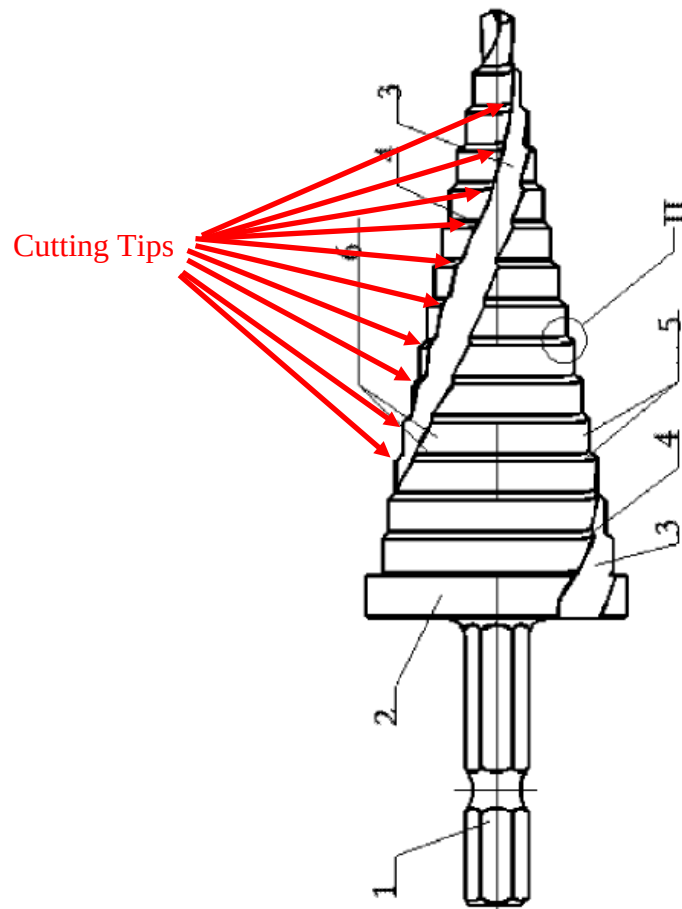
16. Chinese Patent Publication No. 102126039 (“Shiqing”)

Viking incorporates, as if fully stated herein, the description of Chinese Patent Application No. 102126039 (“Shiqing”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Shiqing discloses that the cylinder portion is longer than the cone portion. *See, e.g.*, Shiqing at FIG. 1 (annotated below).



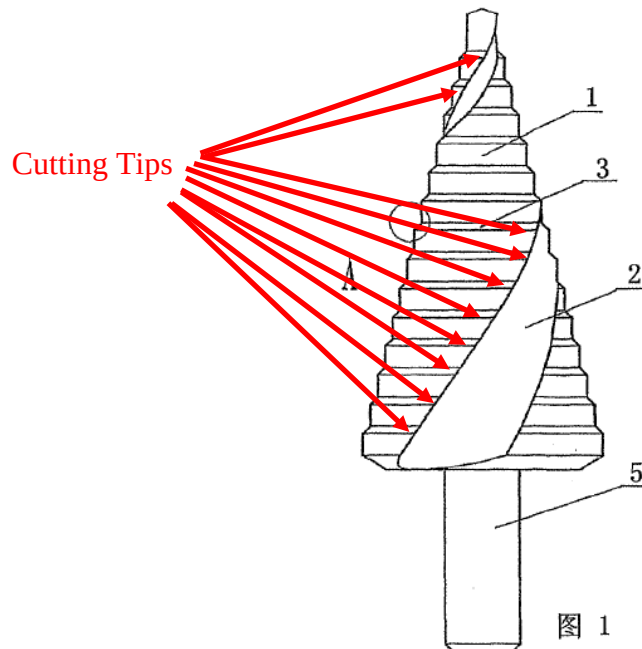
17. PCT Application Publication No. 2012/167448 (“Tec-Spiral”)

Viking incorporates, as if fully stated herein, the description of PCT Application Publication No. 2012/167448 (“Tec-Spiral”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Tec-Spiral discloses that the cutting tips of the plurality of composite cutting blade groups are formed spirally on the cone portion. *See, e.g.,* Tec-Spiral at FIG. 1 (annotated below); *see also* FIG. 2.



18. PCT Application Publication No. 2008/092386 (“Zhang”)

Viking incorporates, as if fully stated herein, the description of PCT Application Publication No. 2008/092386 (“Zhang”) provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, Zhang discloses that the cutting tips of the plurality of composite cutting blade groups are formed spirally on the cone portion. *See, e.g.*, Zhang at FIG. 1 (annotated below).

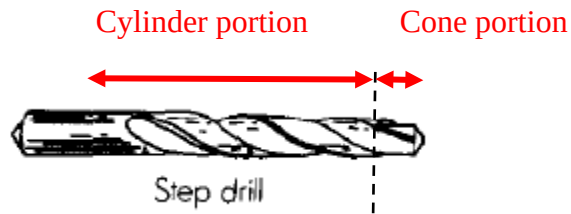


B. Non-Patent Literature

1. **Tool and Manufacturing Engineers Handbook, Vol. 1: Machining, Society of Manufacturing Engineers, Dearborn, MI, 1998, Chapter 9 – Drilling, Reaming and Related Processes (“Handbook”)**

The Tool and Manufacturing Engineers Handbook, Vol. 1: Machining, Society of Manufacturing Engineers, Dearborn, MI, 1998, Chapter 9 – Drilling, Reaming and Related Processes (“Handbook”) is an authoritative treatise on manufacturing technologies, including drilling. Twist drills are described in the subchapter “Twist Drills.” See pp. 9-14 to 9-47. Step drills are described in a subsection of “Twist Drills,” titled “Multidiameter Drills.” *Id.* at pp. 9-17 to 9-18.

FIG. 9-16 shows examples of different types of twist drills, including a step drill formed with a helical flute. The steps (cutting tips) are arranged helically along the flute and the cylinder portion is longer than the cone portion.

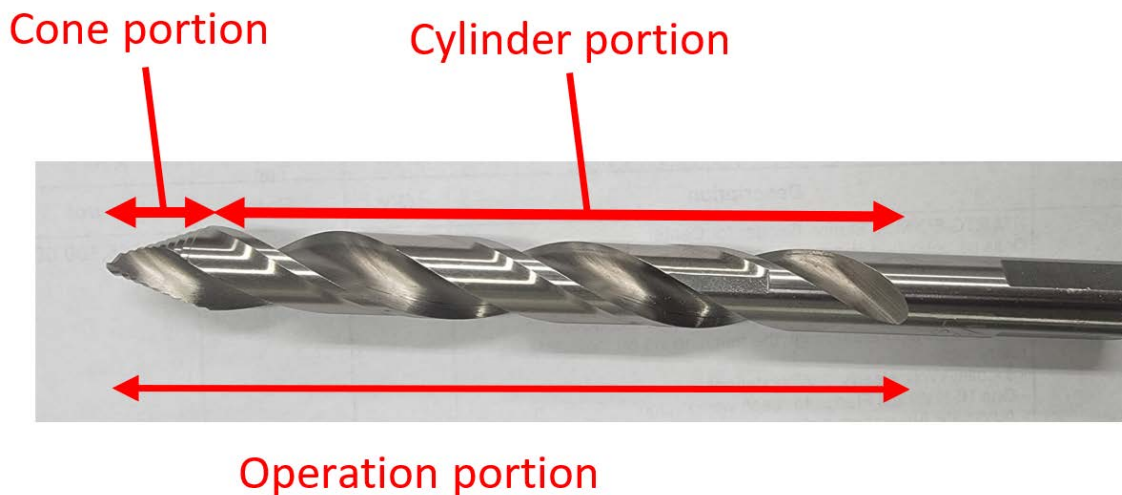


Id. at 9-16.

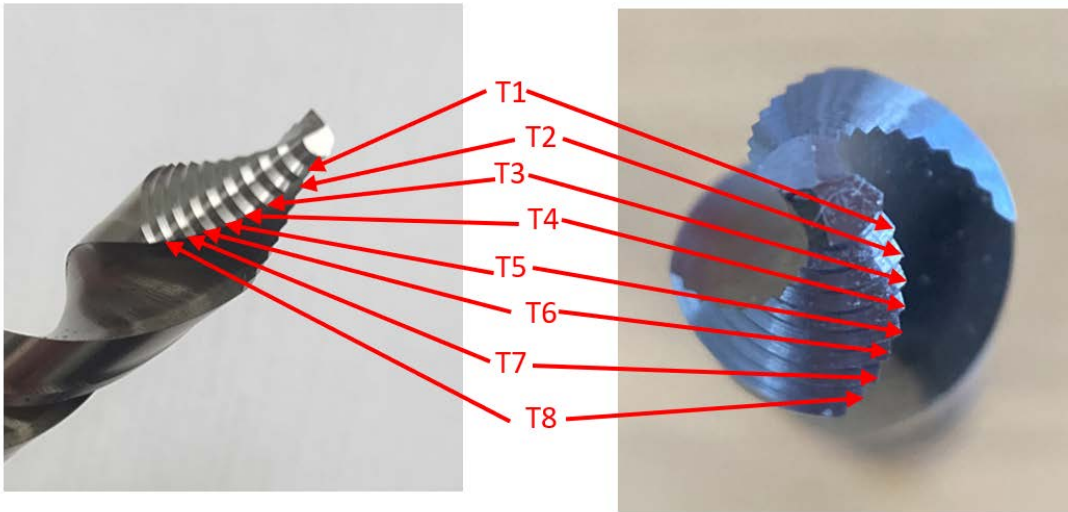
C. Prior Use, Sale or Otherwise Available to the Public

1. Matco Hyper-Step Drills

Viking incorporates, as if fully stated herein, the description of the Matco Hyper-Step Drills provided in its July 13, 2022 Prior Art Statement and Claim Charts. Further, the Matco Hyper-Step Drills have a cylinder portion that is longer than the cone portion:



The Matco Hyper-Step Drills have cutting tips (T1-T8) of the composite cutting blade groups. These cutting tips are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion, as shown below:



2. Viking 00714 Drill

Viking incorporates, as if fully stated herein, the description of the Viking 00714 drill provided in its July 13, 2022 Prior Art Statement and Claim Charts.

3. Viking 00693 Drill

Viking incorporates, as if fully stated herein, the description of the Viking 00693 drill provided in its July 13, 2022 Prior Art Statement and Claim Charts.

4. Viking 00694 Drill

Viking incorporates, as if fully stated herein, the description of the Viking 00694 drill provided in its July 13, 2022 Prior Art Statement and Claim Charts.

VII. ASSERTED CLAIMS 15, 18-19 and 22 OF THE '583 PATENT ARE INVALID AS BEING ANTICIPATED AND/OR OBVIOUS OVER THE PRIOR ART

As set forth in **Exhibits J-R** and as discussed below and above, asserted claims 15, 18-19 and 22 of the '583 patent, as properly construed and/or if construed to cover Viking's products, are anticipated and/or obvious in light of the prior art references discussed herein alone and/or in combination, or in combination with the knowledge of a

POSA, including the combinations of prior art references discussed below for each particular Asserted Claim. Viking identifies below exemplary combinations of references that render the asserted claims 15, 18-19 and 22 of the '583 patent obvious. Invalidity need not be proven with resort to certain specific combinations of references, but instead must involve a holistic analysis of the prior art considered in view of the ordinary knowledge and creativity possessed by those of ordinary skill in the art, consistent with how a POSA would have proceeded when faced with a given problem. Indeed, these references all contribute to the scope and content of the prior art, which is the appropriate analysis under *Graham* and *KSR*. Those cases do not require Viking to prove obviousness through an arbitrary characterization of references as “primary” and/or “secondary.” Accordingly, although Viking identifies exemplary combinations of references that render asserted claims 15, 18-19 and 22 of the '583 patent obvious, the combinations of references discussed below are not intended to be exhaustive, but rather, to provide examples of combinations of the above references that render asserted claims 15, 18-19 and 22 of the '583 patent obvious.

A. Every Element of Asserted Claims 15, 18-19 and 22 of the '583 Patent is Disclosed in the Prior Art

1. The cylinder portion is longer than the cone portion ('583 Patent, Claims 15, 19)

Twist drills having a cylinder portion that is longer than the cone portion are well-known in the art and have been used for many years. Bannister, which issued in 1940, shows a twist drill having a cylinder portion longer than a cone portion. See Bannister at FIGs. 1, 2, p. 1 left col. l. 1 – p. 2 left col. l. 31; p. 2 left col. l. 32 – p. 3 left col. l. 11.

Wang I discloses a twist drill having a cylinder portion that is longer than the cone portion. See Wang I at FIGs. 5-12, ¶¶ [31-39]. Li discloses a twist drill, referred to as a “helical bit tool,” having a cylinder portion that is longer than the cone portion. See Li at FIG. 1; Abstract; ¶¶ [3; 21-24]. Wang II discloses a twist drill having a cylinder portion that is longer than the cone portion. See Wang II at FIGs. 1-8. The prior art Matco drills include a twist drill having a cylinder portion that is longer than the cone portion. See description of the Matco drills, *supra*.

To the extent that a prior art drill did not have a cylinder portion longer than the cone portion, a person of ordinary skill in the art would have known that step drills are not restricted to cutting workpieces that are thinner than the height of a step of the step drill, and would realize that the cylinder portion could be made longer. They would understand that a drill so modified would be effective in accurately drilling into workpieces having a thickness that is greater than the height of a step, and even workpieces whose thickness is greater than the length of the cone portion.

The person of ordinary skill would also be aware of many different designs of twist drills where the cutting tip had been modified from the conventional chisel tip to provide for improved drilling, with the result that the drill has a cone portion at the tip, followed by a cylinder portion that is longer than the cone portion. Examples of such designs that would be known to a person of ordinary skill include Bannister at FIGs. 1 and 2; Wang I at FIGs. 5-12; Wetzl at FIG. 1; Li at FIG. 1; Wang II at FIGs. 1 and 3; Nevills at FIG. 10; Mackey at FIG. 4; Shiqing at FIG. 1 and the Handbook at FIG 9-16.

The person of ordinary skill would be motivated to make such a modification because the prior art teaches that a drill having a conical portion followed by a longer cylinder portion lead to advantages such as requiring less torque, generating less heat, improved drilling accuracy, easier starting into the workpiece material, effectively clearing the hole of chips, the production of fewer burrs and a better finished hole. *See, e.g.* Bannister at p. 1, left col., ll. 1-11; Wetzl at ¶ [0008]; Li at ¶ [0003]; Wang I at ¶ [0013]; Nevills at 5:54 – 6:45; Mackey at 1:46-65; and Shiqing at Abstract. Furthermore, a person of ordinary skill would reasonably understand one or more of these advantages would be achieved by making the modification.

2. The cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion ('583 Patent, Claims 18, 22)

Twist drills in which the cutting tips of composite cutting blade groups are formed spirally on a cone portion exterior were well known in the art. For example, such an arrangement is disclosed in Wang I at FIGs. 5-12; Bannister at FIGs. 1 and 2; and in the Matco drills. Cutting tips formed spirally on a cone portion of a drill are also disclosed in Durfee I at FIGs. 1 and 2; Korb at FIG. 7; Mackey at FIGs. 2 and 3; Ruko at FIG. 1; Zhang at FIG. 1; and Tec Spiral at FIGs. 1 and 2.

To the extent that a prior art reference does not explicitly disclose the claimed arrangement of cutting tips, a person of ordinary skill would have known that drills could have cutting tips arranged along the edge of a spiral flute, i.e. where the cutting tips are formed spirally. *See e.g.* Durfee I at 1:33-39 and 3:57 – 6:32; Li at FIGs. 1-8; Wang I at

FIGs. 5-12 and ¶¶ [31, 32, 35, 36]; Korb at FIGs. 1, 2 and 7, 1:33-35, and 2:37-44. Korb suggests equivalency between a flute cut helically, and a flute cut at about zero degrees to the drill axis. Step drills with helical flutes were also known from Shiqing at FIGs. 1-5; Ruko at FIG. 1; Tec Spiral at FIGs. 1-2; and Zhang at FIG. 1.

It would have been obvious to one of ordinary skill to modify a drill to have a spiral flute, in which case the cutting tips of the modified drill would be formed spirally, because spiral flutes are known to be easier, quicker and less expensive to manufacture in a drill than a straight flute. A POSA would be motivated to make such a modification for the same reasons as discussed in the previous subsection, *supra*.

Thus, for at least these reasons, the asserted claims 15, 18-19 and 22 of the '583 patent are invalid as being anticipated and/or obvious in light of the teachings of the prior art and the knowledge of a POSA. As is explained in the accompanying claim charts, all claims of the Patents-in-suit are anticipated by the prior art Matco drills. As is explained in the accompanying claim charts, claim 22 of the '583 patent is anticipated by Sheldon. Below are exemplary references and combinations of references, as is explained in the accompanying claim charts, that invalidate the claims of the Patents-in-Suit as being obvious. These obviousness combinations are not exhaustive, and Viking incorporates by reference any combination(s) of references cited in Viking's Invalidity and Prior Art Statement and Claim Charts of July 13, 2022 as applied to claims 1 and 8, on which claims 15, 18, 19, and 22 depend.

Matco Drills: all claims of the Patents-in-Suit are obvious over the Matco drills.

Sheldon: claims 15, 18, 19 and 22 of the '583 patent are obvious over Sheldon alone or in combination with one or more of Bannister, Wetzl, Li, Wang II, Nevills, Mackey, Shiqing, Durfee I, Durfee II, Gentry, Allen, Korb, Ruko, the Viking 2014 catalog, NAS 907, or the Viking 00693, 00694 or Viking 00714 drills.

Wang I: claims 15, 18, 19 and 22 of the '583 patent are obvious over Wang I either alone or in combination with one or more of Durfee I, Durfee II, Gentry, Allen, Korb, Ruko, Mackey, Wetzl or the Viking 00693, 00694 or 00714 drills.

Bannister: claims 15, 18, 19, and 22 of the '583 patent are obvious over Bannister in combination with one or more of Durfee I, Durfee II, Gentry, Allen, Korb, Ruko Wetzl, Li, Wang I, Shiqing, Tec Spiral, Zhang, Mackey, or the Viking 00693, 00694 or 00714 drills.

Li: claims 15, 18, 19, and 22 of the '583 patent are obvious over Li in combination with one or more of Durfee I, Durfee II, Gentry, Allen, Korb, Ruko Wetzl, Wang I, Shiqing, Tec Spiral, Zhang, Mackey, or the Viking 00693, 00694 or 00714 drills.

Wang II: claims 15, 18, 19, and 22 of the '593 patent are obvious over Wang II alone or in combination with one or more of Durfee I, Durfee II, Gentry, Allen, Korb, Ruko, Bannister, Mackey, Zhang, Tec Spiral or the Viking 00693, 00694 or 00714 drills.

Viking Drills: claims 15, 18, 19, and 22 of the '583 patent are invalid as being obvious over any of the Viking 00693, 00694 or 00714 drills, in combination with one or more of Bannister, Wetzl, Li, Wang II, Nevills, Mackey, Shiqing, Durfee I, Wang I, Korb, Zhou, Ruko, Tec Spiral, Zhang, and the Handbook.

B. There are No Secondary Considerations of Non-Obviousness

A patentee bears the burden of producing evidence of secondary considerations of non-obviousness and showing a legally and factually sufficient connection between this evidence and the claims of the patents, i.e., a nexus. *See Novo Nordisk A/S v. Caraco Pharm. Labs., Ltd.*, 719 F.3d 1346, 1352–54 (Fed. Cir. 2013); *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019). In the August 20, 2022 Amended Responsive Prior Art Statement and Claim Charts, Plaintiffs allege secondary considerations, *inter alia*, commercial success, copying, long-felt but unmet need, failure of others and unexpected results. Plaintiffs have not provided a detailed explanation of the factual and legal bases that support their assertions, nor have Plaintiffs identified any evidence. Plaintiffs have also not produced documents relating to any such secondary considerations, such as documents relating to allegations of commercial success, industry praise, or failure of others. Plaintiffs have also not explained why any of their secondary considerations were reasonably commensurate in scope with the Asserted Claims of the Asserted Patents. To the extent Plaintiffs provide such information and more detail at a later stage in the case, such as in supplementary interrogatory responses and/or connection with expert reports, Viking reserves the right to respond. Viking incorporates, as if fully stated herein, its contentions that there are no secondary considerations of non-obviousness as set forth in its July 13, 2022 Prior Art Statement and Claim Charts.

VIII. ASSERTED CLAIMS 15 AND 19 OF THE '583 PATENT ARE UNDER 35 U.S.C. § 112 FOR INDEFINITENESS

According to 35 U.S.C. § 112(b), the specification “shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.” To meet this requirement, the asserted claim “must set forth what the applicant regards as his invention and second, it must do so with sufficient particularity and distinctness, i.e., the claim must be sufficiently definite.” *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348 (Fed. Cir. 2002) (internal quotes removed) (quoting *Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 1377 (Fed. Cir. 2000)); see also *Justacomm-Texas Software, LLC, v. Axway, Inc.*, Case No. 6:10-cv- 00011-LED, Dkt. No. 1079 at 6 (E.D. Tex. July 5, 2012). “A determination of whether a claim recites the subject matter which the applicant regards as his invention and is sufficiently definite, so as to satisfy the requirements of 35 U.S.C. § 112, paragraph 2, is a legal conclusion” *Allen Eng’g*, 299 F.3d at 1344. A court must hold a claim invalid “[w]here it would be apparent to one of skill in the art, based on the specification, that the invention set forth in [the] claim is not what the patentee regarded as his invention.” *Id.* at 1349.

A claim is sufficiently definite only if, viewed in light of the specification and prosecution history, it informs those skilled in the art about the scope of the invention with reasonable certainty. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014). To the extent that asserted claims 15 and 19 of the '583 patent are found to be nonobvious, they are indefinite because they do not comply with the requirements for

particularly pointing out and distinctly claiming “the subject matter which the applicant regards as his invention” for the following reasons. Asserted claims 15 and 19 of the ’583 patent fail to inform a POSA about the scope of the invention with reasonable certainty, rendering those claims (and any claims depending therefrom) invalid as indefinite.

The limitation “wherein the cylinder portion is longer than the cone portion” of asserted claims 15 and 19 of the ’583 patent is indefinite for failing to inform one of skill in the art with reasonable certainty about the scope of the invention. It is not clear where a cone portion on the claimed inventions ends, and where a cylinder portion begins. If the cone portion on the claimed twist drill extends beyond where the diameter of the drill stops increasing, then a POSA would not know where this claim limitation ends. As a result, a POSA would not be informed about how to determine whether “the cylinder portion is longer than the cone portion” with reasonable certainty, and a competitor could also not reasonably determine the same. Plaintiffs’ infringement contentions support of the lack of particularity with respect to this limitation. For instance, Plaintiffs’ Supplemental Infringement Contentions Claim Charts dated July 8, 2022, arbitrarily identify an alleged “last composite cutting blade group located at the rear end of the cone portion immediately adjacent to the cylinder portion” on the Accused Products regarding claim limitation 1.d, and 8.d. *See* July 8, 2022 Supplemental Infringement Contentions, Ex. 1 at 4. In the same contentions, Plaintiffs then allege as to claim limitations 1.n and 8.n, that a plurality of composite cutting blade groups are on a region beyond where the drill stops increasing in diameter and becomes cylindrical. *See* July 8, 2022

Supplemental Infringement Contentions, Ex. 1 at 2. Similarly, Plaintiffs' September 21, 2022 Second Supplemental Infringement Contentions also annotate a cone portion beyond where the drill stops increasing in diameter and becomes cylindrical. See Second Supplemental Infringement Contentions, Ex. 3 at 1.

IX. CONCLUSION

Based upon the information presently available to Viking, and based upon Viking's initial understanding of the scope and construction of asserted claims 15, 18-19 and 22 of the '583 patent, these claims are invalid at least on the grounds set forth above and in the claim charts attached as **Exhibits J-R**.

Date: September 30, 2022

/s/ Saukshmya Trichi

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Tool, Inc.*

CERTIFICATE OF SERVICE

I hereby certify that on September 30, 2022, I caused Defendant, Viking Drill & Tool, Inc.'s Invalidity and Prior Art Statement concerning asserted claims 15, 18-19 and 22 of the '583 patent, and accompanying Claim Charts to be served via electronic mail on all counsel or parties of record:

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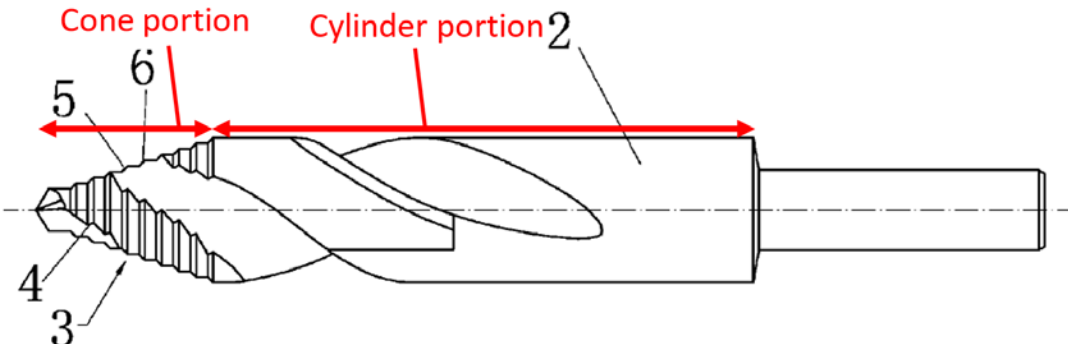
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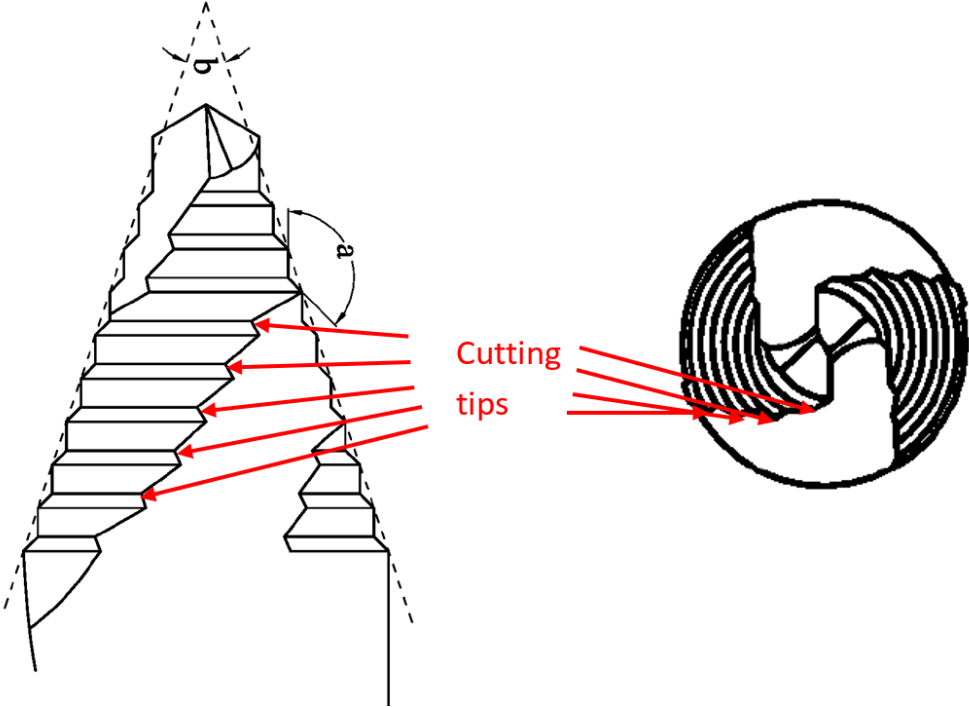
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Hongjia Wang*

Dated: September 30, 2022

s/ Saukshmya Trichi

EXHIBIT J

The '583 Patent	
Claims	Wang I (U.S. Patent App. Pub. No. 2018/0133808)
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	In Wang I, the cylinder portion is longer than the cone portion, as shown in the annotated reproduction of FIG. 5, shown below.  The diagram shows a side view of a twist drill. A red arrow labeled 'Cone portion' points to the front section of the drill, and another red arrow labeled 'Cylinder portion' points to the longer middle section. A red arrow labeled '2' indicates the length of the cylinder portion. Labels 3, 4, 5, and 6 point to various features of the drill's cutting edge and flutes.
	Wang I shows the cutting tips of the plurality of composite cutting blade groups formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion. See the annotated reproductions of FIGs. 7 and 8 presented below.

	 Wang I further teaches this spiral formation of cutting tips of the plurality of cutting blade groups in Paragraphs [0010] and [0035], which state that “connecting lines of the flutes form a spiral structure.”
[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.	See [’583:15]
[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of	See [’583:18]

the cone portion to a rear end of the cone portion.	
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EXHIBIT K

The '583 Patent	
Claims	Matco Drills
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	In the Matco drills, the cylinder portion is longer than the cone portion. Cone portion Cylinder portion  Operation portion
[’583:18] The twist drill of claim 8 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	In the Matco drills, the cutting tips (T1-T8) of the composite cutting blade groups are formed spirally on cone portion exterior from a front end of the cone portion to a rear end of the cone portion.

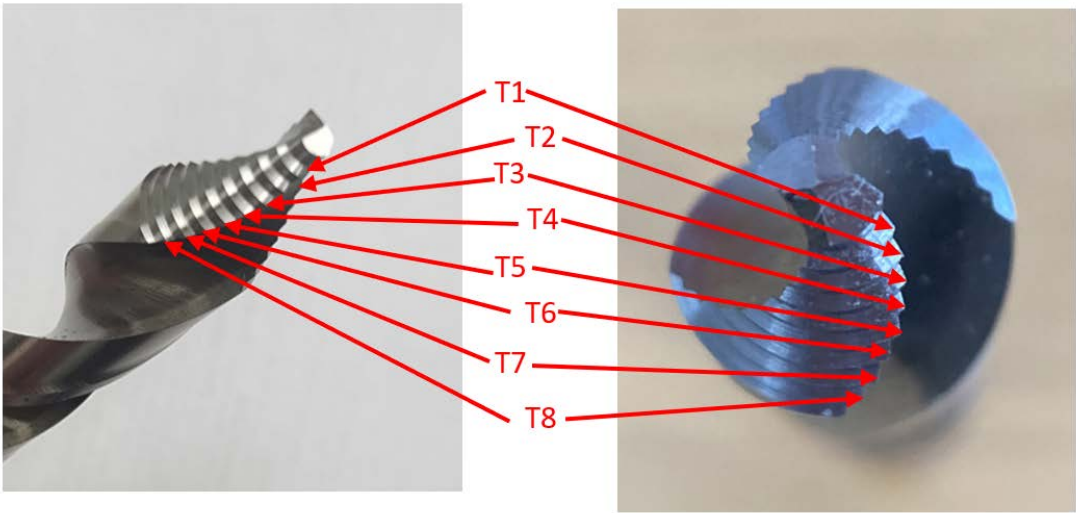
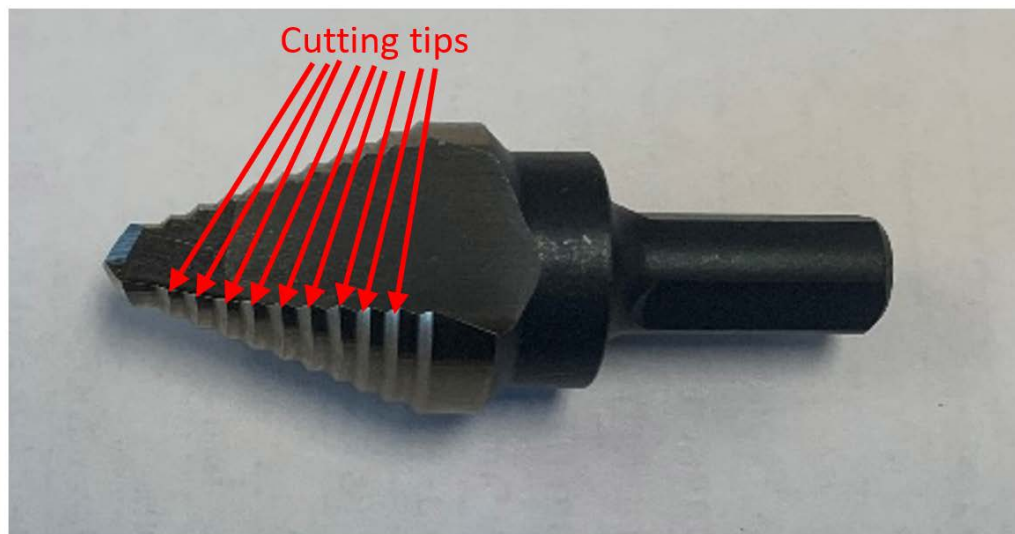
	
[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.	See [’583:15]
[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	See [’583:18]

EXHIBIT L

The '583 Patent	
Claims	Viking 00714 drill
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	The Viking 00714 drill has a cylinder portion that is shorter than the cone portion. Knowing that step drills are not restricted to cutting workpieces that are thinner than the height of a step of the step drill, however, a person of ordinary skill would realize that the cylinder portion could be made longer. They would understand that a drill modified in this manner would be effective in accurately drilling into workpieces having a thickness that is greater than the height of a step, and even workpieces whose thickness is greater than the length of the cone portion. The person of ordinary skill would also be aware of many different designs of twist drills where the cutting tip had been modified from the conventional chisel tip to provide for improved drilling, with the result that the drill has a cone portion at the tip, followed by a cylinder portion that is longer than the cone portion. Examples of such designs that would be known to a person of ordinary skill include Bannister, FIGs. 1 and 2; Wetzl, FIG. 1; Li, FIG. 1; Wang II, FIGs. 1, 3; Nevills, FIG. 10; Mackey FIG. 4 and Shiqing, FIG. 1. See also the Handbook at FIG. 9-16. The person of ordinary skill would be motivated to make such a modification because the prior art teaches that a drill having a conical portion followed by a longer cylinder portion lead to advantages such as requiring less torque, generating less heat, improved drilling accuracy, easier starting into the workpiece material, effectively clearing the hole of chips, the production of fewer burrs and a better finished hole. See, e.g. Bannister p. 1, left col., ll. 1-11; Wetzl ¶ [0008]; Li ¶ [0003]; Wang II; Nevills, 5:54 –6:45; Mackey 1:46-65; and Shiqing, Abstract. Furthermore, a person of ordinary skill would reasonably understand one or more of these advantages would be achieved by making the modification.
	[’583:18] The twist drill of claim 8 wherein the cutting tips of the plurality of composite The Viking 00714 drill has cutting tips of the plurality of composite cutting blade groups formed on a cone portion exterior from a front end of the cone portion to a

cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.

rear end of the cone portion. See annotated photo of an exemplary Viking 00714 drill in [’583: 1.a] and below.



It was known that drills could have cutting tips arranged along the edge of a spiral flute. See *e.g.* Durfee I, 1:33-39 and 3:57 – 6:32; Li, FIGs. 1-8; Wang I, FIGs. 5-12 and ¶¶ [31, 32, 35, 36]; Korb, FIGs. 1, 2 and 7, 1:33-35, and 2:37-44. Korb suggests equivalency between a flute cut helically, and a flute cut at about zero degrees to the drill axis. Step drills with helical flutes were also known in Shiqing, FIGs. 1-5; Ruko, FIG. 1; Tec Spiral FIGs. 1-2; and Zhang, FIG. 1.

It would have been obvious to one of ordinary skill to modify the straight flute of the Viking 00714 drill to a spiral flute, in which case the cutting tips of the modified drill would be formed spirally. Spiral flutes are known to be easier, quicker and less expensive to manufacture in a drill than a straight flute, which would result in the cutting tips of the Viking 00714 drill being formed spirally on the cone portion exterior as claimed.

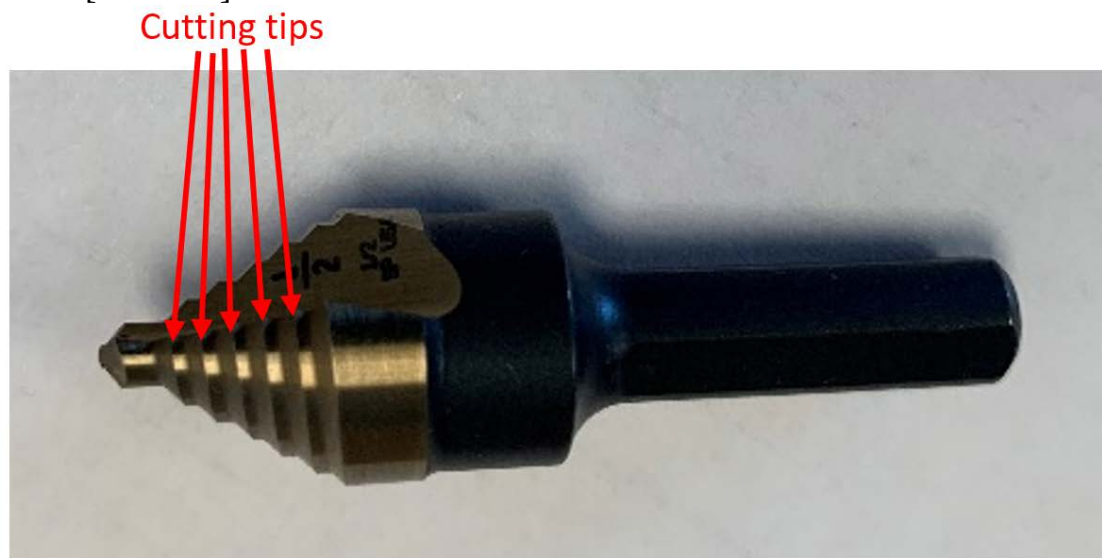
[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.	See [’583:15]
[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	See [’583:18]

EXHIBIT M

The '583 Patent	
Claims	Viking 00693 drill
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	The Viking 00693 drill has a cylinder portion that is shorter than the cone portion. Knowing that step drills are not restricted to cutting workpieces that are thinner than the height of a step of the step drill, however, a person of ordinary skill would realize that the cylinder portion could be made longer. They would understand that a drill modified in this manner would be effective in accurately drilling into workpieces having a thickness that is greater than the height of a step, and even workpieces whose thickness is greater than the length of the cone portion. The person of ordinary skill would also be aware of many different designs of twist drills where the cutting tip had been modified from the conventional chisel tip to provide for improved drilling, with the result that the drill has a cone portion at the tip, followed by a cylinder portion that is longer than the cone portion. Examples of such designs that would be known to a person of ordinary skill include Bannister, FIGs. 1 and 2; Wetzl, FIG. 1; Li, FIG. 1; Wang II, FIGs. 1 and 3; Nevills, FIG. 10; Mackey, FIG. 4; and Shiqing, FIG. 1. <i>See also</i> the Handbook at FIG. 9-16. The person of ordinary skill would be motivated to make such a modification because the prior art teaches that a drill having a conical portion followed by a longer cylinder portion leads to advantages such as requiring less torque, generating less heat, improved drilling accuracy, easier starting into the workpiece material, effectively clearing the hole of chips, the production of fewer burrs and a better finished hole. See, e.g. Bannister p. 1, left col., ll. 1-11; Wetzl ¶ [0008]; Li ¶ [0003]; Wang I ¶ [0013]; Nevills 5:54 – 6:45; Mackey 1:46-65; and Shiqing, Abstract. Furthermore, a person of ordinary skill would reasonably understand one or more of these advantages would be achieved by making the modification.
	[’583:18] The twist drill of claim 8 wherein the cutting tips of the plurality of composite The Viking 00693 drill has cutting tips of the plurality of composite cutting blade groups formed on a cone portion exterior from a front end of the cone portion to a

cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.

rear end of the cone portion. See annotated photo of an exemplary Viking 00693 drill in [’583: 1.a] and below.



It was known that drills could have cutting tips arranged along the edge of a spiral flute. See *e.g.* Durfee I, 1:33-39 and 3:57 – 6:32; Li, FIGs. 1-8; Wang I, FIGs. 5-12 and ¶¶ [31, 32, 35, 36]; Korb, FIGs. 1, 2 and 7, 1:33-35, and 2:37-44. Korb suggests equivalency between a flute cut helically, and a flute cut at about zero degrees to the drill axis. Step drills with helical flutes were also known from Shiqing, FIGs. 1-5; Ruko, FIG. 1; Tec Spiral FIGs. 1-2; and Zhang, FIG. 1.

It would have been obvious to one of ordinary skill to modify the straight flute of the Viking 00694 drill to a spiral flute, in which case the cutting tips of the modified drill would be formed spirally. Spiral flutes are known to be easier, quicker and less expensive to manufacture in a drill than a straight flute, which would result in the cutting tips of the Viking 00693 drill being formed spirally on the cone portion exterior as claimed.

[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.	See [’583:15]
[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	See [’583:18]

EXHIBIT N

The '583 Patent	
Claims	Viking 00694 drill
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	The Viking 00694 drill has a cylinder portion that is shorter than the cone portion. Knowing that step drills are not restricted to cutting workpieces that are thinner than the height of a step of the step drill, however, a person of ordinary skill would realize that the cylinder portion could be made longer. They would understand that a drill modified in this manner would be effective in accurately drilling into workpieces having a thickness that is greater than the height of a step, and even workpieces whose thickness is greater than the length of the cone portion. The person of ordinary skill would also be aware of many different designs of twist drills where the cutting tip had been modified from the conventional chisel tip to provide for improved drilling, with the result that the drill has a cone portion at the tip, followed by a cylinder portion that is longer than the cone portion. Examples of such designs that would be known to a person of ordinary skill include Bannister, FIGs. 1 and 2; Wetzl, FIG. 1; Li, FIG. 1; Wang II, FIGs. 1, 3; Nevills, FIG. 10; Mackey FIG. 4 and Shiqing, FIG. 1. <i>See also</i> The Handbook at FIG. 9-16. The person of ordinary skill would be motivated to make such a modification because the prior art teaches that a drill having a conical portion followed by a longer cylinder portion lead to advantages such as requiring less torque, generating less heat, improved drilling accuracy, easier starting into the workpiece material, effectively clearing the hole of chips, the production of fewer burrs and a better finished hole. <i>See, e.g.</i>, Bannister, p. 1, left col., ll. 1-11; Wetzl, ¶ [0008]; Li, ¶ [0003]; Wang II; Nevills, 5:54–6:45; Mackey, 1:46-65; and Shiqing, Abstract. Furthermore, a person of ordinary skill would reasonably understand one or more of these advantages would be achieved by making the modification.
[’583:18] The twist drill of claim 8 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion	The Viking 00694 drill has cutting tips of the plurality of composite cutting blade groups formed on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion. <i>See</i> annotated photo of an exemplary Viking 00694 drill in [’583: 1.a] and below.

exterior from a front end of the cone portion to a rear end of the cone portion.

Cutting tips



It was known that drills could have cutting tips arranged along the edge of a spiral flute. See *e.g.* Durfee I, 1:33-39 and 3:57 – 6:32; Li, FIGs. 1-8; Wang I, FIGs. 5-12 and ¶¶ [31, 32, 35, 36]; Korb, FIGs. 1, 2 and 7, 1:33-35, and 2:37-44. Korb suggests equivalency between a flute cut helically, and a flute cut at about zero degrees to the drill axis. Step drills with helical flutes were also known in Shiqing, FIGs. 1-5; Ruko, FIG. 1; Tec Spiral, FIGs. 1-2; and Zhang, FIG. 1.

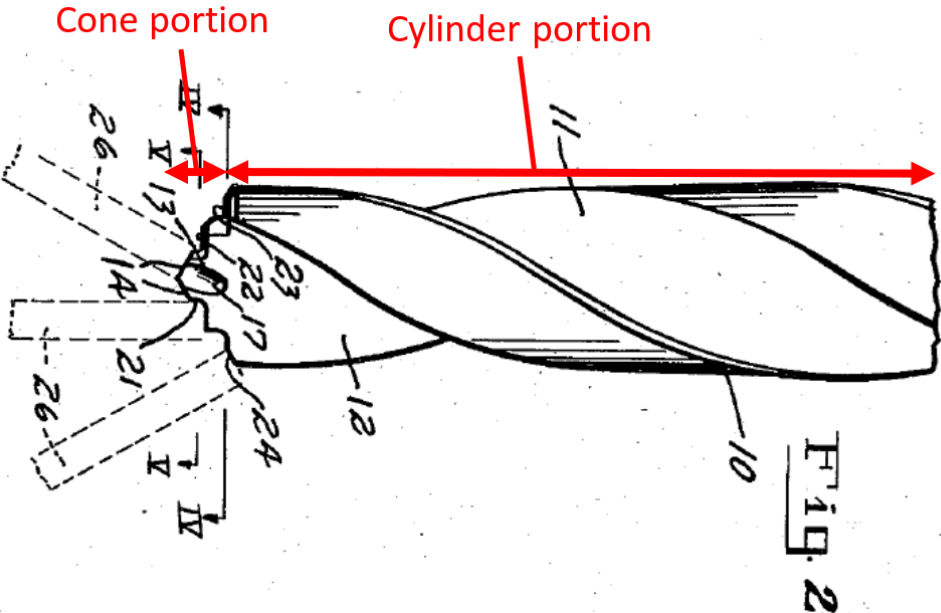
It would have been obvious to one of ordinary skill to modify the straight flute of the Viking 00694 drill to a spiral flute, in which case the cutting tips of the modified drill would be formed spirally. Spiral flutes are known to be easier, quicker and less expensive to manufacture in a drill than a straight flute, which would result in the cutting tips of the Viking 00694 drill being formed spirally on the cone portion exterior as claimed.

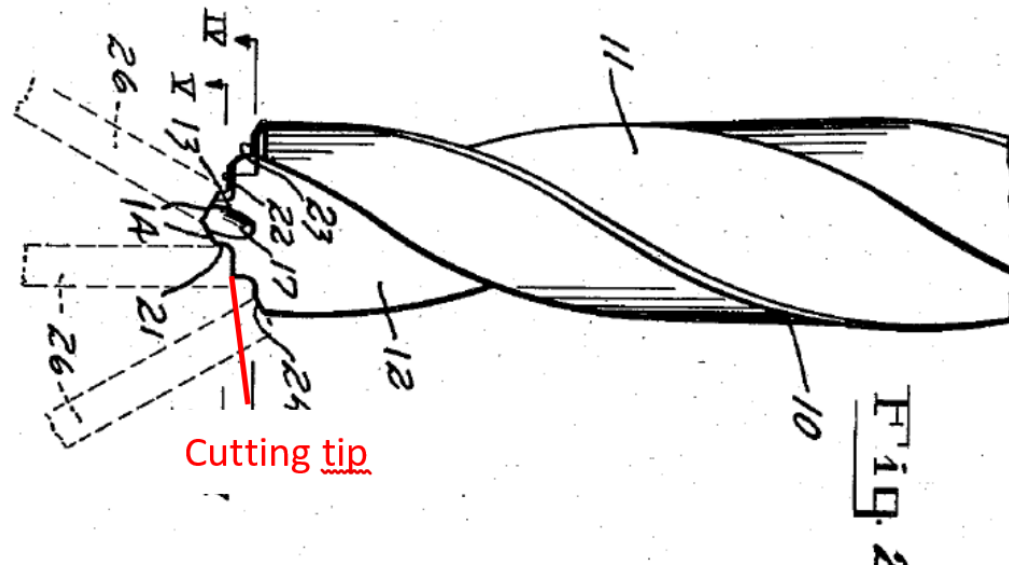
[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.

See [’583:15]

[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	See [’583:18]
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EXHIBIT O

The '583 Patent	
Claims	Bannister (U.S. Patent No. 2,193,186)
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	Bannister shows a twist drill in which the cylinder portion is longer than the cone portion, as seen in the annotated reproduction of FIG. 2, below.  Fig. 2
[’583:18] The twist drill of claim 8 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	Bannister shows a twist drill with a pair of cutting tips between the front tip and the shoulder leading to the cylinder portion.

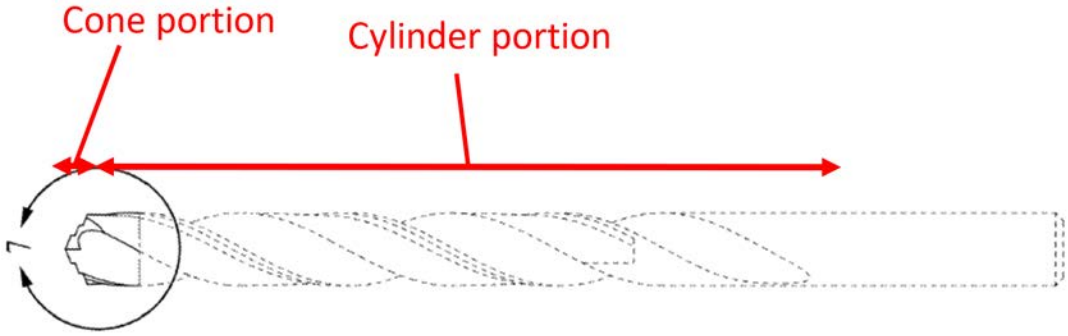


Bannister does not, however, limit the disclosure to this arrangement and emphasizes that the drill may include multiple steps: “[w]hile I have illustrated a plurality of steps or series of drilling units, the number will be governed largely by the size of the drill. For example, with drills less than one inch diameter, I preferably grind the point with the central drilling unit and one pair of cutting edges. As the diameter of the drill increases, the number of drill units may be increased.” Bannister, p. 2, right col, l. 70 – p. 3, left col. l. 2.

It was known that drills having stepped cutting blades at their front ends could have the cutting tips arranged spirally along the side of the spiral flute. See *e.g.* Durfee I, 1:33-39 and 3:57 – 6:32; Wetzl, FIGs. 1 and 2, and ¶¶ [8, 27, 37, 38, 46-50], Li, FIGs. 1-8; Wang I, FIGs. 5-12 and ¶¶ [31, 32, 35, 36]; Korb, FIGs. 1, 2 and 7, 1:33-35, and 2:37-44. Korb suggests equivalency between a flute cut helically, and a flute cut at about zero degrees to the drill axis. Step drills with helical flutes were also known from Shiqing, FIGs. 1-5; Ruko, FIG. 1; Tec Spiral FIGs. 1-2; and Zhang, FIG. 1.

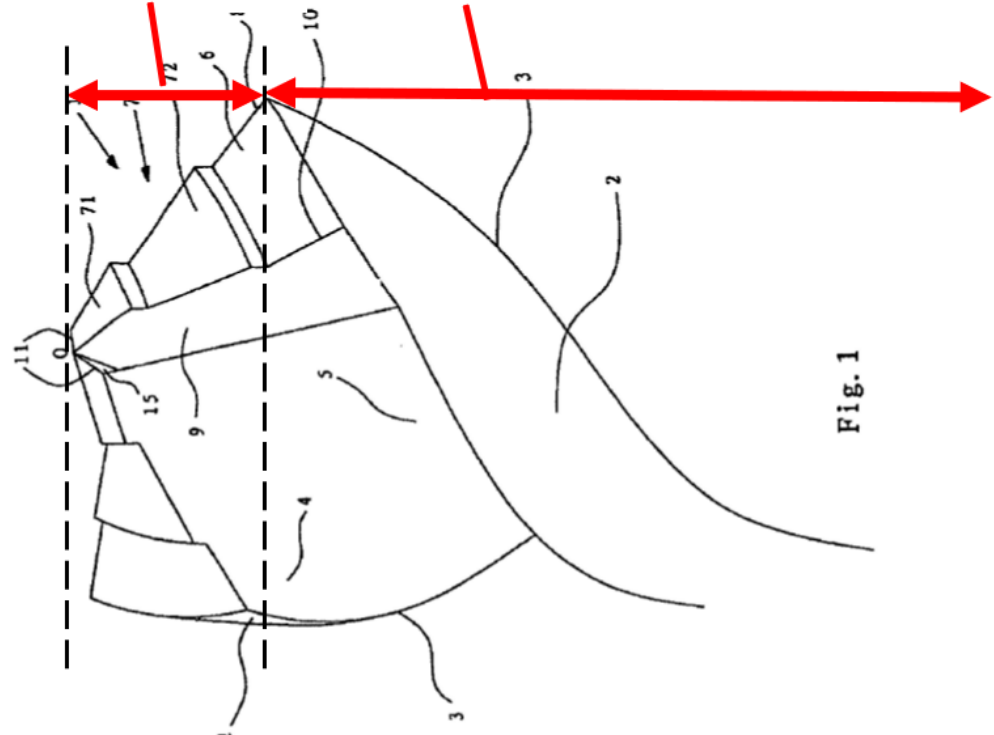
	It would have been obvious to one of ordinary skill to modify Bannister so that the cutting tips of the modified drill would be formed spirally, because spiral flutes are known to be easier, quicker and less expensive to manufacture in a drill than a straight flute.
[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.	See [’583:15]
[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	See [’583:18]

EXHIBIT P

The '583 Patent	
Claims	Wang II (U.S. Design Pat. No. D840,449)
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	Wang II shows a twist drill with a cylinder portion longer than the cone portion, as shown in the annotated reproduction of FIG. 2, below. 
[’583:18] The twist drill of claim 8 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	Wang II does not show or teach that the cutting tips are formed spirally. A person of ordinary skill would know of drills having cutting tips arranged spirally on a cone section. A person of ordinary skill would know of such an arrangement as shown in, for example, Bannister, FIGs. 1 and 2; Durfee I, FIGs. 1 and 2; Korb, FIG. 7; Mackey, FIGs. 2 and 3; Ruko, FIG. 1; Zhang, FIG. 1; and Tec Spiral, FIGs. 1 and 2. A person would have been motivated to modify Wang II’s drill because the prior art teaches that a drill having a conical portion with a spiral flute leads to advantages such as requiring less torque, generating less heat, improved drilling accuracy, easier starting into the workpiece material, effectively clearing the hole of chips, the production of fewer burrs and a better finished hole. <i>See, e.g.</i> Bannister p. 1, left col., ll. 1-11; Korb 1:51-60; and Mackey 1:46-65. Furthermore, a person of ordinary skill would reasonably understand one or more of these advantages would be achieved by making the modification.

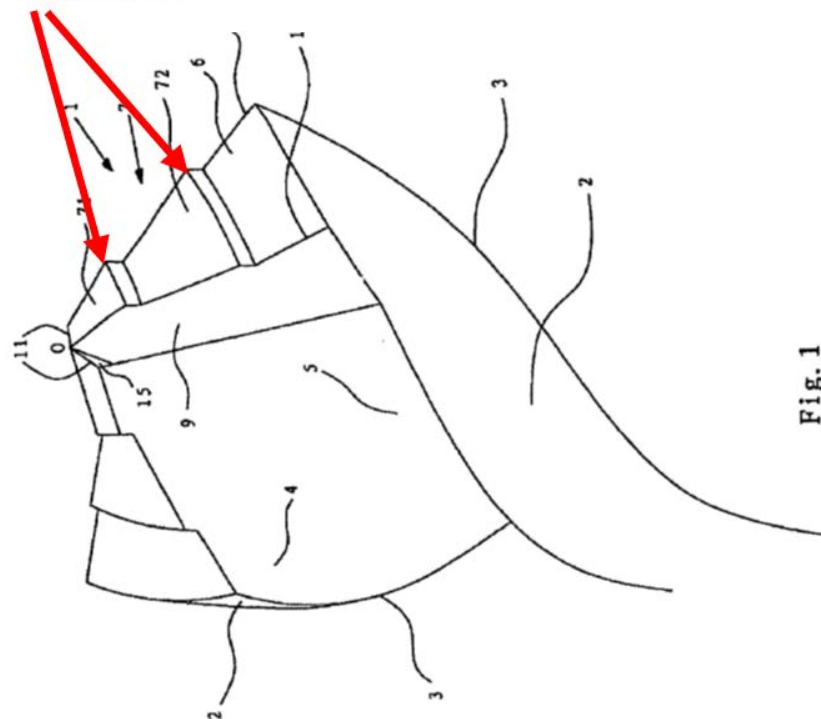
[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.	See [’583:15]
[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	See [’583:18]

EXHIBIT Q

The '583 Patent	
Claims	Li (U.S. Pat. App. Pub. No. 2011/0116884)
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	Li shows a drill having a cylinder portion longer than the cone portion, as shown in the annotated reproduction of FIG. 1, below. Cone portion Cylinder portion  Fig. 1
[’583:18] The twist drill of claim 8 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of	Li shows cutting tips formed on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion. See the annotated reproduction of FIG. 1 below.

the cone portion to a rear end of the cone portion.

Cutting tips



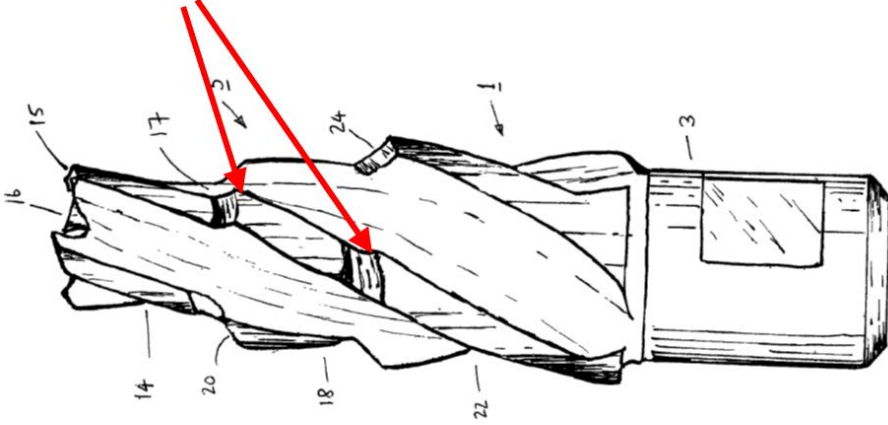
It was known that drills could have cutting tips arranged along the edge of a spiral flute. See e.g. Durfee I, 1:33-39 and 3:57 – 6:32; Wetzl, FIGs. 1 and 2, and ¶¶ [8, 27, 37, 38, 46-50], Li, FIGs. 1-8; Wang I, FIGs. 5-12 and ¶¶ [31, 32, 35, 36]; Korb, FIGs. 1, 2 and 7, 1:33-35, and 2:37-44. Korb suggests equivalency between a flute cut helically, and a flute cut at about zero degrees to the drill axis. Step drills with helical flutes were also known from Shiqing, FIGs. 1-5; Ruko, FIG. 1; Tec Spiral FIGs. 1-2; and Zhang, FIG. 1.

In view of the art described above, it would have been obvious to one of ordinary skill to modify Li to have the cutting tips arranged spirally to achieve the advantages discussed in the art.

[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.	See [’583:15]
[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	See [’583:18]

EXHIBIT R

The '583 Patent	
Claims	Sheldon (GB 2,405,820A)
[’583:15] The twist drill of claim 8 wherein the cylinder portion is longer than the cone portion.	Sheldon shows a drill having a cylinder portion that is shorter than the cone portion. Knowing that step drills are not restricted to cutting workpieces that are thinner than the height of a step of the step drill, however, a person of ordinary skill would realize that the cylinder portion could be made longer. They would understand that a drill modified in this manner would be effective in accurately drilling into workpieces having a thickness that is greater than the height of a step, and even workpieces whose thickness is greater than the length of the cone portion. The person of ordinary skill would also be aware of many different designs of twist drill where the cutting tip had been modified from the conventional chisel tip to provide for improved drilling, with the result that the drill has a cone portion at the tip, followed by a cylinder portion that is longer than the cone portion. Examples of such designs that would be known to a person of ordinary skill include Bannister, FIGs. 1 and 2; Wetzl, FIG. 1; Li, FIG. 1; Wang II, FIGs. 1 and 3; Nevills, FIG. 10; Mackey FIG. 4 and Shiqing, FIG. 1. The person of ordinary skill would be motivated to make such a modification because the prior art teaches that a drill having a conical portion followed by a longer cylinder portion lead to advantages such as requiring less torque, generating less heat, improved drilling accuracy, easier starting into the workpiece material, effectively clearing the hole of chips, the production of fewer burrs and a better finished hole. <i>See, e.g.</i> Bannister, p. 1, left col., ll. 1-11; Wetzl, ¶ [0008]; Li, ¶ [0003]; Wang I, ¶ [0013]; Nevills, 5:54 – 6:45; Mackey, 1:46-65; and Shiqing, Abstract. Furthermore, a person of ordinary skill would reasonably understand one or more of these advantage would be achieved by making the modification.
	[’583:18] The twist drill of claim 8 wherein the cutting tips of the plurality of composite Sheldon discloses that the cutting tips of the plurality of cutting blade groups are formed spirally on the cone portion exterior from a front end of the cone portion to

cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	a rear end of the cone portion. See the annotated reproduction of FIG. 1 shown below. Cutting blade tips formed spirally 
[’583:19] The twist drill of claim 1 wherein the cylinder portion is longer than the cone portion.	See [’583:15]
[’583:22] The twist drill of claim 1 wherein the cutting tips of the plurality of composite cutting blade groups are formed spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion.	See [’583:18]

CERTIFICATE OF SERVICE

I hereby certify that on September 30, 2022, I caused Defendant, Viking Drill & Tool, Inc.'s Invalidity and Prior Art Statement concerning asserted claims 15, 18-19 and 22 of the '583 patent, and accompanying Claim Charts to be served via electronic mail on all counsel or parties of record:

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Dated: September 30, 2022

s/ Saukshmya Trichi