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EFS Transmission Sheet

January 13, 2022

To: Mail Stop *Ex Parte* Reexam
From: Kevin C. Brown
Re: In re the Patent of: HongJia WANG
Patent No.: 11,007,583
Date Issued: May 18, 2021
Title: TWIST DRILL
Our Docket No.: 921_190

I hereby certify that the following documents are being transmitted via EFS to the Patent and Trademark Office on ***January 11, 2022***:

	<u>Paper</u>	<u>Index of Pages</u>	<u># of Pages</u>
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	Total Pages		140

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Kevin C. Brown

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(Also referred to as FORM PTO-1465)

REQUEST FOR *EX PARTE* REEXAMINATION TRANSMITTAL FORM

Address to:
Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: 921_190

Date: January 13, 2022

1. ☒ This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 11,007,583 issued May 18, 2021. The request is made by:
☐ patent owner. ☒ third party requester.
2. ☒ The name and address of the person requesting reexamination is:
Guehring KG
Herderstraße 50-54
72458 Albstadt, GERMANY
3. Requester ☐ asserts small entity status (37 CFR 1.27) or ☐ certifies micro entity status (37 CFR 1.29). Only a patent owner requester can certify micro entity status. Form PTO/SB/15A or B must be attached to certify micro entity status.
4. This request is accompanied by payment of the reexamination fee as set forth in:
☐ 37 CFR 1.20(c)(2); or
☒ 37 CFR 1.20(c)(1). In checking this box for payment of the fee set forth in 37 CFR 1.20(c)(1), requester asserts that this request has forty (40) or fewer pages and complies with all other requirements of 37 CFR 1.20(c)(1).
Payment of the reexamination fee is made by the method set forth below.
 - a. ☐ A check in the amount of \$_____ is enclosed to cover the reexamination fee;
 - b. ☐ The Director is hereby authorized to charge the reexamination fee
to Deposit Account No. _____;
 - c. ☐ Payment by credit card. Form PTO-2038 is attached; or
 - d. ☒ Payment made via EFS-Web.☒ In addition, the Director is hereby authorized to charge any fee deficiencies to
Deposit Account No. 50-1446.
5. ☒ Any refund should be made by ☐ check or ☒ credit to Deposit Account No. 50-1446
37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.
6. ☒ A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4).
7. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
☐ Landscape Table on CD

[Page 1 of 3]

This collection of information is required by 37 CFR 1.510. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) a request for reexamination. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Mail Stop *Ex Parte* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

8. ☐ Nucleotide and/or Amino Acid Sequence Submission
If applicable, items a. – c. are required.
- a. ☐ Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
- i. ☐ CD-ROM (2 copies) or CD-R (2 copies) or
- ii. ☐ paper
- c. ☐ Statements verifying identity of above copies.
9. ☐ A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.
10. ☒ Reexamination of claim(s) 1-14 is requested.
11. ☒ A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.
12. ☒ An English language translation of all necessary and pertinent non-English language patents and/or printed publications is attached.
13. ☒ The attached detailed request includes at least the following items:
- a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1).
- b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2).
14. ☐ A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e).
15. ☒ It is certified that the statutory estoppel provisions of 35 U.S.C. 315(e)(1) or 35 U.S.C. 325(e)(1) do not prohibit requester from filing this *ex parte* reexamination request. 37 CFR 1.510(b)(6).
16. Service
- a. ☒ It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
- The name and address of the party served are:
- Daniel M. Cislo, Cislo & Thomas LLP
- 12100 Wilshire Blvd., Suite 1700
- Los Angeles, CA 90025
- Date of Service: January 13, 2022
- OR
- b. ☐ A duplicate copy is enclosed since service on patent owner was not possible. An explanation of the efforts made to serve patent owner is attached. See MPEP 2220.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

17. Correspondence Address: Direct all communication about the reexamination to:

☒ The address associated with Customer Number: 25191

OR

☐ Firm or Individual Name _____
(at the address identified below)

Address

City	State	Zip
Country		
Telephone	Email	

18. ☐ The patent is currently the subject of the following concurrent proceeding(s):

- a. ☐ Copending reissue Application No. _____
- b. ☐ Copending reexamination Control No. _____
- c. ☐ Copending Interference No. _____
- d. ☐ Copending litigation styled: _____

WARNING : Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

Kevin C. Brown
Authorized Signature

January 13, 2022

Date

Kevin C. Brown

Typed/Printed Name

32,402

Registration No.

☐ For Patent Owner Requester☒ For Third Party Requester

Attorney Docket No.: 921_190

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the patent of: Wang

Patent Number: 11,007,583

Granted: May 18, 2021

U.S. Application Serial No.: 16/699,089 Group Art Unit: 3722

Filed: November 28, 2019

Examiner: Nicole N. Ramos

Confirmation No.: 1000

For: TWIST DRILL

REQUEST FOR EX PARTE REEXAMINATION
UNDER 35 USC §§301-307 and 37 CFR §§1.510-1.570

I. IDENTIFICATION OF CLAIMS FOR WHICH REEXAMINATION IS REQUESTED

The Requestor respectfully requests that the U.S. Patent & Trademark Office (USPTO) conduct reexamination (pursuant to 35 U.S.C. §§301-307 and 37 C.F.R. §§1.510 - 1.570) of claims 1-14 of the U.S. Patent No. 11,007,583 (referred to herein as “the '583 patent”).

II. STATEMENT IDENTIFYING SUBSTANTIAL NEW QUESTIONS OF PATENTABILITY

As discussed in detail below:

[1] GB 2 405 820 (referred to herein as “GB ‘820”) discloses a twist drill that anticipates each of claims 1, 2, 3 and 6 of the ‘583 patent;

[2] subject matter of each of claims 5, 8, 9, 11 and 14 would have been obvious over GB '820 in view of US 2005/0053438 (referred to herein as "US '438");

[3] CN 203356678 (referred to herein as "CN '678") discloses a twist drill that anticipates each of claims 1, 2, 4, 5, 6, 8, 10, 11, 13 and 14 of the '583 patent;

[4] subject matter of each of claims 3, 4, 7, 9, 10, 12 and 13 would have been obvious in view of CN '678;

[5] subject matter of each of claims 3 and 9 would have been obvious over CN '678 in view of GB '820; and

[6] subject matter of claim 13 would have been obvious over CN '678 in view of US 2011/0116884 (referred to herein as "US '884").

According to MPEP §2422:

A prior art patent or printed publication raises a substantial question of patentability where there is a substantial likelihood that a reasonable examiner would consider the prior art patent or printed publication important in deciding whether or not the claim is patentable. If the prior art patents and/or publications would be considered important, then the examiner should find "a substantial new question of patentability" unless the same question of patentability has already been decided as to the claim in a final holding of invalidity by a federal court or by the Office in an earlier concluded examination or review of the patent, or unless the same question of patentability has been raised

to or by the Office in a pending reexamination or supplemental examination of the patent.

GB '820, CN '678 and US '438 (discussed in detail herein and cited in the accompanying Information Disclosure Statement Under 37 C.F.R. §§1.501 and 1.510(b)(3)) were not of record in the application that led to the granting of the '583 patent.

US '884 was of record in the prosecution history of the '583 patent, but was not applied or discussed. Nothing in the prosecution history of the '583 patent indicates that the Examiner interpreted the drawings in US '884, or that the Examiner compared an interpretation of US '884 with any of the claims of the '583 patent. The discussions herein therefore present US '884 in a new light, and in a different way, in view of material new arguments and interpretations presented in this request that were not presented during the prosecution history of the '583 patent.

CN '678 was not of record in the application that led to the granting of the '583 patent. CN 103084629 (CN '629) (cited during prosecution of the application on which the '583 patent was granted) appears to include disclosure that is very similar to disclosure in CN '678. Nothing in the prosecution history of the '583 patent indicates that the Examiner interpreted the drawings in CN '629, or that the Examiner compared an interpretation of CN '629 with any of the claims of the '583 patent. The discussions herein of CN '678 therefore present questions of patentability that have not previously been raised or considered by the USPTO.

Under MPEP §2422:

In a decision to order reexamination made on or after November 2, 2002, reliance on old art does not necessarily preclude the existence of a substantial new question of patentability that is based exclusively on that old art. See Public Law 107-273, 116 Stat. 1758, 1899-1906 (2002), which expanded the scope of what qualifies for a substantial

new question of patentability upon which a reexamination may be based. Determinations on whether a substantial new question of patentability exists in such an instance shall be based upon a fact-specific inquiry done on a case-by-case basis. For example, a substantial new question of patentability may be based solely on old art where the old art is being presented/viewed in a new light, or in a different way, as compared with its use in the earlier examination(s), in view of a material new argument or interpretation presented in the request. Such material new argument or interpretation may be based solely on claim scope of the patent being reexamined.

In view of the above, the references discussed herein raise substantial new questions of patentability. The above-identified questions of patentability have not been raised or addressed in the USPTO or in Federal court. Accordingly, the Requestor respectfully submits that it would be proper for the USPTO to conduct reexamination of claims 1-14 of the '583 patent.

III. DETAILED EXPLANATION OF THE PERTINENCY AND MANNER OF APPLYING THE CITED ART TO CLAIMS 1-14 OF THE '583 PATENT

A. Explanation of Pertinent Disclosure in the Cited Art

GB 2 405 820 (GB '820)

GB '820 was published on March 16, 2005, which is more than one year prior to the earliest possible effective filing date of the '583 patent (February 14, 2016), and so GB '820 is prior art under 35 U.S.C. 102 relative to the '583 patent.

GB '820 discloses a hole-cutting tool, for cutting holes in mild steel, e.g., for cutting holes in the webs of I-beams (GB '820, page 1, lines 3-8). The tool comprises an elongate tube having at one end teeth, and fluting extending from

between the teeth spirally along the tube, in which the external diameter of the tool is stepped (GB '820, page 1, lines 15-19).

GB '820 discloses that there may be three diameters (two steps), and that a useful set of steps is, for instance, 14mm, 18mm and 22mm external diameter (GB '820, page 1, lines 22-28). GB '820 discloses that each step may have the same axial length (GB '820, page 1, lines 28-29). GB '820 discloses that the shoulders of the steps are preferably angled at about 45° to the axis (GB '820, page 1, lines 29-30).

GB '820 describes an embodiment of a hole-cutting tool 1 in Figs. 1, 2A, 2B and 3 (GB '820, page 2, lines 14-20). According to GB '820:

In Fig. 1 a hole-cutting tool 1 comprises a shaft 3 to be inserted into and held in a power tool, and a main drill portion or business end 5. The drill portion has teeth 15 at its axial front end with spiral, i.e., generally helical, fluting 17 extending from between the teeth, forming spiral ridges which do the drilling. In this embodiment, there are four teeth and four flutes, but there could be more or fewer. At the business end there is a gash 16 between each pair of teeth.

The drill portion has three sections of constant diameter stepped to increase away from the business end. The section 14 at the front end has a diameter of 14mm, the second section 18 has a diameter of 18mm and the third section 22 has a diameter of 22mm. Each of these sections is 15mm in axial length. Between each pair of sections there are corresponding inclined steps or countersinks 20 and 24, whose shoulders are angled at about 45° to the axis, as seen in an axial plane.

(GB '820, page 2, line 24 - page 3, line 3).

US 2005/0053438 (US '438)

US '438 was granted on an application filed in the U.S. on September 7, 2004, i.e., before the earliest possible effective filing date of the '583 patent (February 14, 2016), and so US '438 is prior art under 35 U.S.C. 102 relative to the '583 patent.

US '438 discloses “a drill bit for cutting accurately formed round holes of uniform diameter through wood, metal and plastics” (US '438, paragraph [0002]).

According to US '438:

It is an object of the present invention to maintain the strength and self-centering capabilities of prior art drill bits while improving drilling speed. This is achieved by an elongate drill bit with a longitudinal axis. The drill bit comprising a shank, a working end and a fluted section located between the shank and the working end. The shank, the working end and the fluted section are all formed integrally in the drill bit. The working end comprises an outer cutting portion and a central pilot tip which extends axially ahead of the outer cutting portion. The pilot tip is formed with at least one pair of minor cutting edges arranged on opposite sides of the axis.

(US '438, paragraph [0008]).

Fig. 1 of US '438 depicts a drill bit 20 “for cutting a variety of material such as metal, wood, plastics, plastics [sic], piping and tubing” (US '438, paragraph [0027]). The drill bit 20 has a shank end 22, a working end 24 and a fluted section 26 between the shank end 22 and the working end 24 (US '438, paragraph [0027]).

Referring to Fig. 1, the working end 24 includes an outer cutting portion 34 with a major diameter D and a pilot tip 36 with a minor diameter d that is smaller than the major diameter D (US '438, paragraph [0028]).

As disclosed in US '438, paragraph [0028], the pilot tip 36 has a split point

cutting edge arrangement at its extreme end 38 (see Fig. 2). The cutting edge arrangement is formed with a pair of inner minor cutting edges 40, 42 separated by a slight chisel edge 38 extending between the cutting edges 40, 42. The chisel edge 38 is perpendicular to the axis X-X. The split point is also formed with a pair of outer minor cutting edges 44, 46. Each minor cutting edge tapers radially outwardly from a respective inner minor cutting edge 40, 42 to the periphery of the minor diameter d of the pilot tip 36.

The pilot tip 36 is also formed with a pair of rounded circumferential outer surfaces 56, 58 (US '438, paragraph [0029])(see Figs. 2 and 3). Each outer surface 56, 58 extends axially rearward on opposite sides of the pilot tip 36 (US '438, paragraph [0029]). The outer surface 56 is formed with a forward edge 60 and a trailing edge 62, and the outer surface 58 is formed with a forward edge 64 and a trailing edge 66 (each in the direction of rotation R)(US '438, paragraph [0029]).

The outer cutting portion 34 is formed with a pair of major cutting edges 70, 72 (US '438, paragraph [0032])(see Fig. 2).

Accordingly, as most easily seen in Fig. 4, the drill bit 20 comprises a pilot tip 36 that includes a chisel edge 38 at its center, first and second inner minor cutting edges 40, 42 extending from opposite sides of the chisel edge 38, a first outer minor cutting edge 44 extending from the inner minor cutting edge 40, and a second outer minor cutting edge 46 extending from the inner minor cutting edge 42, i.e., each of the first and second inner minor cutting edges 40 and 42 is intersected with a respective outer minor cutting edge 44, 46 and the chisel edge 38.

CN 203356678 (CN '678)

CN '678 was published on December 25, 2013, which is more than one year prior to the earliest possible effective filing date of the '584 patent (February 14, 2016), and so CN '678 is prior art under 35 U.S.C. 102 relative to the '584 patent.

Submitted herewith is a translation of CN '678. Referring to the translation, and to Figs. 1 and 2, CN '678 discloses a twist drill that comprises first and second

main cutting edges that are segmented (CN '678, Abstract). The first main cutting edge is segmented to be two segments, namely, an outer protruding edge and an inner sunken edge (CN '678, Abstract). The second main cutting edge is segmented to be two segments, namely, an outer sunken edge and an inner protruding edge (CN '678, Abstract). The twist drill is characterized in that the two main cutting edge segments have asymmetrical edge heights on the same circumference (CN '678, Abstract). The twist drill further comprises a center drill tip 5 and a chisel edge 8 (CN '678, Abstract).

CN '678 discloses that the asymmetric height difference of the cutting edge heights of the main cutting edge segments on the same circumference is 0.05 mm to 0.30 mm (CN '678, paragraph [0010]).

Figs. 1 and 2 depict an embodiment that comprises a segmented outer protruding edge 1, a segmented outer sunken edge 2, a segmented inner sunken edge 3, a segmented inner protruding edge 4, a center drill tip 5, a chisel edge 8, a twist drill body 9, and an edge back 10 (CN '678, paragraph [0022]).

According to CN '678, the grinding height h_2 of the segmented outer sunken edge 2 is greater than the height h_1 of the segmented outer protruding edge 1, and the grinding height h_3 of the segmented inner sunken edge 3 is greater than the height h_4 of the segmented inner protruding edge 4 (CN '678, paragraph [0024]). The twist drill also includes grooves 6 and 7, as well as spiral flutes (CN '678, Fig. 2, clockwise rotationally just beyond the cutting edges) that each have sidewalls.

Attached as Appendix A are annotated Figs. 1 and 2 from CN '678. In the following discussion, references to "A", "B", "C", "D", and "d" refer to the annotations in Appendix A.

The twist drill of CN '678 comprises a top blade that comprises (i) a chisel edge 8 (where the two regions "A" meet), (ii) a first pair of edges, the first edge extending away from a first end of the chisel edge 8, the second edge extending away from a second (opposite) end of the chisel edge (each of these edges extending along a portion of a first edge of a respective one of the two regions "A"), (iii) a pair

of straight cutting edges, each one extending from a first end (remote from the chisel edge) of a respective one of the first edges to a second end, and (iv) a pair of minor cutting edges (labeled “d” in annotated Fig. 1), each one extending from the second end of one of the respective straight cutting edges to a surface “B”.

The twist drill shown in Figs. 1 and 2 of CN ‘678 comprises a first composite cutting blade group (comprising the conical step surface “B” and the cylindrical step surface between surface “B” and surface “C”), and a second (or next) composite cutting blade group (comprising the conical step surface “C” and the initial part of the drill extending downward – in the orientation depicted in Fig. 1 – below the section “C”). It would have been obvious to people of skill in the art to provide one or more additional composite cutting blade groups, e.g., so that the twist drill includes three (or more) composite cutting blade groups instead of two, e.g., (i) because CN ‘678 does not disclose any reason to limit the device to two composite cutting blade groups, and/or (ii) to provide a twist drill that has a larger diameter.

People of skill in the art recognize that the regions labeled “D” in Appendix A are flutes, and that they would provide the function well known to be provided by flutes in twist drills.

People of skill in the art recognize that the portion of the twist drill shown in Fig. 1 that extends downward (in the orientation depicted in Fig. 1) from below the second composite cutting blade group is a cylinder portion, i.e., the shape of a cylinder, minus the flutes, and depicting the twist of the drill.

People of skill in the art would recognize that the cutting blade groups in the device disclosed in CN ‘678 are configured to crush cutting chips into finer chips, and to shunt the finer chips (and that they would do so in use), in the same way that the cutting blade groups in the ‘583 patent do. People of skill in the art would also recognize that the cylindrical step surfaces in the device disclosed in CN ‘678 are configured to smooth the machined surface of the workpiece to improve surface quality (and, as noted above, that they would do so in use), in the same way that the cutting blade groups in the ‘583 patent do.

US 2011/0116884 (US '884)

US '884 discloses a helical bit tool, comprising a bit head, characterized in that the bit head is integratively provided with multiple helical pieces, each helical piece has a side cutting edge that faces the direction of cutting operation, a step area is formed on the top surface of the bit head, in which a step or multiple steps are formed with progressively lower heights from the center of the top surface to the outer flank, the periphery of every step is inclined with respect to the periphery of the bit head, and the intersection of the upright cutting face and the step area at its back side forms a chisel edge (US '884, paragraph [0005]).

FIG. 1 of US '884 depicts an embodiment that comprises: a bit head 1, which is integratively provided with two helical pieces 2, the surface of the side cutting edge 3 that faces the direction of cutting forms a cutting face 4, the step area 7 is formed on the top surface 6 of the bit head 1, in which a step or multiple steps are formed with progressively lower heights from the center O of the top surface to the outer flank, and the periphery of every step is inclined with respect to the periphery of the bit head 1 (US '884, paragraph [0023]). The intersection of the upright cutting face 15 and the step area at its backside forms a chisel edge 11 (US '884, paragraph [0024]).

The tool disclosed in US '884 is a drill that comprises helical grooves, and so it is a twist drill in accordance with the '583 patent. Although the drawings (e.g., Fig. 1) show a large degree of twist, people of skill in the art would understand that the tool comprises a cylinder portion below (in the orientation shown in Fig. 1) the top surface 6.

The “last” composite cutting blade group in the twist drill disclosed in '583 patent comprises a conical step surface and a cylindrical step surface that has the same diameter as the cylinder portion. The only possible interpretation of the '583 patent is that the “last composite cutting blade group located at the rear end of the cone portion immediately adjacent to the cylinder portion,” which must have a diameter that is equal to the cylinder portion diameter, must include a portion of the

drill that is of the same diameter as the cylinder portion and that merges seamlessly with the cylinder portion (i.e., as in the drill shown in the '583 patent). The '583 patent does not give any indication as to the location where the cylindrical step surface of the last composite cutting blade group ends and where the cylinder portion begins, and so the scope of the claims in the '583 encompasses twist drills in which such location is anywhere along the length of the cylinder portion.

B. Explanation of the Manner of Applying the Cited Art to Claims 1-14 of the '583 Patent

Reasons that claim 1 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over GB '820

Claim 1 recites a twist drill. The '583 patent does not define "twist drill," nor does it describe attributes that dictate whether something is a twist drill. "Twist drill" is understood by those of skill in the art to encompass at least drills that have helical grooves. The tool disclosed in GB '820 is a drill that comprises helical grooves, and so it is a twist drill in accordance with the '583 patent.

Claim 1 (and claim 8) of the '583 patent recites an operation portion that comprises a cone portion and a cylinder portion. The cone portion 11 shown in Fig. 3 is generally cone-shaped, with a number of step surfaces in which the maximum diameter of the respective steps decreases as the distance from the top blade decreases (similar to how the circumference of a cone decreases as the distance from the tip decreases). The cylinder portion 12 shown in Fig. 3 is the shape of a cylinder, minus the spiral flute, and by rotating the drill 100 about its axis, the radially outermost regions of the cylinder portion 12 of the drill 100 define a cylindrical imaginary surface.

In the tool disclosed in GB '820 (see Fig. 2A), the 14mm (diameter) section, the first inclined step between the 14mm section and the 18mm section, the 18mm section, the second inclined step between the 18mm section and the 22mm section,

and a portion of the 22mm section that abuts the second inclined step, together satisfy all of the features of the cone portion as recited in claim 1.

In the tool disclosed in GB '820, a portion of the 22mm section that is not abutting the second inclined step satisfies all of the features of the cylinder portion recited in claim 1.

The cone portion of the GB '820 tool and the cylinder portion of the GB '820 tool are axially fixed, and therefore they together satisfy the features of the operation portion recited in claim 1.

Claim 1 recites a shank portion axially fixed to the cylinder portion opposite the cone portion.

The shaft 3 of the GB '820 tool is axially fixed to the cylinder portion of the GB '820 tool, opposite the cone portion of the GB '820 tool.

Claim 1 recites a spiral flute formed on an exterior surface of the operating portion extending from a front end of the cone portion and at least partway up the cylinder portion.

Each of the flutes in the GB '820 tool is spiral, and each is formed on an exterior surface of the operating portion extending from a front end of the cone portion and at least partway up the cylinder portion.

Claim 1 recites that the spiral flute has a sidewall.

Each of the spiral flutes in the GB '820 tool has a sidewall.

Claim 1 recites a plurality of composite cutting blade groups formed sequentially and spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion. The broadest reasonable interpretation of "plural" is two or more.

The tool depicted in Figs. 1, 2A, 2B and 3 of GB '820 tool comprises:

a first composite cutting blade group comprising (1) the first inclined step between the 14mm section and the 18mm section, and (2) the 18mm section, and

a second composite cutting blade group comprising (3) the second inclined step between the 18mm section and the 22mm section, and (4) the portion of the 22mm section that abuts the second inclined step.

In addition, while not necessary to demonstrate that GB '820 anticipates claim 1 of the '583 patent, it would have been obvious to a person of skill in the art to provide one (or more) additional steps, such that the twist drill includes three (or more) composite cutting blade groups, because GB '820 does not disclose any reason to limit the number of composite cutting blade groups, and/or to provide a twist drill that has a larger diameter.

It is unclear, from review of the '583 patent and its prosecution history, whether the expression "formed sequentially and spirally on a cone portion exterior from a front end of the cone portion to a rear end of the cone portion" is intended to mean [1] that individual conical first step surfaces and/or individual cylindrical second step surfaces extend spirally, or [2] that a series of composite cutting blade groups are spaced from each other such that corresponding locations on respective composite cutting blade groups are spaced from each other along a spiral pattern (e.g., points (where respective lateral ends of cutting blade groups intersect with a flute) that are axially spaced from each other in one direction (e.g., from the top blade toward the shank) are circumferentially offset from each other in the same circumferential direction (i.e., clockwise or counter-clockwise). Because claim 1 recites that the plurality of composite cutting blade groups are formed "sequentially and spirally" on the cone portion exterior, and it would not make sense to state that a single composite cutting blade group is formed "sequentially," it appears to be more likely that claim 1 is intended to require that the composite cutting blade groups are formed "spirally" with respect to each other (in the same way that the composite cutting blade groups are formed "sequentially" with respect to each other).

In any event, the broadest reasonable interpretation of claim 1 encompasses twist drills in which a series of composite cutting blade groups are spaced from each

other such that corresponding locations on respective composite cutting blade groups are spaced from each other along a spiral pattern, i.e., corresponding locations that are axially spaced from each other in one direction (e.g., from the top blade toward the shank) are circumferentially offset from each other in the same circumferential direction (i.e., clockwise or counter-clockwise).

In the GB '820 tool, the first and second composite cutting blade groups are spaced from each other such that corresponding locations on respective composite cutting blade groups are spaced from each other along a spiral pattern (i.e., the conical first step surfaces of the respective cutting blade groups that are axially spaced from each other in one direction (e.g., from the top blade toward the shank) are circumferentially offset from each other in the same circumferential direction (i.e., clockwise or counter-clockwise).

Claim 1 recites that each of the plurality of composite cutting blade groups comprises: (1) a conical first step surface; (2) a cylindrical second step surface adjacent to the conical first step surface, (3) a major cutting edge defined by the intersection of the conical first step surface and the sidewall of the spiral flute; (4) a minor cutting edge defined by the intersection of the cylindrical second step and the sidewall of the spiral flute; and (5) a cutting tip defined by the intersection of the major cutting edge, the minor cutting edge, and the sidewall of the spiral flute.

The '583 patent does not define "conical" or "cylindrical" in the context of "the conical first step surface" or "the cylindrical second step surface," respectively. As shown in Fig. 3 of the '583 patent, the first step surface 141 is conical in the sense that points that are closer to the top blade are closer to the axis, and the second step surface 142 is cylindrical in that apparently all of the points on the surface are substantially the same radial distance from the axis.

The '583 patent also does not specify the characteristics that a cutting edge is required to have in order to be considered a "major" cutting edge (i.e., in the expression "major cutting edge") or the characteristics that a cutting edge is required to have in order to be considered a "minor" cutting edge (i.e., in the expression

“minor cutting edge”). Each of the major cutting edges in the embodiments described in the ‘583 patent is conical (as that term is used in the ‘583 patent), and each of the minor cutting edges in the embodiments described in the ‘583 patent is cylindrical (as that term is used in the ‘583 patent).

Each of the first and second composite cutting blade groups in the GB ‘820 tool comprises a conical step part and a cylindrical step part (as “conical” and “cylindrical” are used in the ‘583 patent). In each of the cutting blade groups in the GB ‘820 tool: a major cutting edge (as that expression is used in the ‘583 patent) is defined by the intersection of the conical step part and the sidewall of the spiral flute; a minor cutting edge (as that expression is used in the ‘583 patent) is defined by the intersection of the cylindrical step part and the sidewall of the spiral flute; and a cutting tip is defined by the intersection of the major cutting edge, the minor cutting edge, and the sidewall of the spiral flute.

Claim 1 recites (later in the claim) that the last composite cutting blade group located at the rear end of the cone portion immediately adjacent to the cylinder portion has a diameter that is equal to the diameter of the cylinder portion. As noted above, the only possible interpretation of the ‘583 patent is that the “last composite cutting blade group located at the rear end of the cone portion immediately adjacent to the cylinder portion,” which must have a diameter that is equal to the cylinder portion diameter, must include a portion of the drill that is of the same diameter as the cylinder portion and that merges seamlessly with the cylinder portion (i.e., as in the drill shown in the ‘583 patent). In other words, the part of the twist drill that is below the last conical first step surface (i) is the shape of a cylinder, minus the flutes, and (ii) comprises both a cylindrical second step surface (i.e., the cylindrical second step surface of the last composite cutting blade group) and the cylinder portion, and the ‘583 patent does not limit in any way the location of demarcation between the cylindrical second step surface and the cylinder portion.

Claim 1 recites that the twist drill further comprises a top blade provided on the front end of the cone portion. The ‘583 patent does not specify the

characteristics that a structure is required to have in order to be considered a “top blade.” The top blade in Fig. 3 extends from the frontmost portion of the drill.

The GB ‘820 tool depicted in Figs. 1, 2A, 2B and 3 comprises four teeth at its axial front end. Any one of the teeth of GB ‘820, or combinations of those teeth, falls within the scope of a top blade as recited in claim 1.

Claim 1 recites that a diameter of each of the plurality of composite cutting blade groups increases sequentially from the front end of the cone portion to the rear end of the cone portion.

In the GB ‘820 tool, the diameter of the second composite cutting blade group is 22mm, i.e., larger than the diameter of the first composite cutting blade group, which is 18mm.

Claim 1 recites that each of the plurality of composite cutting blade groups is configured to crush cutting chips into finer chips. The ‘583 patent does not describe any specific characteristics that are required in order for a structure to be “configured to crush cutting chips into finer chips.”

People of skill in the art would recognize that in use, the composite cutting blade groups in the GB ‘820 tool would crush cutting chips into finer chips, in the same way that the composite cutting blade groups in the ‘583 patent would crush cutting chips into finer chips.

Claim 1 recites that the spiral flute is configured to shunt the finer chips. The ‘583 patent does not describe any specific characteristics that are required in order for a structure to be “configured to shunt the finer chips.”

People of skill in the art would recognize that in use, the spiral flutes of the GB ‘820 tool would shunt the finer chips, in the same way that the spiral flutes in the ‘583 patent would shunt the finer chips.

Claim 1 recites that at least one cylindrical second step surface is immediately adjacent to a conical first step surface of a next composite cutting blade group.

In the GB ‘820 tool, the cylindrical step surface of the first composite cutting blade group (i.e., the 18mm section) is adjacent to the conical step surface of the

second composite cutting blade group (i.e., the second inclined step between the 18mm section and the 22mm section).

Claim 1 recites that the diameter of the last composite cutting blade group located at the rear end of the cone portion immediately adjacent to the cylinder portion is equal to the cylinder portion diameter.

In the GB '820 tool, the diameter of the second (and last) composite cutting blade group is 22mm, which is equal to the cylinder portion diameter. As noted above, the only possible interpretation of the '583 patent is that the "last composite cutting blade group located at the rear end of the cone portion immediately adjacent to the cylinder portion," which must have a diameter that is equal to the cylinder portion diameter, must include a portion of the drill that is of the same diameter as the cylinder portion and that merges seamlessly with the cylinder portion (i.e., as in the drill shown in the '583 patent).

Reasons that claim 1 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over CN '678

Claim 1 recites a twist drill. As noted above, "twist drill" is understood by those of skill in the art to encompass at least drills that have helical grooves. The tool disclosed in CN '678 is referred to as a twist drill and it comprises helical grooves, and so it is a twist drill in accordance with the '583 patent.

As discussed in detail below, the twist drill in CN '678 satisfies the features of the operation portion and the shank portion recited in claim 1, each of the two spiral flutes satisfies the features of the spiral flute recited in claim 1, and the cutting blade groups of CN '678 satisfy the features of the plurality of composite cutting blade groups recited in claim 1.

The portion of the twist drill in CN '678 in annotated Fig. 1 including the first and second composite cutting blade groups is a cone portion, as that expression is used in the '583 patent, i.e., it is generally cone-shaped, with a number of step surfaces in which the maximum diameter of the respective steps decreases as the

distance from the top blade decreases.

As noted above, the portion of the twist drill in CN '678 in annotated Fig. 1 below the second composite cutting blade group is a cylinder portion as that expression is used in the '583 patent, i.e., it is the shape of a cylinder, minus the spiral flute, and by rotating the device about its axis, the radially outermost regions of the twist drill of CN '678 define a cylindrical imaginary surface.

People of skill in the art would recognize that a shank portion would be axially fixed to the cylinder portion of the twist drill of CN '678, opposite the cone portion. In addition, it is obvious that a shank portion would be axially fixed to the cylinder portion of the twist drill of CN '678, opposite the cone portion, and it would be obvious to provide a standard shank portion axially fixed to the cylinder portion of the twist drill of CN '678, opposite the cone portion, in order to operate the twist drill by connecting it to a drill.

As noted above, each of the spiral flutes in CN '678 is formed on an exterior surface of the twist drill, starting from the chisel 8 and extending through the first cutting blade group and the next (second) composite cutting blade group.

As noted above, each of the two spiral flutes in the twist drill disclosed in CN '678 has a sidewall.

As noted above, the first and second composite cutting blade groups are formed on an exterior of the cone portion of the twist drill from a front end of the cone portion to a rear end of the cone portion, and each composite cutting blade group comprises a conical (as that expression is used in the '583 patent in relation to the conical first step surface, in the sense that points that are closer to the top blade are closer to the axis) step surface and a cylindrical (as that expression is used in the '583 patent in relation to the cylindrical second step surface, in the sense that all of the points on the surface are substantially the same radial distance from the axis) step surface. The composite cutting blade groups are formed spirally with respect to each other, i.e., points (where respective lateral ends of cutting blade groups intersect with a flute) that are axially spaced from each other in one direction (e.g., from the top

blade toward the shank) are circumferentially offset from each other in the same circumferential direction (i.e., clockwise or counter-clockwise).

As noted above, each of the composite cutting blade groups in the twist drill disclosed in CN '678 comprises a conical step surface and a cylindrical step surface. In each of the cutting blade groups:

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

a minor cutting edge is defined by the intersection of the cylindrical step surface and the sidewall of the spiral flute; and

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

As noted above, the device disclosed in CN '678 comprises a top blade that comprises a chisel edge 8, a pair of auxiliary edges (the first one extending away from a first end of the chisel edge 8, the second one extending away from a second (opposite) end of the chisel edge 8), a pair of straight major cutting edges (each one extending from a first end (remote from the chisel edge 8) of a respective one of the auxiliary edges to a second end of the straight major cutting edge 8), and a pair of minor cutting edges (labeled "d" in annotated Fig. 1) (each extending from the second end of a respective straight major cutting edge).

The center drilling tip in the device disclosed in CN '678 comprises a "top blade" as that expression is used in the '583 patent, i.e., in the sense that it extends to and includes the frontmost portion of the drill.

As shown in Figs. 1 and 2 of CN '678, the diameter of each of the plurality of composite cutting blade groups in the device disclosed in CN '678 increases sequentially from the front end of its cone portion to the rear end of its cone portion.

People of skill in the art would recognize that the composite cutting blade groups in the device disclosed in CN '678 are configured to crush cutting chips into finer chips (and that they would do so in use).

People of skill in the art would recognize that the composite cutting blade groups in the device disclosed in CN '678 are configured to shunt the finer chips (and that they would do so in use).

As shown in Figs. 1 and 2 of CN '678, in the device disclosed in CN '678, a cylindrical step surface of the composite cutting blade group is immediately adjacent to a conical step surface of the next composite cutting blade group.

As shown in Figs. 1 and 2 of CN '678, the diameter of the second composite cutting blade group, i.e., the composite cutting blade group that is located at the rear end of the cone portion immediately adjacent to the cylinder portion, is equal to the diameter of the cylinder portion, in the same way that the twist drill disclosed in the '583 patent satisfies that recitation.

Reasons that claim 2 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over GB '820

Claim 2 of the '583 patent depends from claim 1, and recites that the minor cutting edge is configured to smooth the machined surface of the workpiece to improve surface quality.

As noted above, the GB '820 tool satisfies the features recited in claim 1 of the '583 patent.

The '583 patent does not describe any specific characteristics that are required in order for a structure to be "configured to smooth the machined surface of the workpiece to improve surface quality," or what is required to constitute smoothing a surface or improving surface quality. The '583 patent discloses (see col. 8, line 67 - col. 9, line 4) that "The minor cutting edge of the composite cutting blade has a certain axial auxiliary angle (also known as a side clearance angle), so it only act [sic] as to smooth (rather than cut) the surface of the machined surface, thereby

improve the surface quality.” As noted above, however, claim 1 (from which claim 2 depends) recites that the second step surface of each composite cutting blade group is cylindrical. Accordingly, a minor cutting edge defined by an intersection of a cylindrical second step and a sidewall of a spiral flute must fall within the scope of “the minor cutting edge is configured to smooth the machined surface of the workpiece to improve surface quality.”

As noted above, GB ‘820 comprises minor cutting edges defined by the intersections of the respective cylindrical steps and the sidewall of the spiral flute, and therefore it satisfies the feature recited in claim 2.

Reasons that claim 2 of the ‘583 patent should be found to be invalid under 35 U.S.C. 102 over CN ‘678

As noted above, the twist drill of CN ‘678 satisfies the features recited in claim 1 of the ‘583 patent.

As also noted above, a minor cutting edge defined by an intersection of a cylindrical second step and a sidewall of a spiral flute must fall within the scope of “the minor cutting edge is configured to smooth the machined surface of the workpiece to improve surface quality.” CN ‘678 includes cutting edges each defined by an intersection of a cylindrical second step and a sidewall of a spiral flute. Therefore, the twist drill disclosed in CN ‘678 satisfies the feature recited in claim 2.

Reasons that claim 3 of the ‘583 patent should be found to be invalid under 35 U.S.C. 102 over GB ‘820

Claim 3 depends from claim 1, and recites that a height of each composite cutting blade group is uniform. The 583 patent discloses that:

heights of the composite blade groups arranged on the exterior surface of the cone portion 11 from the front end to the rear end varies uniformly or irregularly. As shown in FIG. 3, $l_1, l_2, l_3 \dots l_n$ are heights of respective composite cutting blade groups.

(the 583 patent, col. 7, lines 17-21). It is unclear, from review of the 583 patent and its prosecution history, whether the expression “a height of each composite cutting blade group is uniform” is intended to mean [1] that for each individual blade group, the height is the same at each location on that blade group, [2] that the height of each blade group is the same as the height of every other blade group, or [3] that each blade group has a height that is the same as a height of every other blade group.

As noted above, the GB ‘820 tool satisfies the features recited in claim 1 of the ‘583 patent.

As also noted above, in the GB ‘820 tool, each of the sections (i.e., the 14mm section, the 18mm section and the 22mm section) is 15mm in axial length, and between each pair of sections are inclined steps whose shoulders are angled at about 45° to the axis, the inclined steps extending in each case between sections whose respective diameters differ by the same amount, i.e., 4mm. In addition, for each of the composite cutting blade groups, a height of the composite cutting blade group does not differ at different circumferential locations. Accordingly, under each of the possible interpretations of claim 3, the height of each of the composite cutting blade groups in GB ‘820 are the same, i.e. they are uniform.

Reasons that claim 3 of the ‘583 patent should be found to be invalid under 35 U.S.C. 103 over CN ‘678 alone and over CN ‘678 in view of GB ‘820

As noted above, the twist drill of CN ‘678 satisfies the features recited in claim 1 of the ‘583 patent.

The respective heights of the composite cutting blade groups is a variable that is described in CN ‘678 (especially in paragraph [0029]), and employing different combinations of heights would certainly be within the technical grasp of a skilled artisan in consideration of the disclosure in CN ‘678. Moreover, the ‘583 patent does not describe any effect obtained by a height of each composite cutting blade group being uniform. Accordingly, it would have been obvious, in view of CN ‘678, to provide a device that falls within any of the possible interpretations of claim 3 of

the '583 patent (e.g., that each blade group has a height that is the same as a height of every other blade group).

In addition, as noted above, GB '820 discloses a twist drill with a plurality of composite cutting blade groups, in which the heights of the respective composite cutting blade groups are the same, and, for each of the composite cutting blade groups, a height of the composite cutting blade group does not differ at different circumferential locations. Accordingly, it would have been obvious, in view of CN '678 and GB '820, to provide a device that falls within the scope of claim 3 of the '583 patent.

Reasons that claim 4 of the '583 patent should be found to be invalid under 35 U.S.C. 102 or 103 over CN '678

Claim 4 depends from claim 1, and recites that a height of each composite cutting blade group is varied irregularly.

As noted above, the twist drill of CN '678 satisfies the features recited in claim 1 of the '583 patent.

The '583 patent does not describe what is required for heights to be “varied irregularly.” It is unclear, from review of the '583 patent and its prosecution history, whether the quoted expression is intended to mean [1] that for each individual blade group, the height is varied at least at some location on that blade group, or [2] that there is at least one instance where the height of one blade group differs from the height of at least one other blade group, i.e., there is at least one instance where the height is not the “regular” height, or [3] that each blade group exhibits something that is more irregular than its height varying to some degree at some location (or over its entirety), i.e., in which the height is “varied irregularly” vs. just being “varied”.

Under the broadest reasonable interpretation of claim 4, the twist drill disclosed in CN '678 satisfies claim 4 (or at least renders obvious a device that satisfies claim 4). CN '678 discloses that the asymmetric height difference of the

cutting edge heights of the main cutting edge segments on the same circumference is 0.05 mm to 0.30 mm. This disclosure in CN '678 indicates that the height of each composite cutting blade group differs from the height of at least one other composite cutting blade group (unless the differences in height were somehow compensated for in other parts of the composite cutting blade groups, for which there is no disclosure or suggestion in CN '678).

Reasons that claim 5 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over GB '820 in view of US '438

Claim 5 depends from claim 1, and recites that the top blade comprises a chisel edge, two auxiliary cutting edges and two straight major cutting edges, and that the auxiliary cutting edge is respectively intersected with the straight major cutting edge and the chisel edge. Accordingly, in the top blade, at least one auxiliary cutting edge (or possibly both auxiliary cutting edges) intersects with both a chisel edge and a straight major cutting edge.

As noted above, the GB '820 tool satisfies the features recited in claim 1 of the '583 patent.

The '583 patent does not describe characteristics that are required in order for a structure to be a chisel edge, an auxiliary cutting edge or a straight major cutting edge. As noted above, each of the major cutting edges in the embodiments described in the '583 patent is an edge of a region that is "conical" (as that term is used in the '583 patent).

As noted above, US '438 discloses a drill bit for cutting accurately formed round holes of uniform diameter through wood, metal and plastics. An object according to US '438 is to maintain the strength and self-centering capabilities of prior art drill bits while improving drilling speed, and that object is achieved by the drill bit of US '438, which comprises a working end comprising an outer cutting portion and a central pilot tip which extends axially ahead of the outer cutting portion.

As noted above, US ‘438 discloses a drill bit 20 that comprises a pilot tip 36 that includes a chisel edge 38 at its center, first and second inner minor cutting edges 40, 42 extending from opposite sides of the chisel edge 38, a first outer minor cutting edge 44 extending from the inner minor cutting edge 40, and a second outer minor cutting edge 46 extending from the inner minor cutting edge 42, i.e., each of the first and second inner minor cutting edges 40 and 42 is intersected with a respective outer minor cutting edge 44, 46 and the chisel edge 38.

In determining the scope of the prior art under 35 U.S.C. §103, it is presumed that an inventor of ordinary skill has full knowledge of all prior art in the field of his endeavor. In re Wood, 599 F2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979).

A person of skill in the art would recognize that the self-centering capabilities of the drill bits according to US ‘438 are affected by, if not dictated by, the pilot tip, which “extends axially ahead of the outer cutting portion” (US ‘438, paragraph [0008]).

If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. KSR International Co. v. Teleflex Inc., 82 USPQ2D 1385, 1396 (US SupCt 2007).

Accordingly, it would have been obvious to people of ordinary skill in the art to modify the tool of GB ‘820 such that instead of the axial front end that comprises teeth (four teeth, or more or fewer teeth – see GB ‘820, page 2, line 22 - page 3, line 3), the tool has a pilot tip as disclosed in US ‘438, in order to provide self-centering capabilities.

Such a modified tool would have a chisel edge at its center, first and second inner cutting edges extending from opposite sides of the chisel edge, a first outer cutting edge extending from the inner cutting edge, and a second outer minor cutting edge extending from the inner minor cutting edge (i.e., each of the first and second inner cutting edges would be intersected with a respective outer minor cutting edge

and the chisel edge).

The chisel edge of the modified tool (i.e., a chisel edge as disclosed in US '438) satisfies all of the features of the chisel edge recited in claim 5. The first and second inner cutting edges extending from opposite sides of the chisel edge of the modified tool (i.e., cutting edges corresponding to the first and second inner minor cutting edges disclosed in US '438) satisfy all of the features of the auxiliary cutting edges recited in claim 5. The first and second outer cutting edges extending from the respective inner cutting edges of the modified tool, i.e., cutting edges corresponding to the first and second outer minor cutting edges disclosed in US '438, shown in US '438 (e.g., Fig. 2) as being conical, satisfy all of the features of the straight major cutting edges recited in claim 5. Accordingly, the modified tool would satisfy recitation in claim 5 that the drill comprises a top blade that comprises a chisel edge, two auxiliary cutting edges and two straight major cutting edges, and that the auxiliary cutting edge is respectively intersected with the straight major cutting edge and the chisel edge.

Accordingly, in view of US '438, it would have been obvious to modify the GB '820 tool such that it also satisfies the features recited in claim 5 of the '583 patent.

Reasons that claim 5 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over CN '678

As noted above, the twist drill of CN '678 satisfies the features recited in claim 1 of the '583 patent.

As also noted above, the device disclosed in CN '678 comprises a top blade that comprises a chisel edge 8, a pair of auxiliary edges, and a pair of straight major cutting edges, in which each auxiliary cutting edge intersects with the chisel edge and with one of the straight major cutting edges.

Reasons that claim 6 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over GB '820

Claim 6 depends from claim 1, and recites that each of the plurality of composite cutting blade groups is coaxial with the cone portion.

As noted above, the GB '820 tool satisfies the features recited in claim 1 of the '583 patent.

As noted above, in the GB '820 tool, between each pair of sections are inclined steps whose shoulders are angled at about 45° to the axis, meaning that the first inclined step between the 14mm section and the 18mm section, the 18mm section, the second inclined step between the 18mm section and the 22mm section, and the portion of the 22mm section that abuts the second inclined step, are all necessarily coaxial.

Reasons that claim 6 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over CN '678

As noted above, the twist drill of CN '678 satisfies the features recited in claim 1 of the '583 patent.

As shown in Figs. 1 and 2, and as would be understood by people of skill in the art, in the twist drill disclosed in CN '678, each of the composite cutting blade groups is coaxial with the cone portion.

Reasons that claim 7 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over CN '678

Claim 7 of the '583 patent depends from claim 1, and recites that "a straight major cutting edge length of the top blade is greater than each of the major cutting edges of the plurality of composite cutting blade groups."

As noted above, the twist drill of CN '678 satisfies the features recited in claim 1 of the '583 patent.

As also noted above, the device disclosed in CN '678 comprises a top blade

that comprises a chisel edge 8, a pair of auxiliary edges, and a pair of straight major cutting edges. Altering the respective lengths of the top blade (and its components) and the major cutting edges of the plurality of composite cutting blade groups is something that would certainly be within the technical grasp of a skilled artisan in consideration of the disclosure in CN '678, and CN '678 contains no disclosure that indicates that the length of the top blade (or its components) should not be enlarged, e.g., for a larger diameter twist drill. Moreover, the '583 patent does not describe any effect obtained by the straight major cutting edge length of the top blade being greater than each of the major cutting edges of the plurality of composite cutting blade groups. Accordingly, it would have been obvious, in view of CN '678, to provide a device that falls within the scope of claim 7 of the '583 patent.

Reasons that claim 8 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over GB '820 in view of US '438

Claim 8 of the '583 patent recites a combination of the features recited in claims 1, 2 and 5 of the '583 patent.

As noted above, the GB '820 tool satisfies each of the features recited in claim 1 and claim 2 of the '583 patent, and in view of US '438, it would have been obvious to modify the GB '820 tool such that it also satisfies the features recited in claim 5 of the '583 patent.

Reasons that claim 8 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over CN '678

Claim 8 of the '583 patent recites the combination of the features recited in claims 1, 2 and 5 of the '583 patent. As noted above, the twist drill of CN '678 satisfies each of the features recited in claims 1, 2 and 5 of the '583 patent.

Reasons that claim 9 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over GB '820 in view of US '438

Claim 9 of the '583 patent depends from claim 8 (which recites the features recited in claims 1, 2 and 5 of the '583 patent), and claim 9 recites the feature recited in claim 3, namely, that a height of each composite cutting blade group is uniform.

As noted above, the GB '820 tool satisfies the features recited in claim 1, claim 2, and claim 3 of the '583 patent. As also noted above, in view of US '438, it would have been obvious to modify the GB '820 tool such that it also satisfies the features recited in claim 5 of the '583 patent.

Reasons that claim 9 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over CN '678, or over CN '678 in view of GB '820

As noted above, the twist drill of CN '678 satisfies the features recited in claims 1, 2 and 5 of the '583 patent, and it would have been obvious, in view of CN '678, to provide a twist drill in which the height of each composite cutting blade group is uniform.

As also noted above, it would have been obvious, in view of CN '678 and GB '820, to provide a twist drill that satisfies the features recited in claims 1, 2 and 5, and in which the height of each composite cutting blade group is uniform as disclosed in GB '820.

Reasons that claim 10 of the '583 patent should be found to be invalid under 35 U.S.C. 102 or 103 over CN '678

Claim 10 of the '583 patent depends from claim 8 (which recites the features recited in claims 1, 2 and 5 of the '583 patent), and claim 10 recites the feature recited in claim 4, namely, that a height of each composite cutting blade group is varied irregularly.

As noted above, the twist drill of CN '678 satisfies the features recited in claims 1, 2 and 5 of the '583 patent.

As also noted above, the twist drill of CN '678 satisfies the broadest reasonable interpretation of the expression "a height of each composite cutting blade group is varied irregularly" in the '583 patent, or at least renders obvious a device that satisfies the broadest reasonable interpretation of that expression.

Reasons that claim 11 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over GB '820 in view of US '438

Claim 11 of the '583 patent depends from claim 8 (which recites the features recited in claims 1, 2 and 5 of the '583 patent), and claim 11 recites the feature recited in claim 6, namely, that each of the plurality of composite cutting blade groups is coaxial with the cone portion.

As noted above, the GB '820 tool satisfies the features recited in claim 1, claim 2, and claim 6 of the '583 patent.

As also noted above, in view of US '438, it would have been obvious to modify the GB '820 tool such that it also satisfies the features recited in claim 5 of the '583 patent.

Reasons that claim 11 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over CN '678

As noted above, the twist drill of CN '678 satisfies each of the features recited in claims 1, 2, 5 and 6 of the '583 patent.

Reasons that claim 12 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over CN '678

Claim 12 of the '583 patent depends from claim 8 (which recites the features recited in claims 1, 2 and 5 of the '583 patent), and claim 12 recites the feature recited in claim 7, namely, that a straight major cutting edge length of the top blade is greater than each of the major cutting edges of the plurality of composite cutting blade groups.

As noted above, the twist drill of CN '678 satisfies each of the features recited in claims 1, 2 and 5 of the '583 patent.

As also noted above, altering the respective lengths of the top blade (and its components) and the major cutting edges of the plurality of composite cutting blade groups is something that would certainly be within the technical grasp of a skilled artisan in consideration of the disclosure in CN '678, and CN '678 contains no disclosure that indicates that the length of the top blade (or its components) should not be enlarged, e.g., for a larger diameter twist drill. Moreover, the '583 patent does not describe any effect obtained by the straight major cutting edge length of the top blade being greater than each of the major cutting edges of the plurality of composite cutting blade groups. Accordingly, it would have been obvious, in view of CN '678, to provide a device that falls within the scope of claim 12 of the '583 patent.

Reasons that claim 13 of the '583 patent should be found to be invalid under 35 U.S.C. 102 or 103 over CN '678

Claim 13 of the '583 patent depends from claim 8 (which recites the features recited in claims 1, 2 and 5 of the '583 patent), and claim 13 recites that a straight minor cutting edge length of the top blade is greater than each of the minor cutting edges of the plurality of composite cutting blade groups.

As noted above, the twist drill of CN '678 satisfies each of the features recited in claims 1, 2 and 5 of the '583 patent. In the device shown in Figs. 1 and 2 of CN '678, the minor cutting edge to the left side of Fig. 1 (labeled "d" in annotated Fig. 1) has a length that is greater than each of the cylindrical step surfaces of the composite cutting blade groups, and/or it would have been obvious, in view of CN '678, to provide a device in which at least one of the minor cutting edges has a length that is greater than each of the cylindrical step surfaces of the composite cutting blade groups, because CN '678 describes height non-uniformities (e.g., see paragraph [0029]), and does not specify whether any of the cylindrical step surfaces

has a length that is greater than the minor cutting edges.

Reasons that claim 13 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over CN '678 in view of US '884

As noted above, the twist drill of CN '678 satisfies each of the features recited in claims 1, 2 and 5 of the '583 patent. As also noted above, in the device shown in Figs. 1 and 2 of CN '678, the minor cutting edge to the left side of Fig. 1 is labeled "d" in annotated Fig. 1.

As discussed above, US '884 discloses another twist drill that has a top blade and a plurality of composite cutting blade groups, including a last composite cutting blade group (i) that is immediately adjacent to a cylinder portion, and (ii) that has a diameter that is equal to the diameter of the cylinder portion. The cylindrical region in the twist drill of US '884 that is closest to the chisel edge 11 corresponds to the straight minor cutting edge of the top blade of the '583 patent, and it is larger than the next cylindrical region in the twist drill of US '583. Also, as discussed above, the '583 patent does not give any indication as to the precise location where the cylindrical step surface of the last composite cutting blade group ends and where the cylinder portion begins, and so the scope of the claims in the '583 encompasses twist drills in which such location is anywhere along the length of the cylinder portion. Therefore, in the twist drill of US '884, the cylindrical step in the last composite cutting blade group can be characterized as also being smaller than the cylindrical portion closest to the chisel edge 11.

Accordingly, it would have been obvious, in view of US '884, for the twist drill of CN '678 to comprise a straight minor cutting edge length of the top blade that is greater than each of the minor cutting edges of the plurality of composite cutting blade groups, or to modify a device according to CN '678 such that a straight minor cutting edge length of the top blade is greater than each of the minor cutting edges of the plurality of composite cutting blade groups.

Reasons that claim 14 of the '583 patent should be found to be invalid under 35 U.S.C. 103 over GB '820 in view of US '438

Claim 14 of the '583 patent depends from claim 8 (which recites the features recited in claims 1, 2 and 5 of the '583 patent), and claim 14 recites that the operation portion is configured to disperse a cutting force on each of the plurality of composite cutting blade groups within a drill hole of a workpiece when at least a portion of the cylinder portion is also within the workpiece.

As noted above, the GB '820 tool satisfies the features recited in claim 1 and claim 2 of the '583 patent.

As noted above, in view of US '438, it would have been obvious to modify the GB '820 tool such that it also satisfies the features recited in claim 5 of the '583 patent.

The '583 patent indicates that because in the GB '820 tool, a diameter of each of the plurality of composite cutting blade groups increases sequentially from the front end of the cone portion to the rear end of the cone portion (as discussed above), the feature recited in claim 14 is satisfied, i.e., the operation portion is configured to disperse a cutting force on each of the plurality of composite cutting blade groups within a drill hole of a workpiece when at least a portion of the cylinder portion is also within the workpiece, because the '583 patent discloses that:

Since diameters of the top edge and the composite cutting blade groups sequentially increase from the front end to the rear end, the cutting allowance of the object to be cut is reasonably distributed according to the diameter of the drill hole, and the object to be cut is gradually cut.

(the '583 patent, col. 3, lines 36-41).

Reasons that claim 14 of the '583 patent should be found to be invalid under 35 U.S.C. 102 over CN '678

As noted above, the twist drill of CN '678 satisfies each of the features recited in claims 1, 2 and 5 of the '583 patent.

As noted above, the '583 patent indicates that the feature recited in claim 14 is satisfied because in the twist drill of CN '678, a diameter of each of the plurality of composite cutting blade groups increases sequentially from the front end of the cone portion to the rear end of the cone portion.

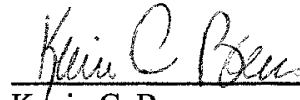
IV. CONCLUSION

For the reasons set forth above, the Requestor respectfully submits that the cited art raises substantial new questions of patentability for claims 1-14 of the '583 patent. Accordingly, the Requestor respectfully requests that the USPTO conduct ex parte reexamination of claims 1-14 of the '583 patent.

Respectfully submitted,

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