

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIKING DRILL & TOOL, INC.

Petitioner

v.

HONGJIA WANG

Patent Owner

IPR2023-00473

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

**DECLARATION OF WILLIAM J. ENDRES IN SUPPORT OF
PATENT OWNER RESPONSE TO VIKING DRILL & TOOL'S PETITION I
FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 11,007,583**

DECLARATION OF WILLIAM J. ENDRES

I, William J. Endres, Ph.D., declare as follows:

1. I am an Associate Professor of Mechanical Engineering, holding a Richard and Elizabeth Henes Endowed Professorship, at Michigan Technology University, in Houghton, Michigan and have held this position for over 21 years. Before that, I was an Assistant Professor in the Mechanical Engineering Department at the University of Michigan in Ann Arbor, Michigan. I attach my CV at **Exhibit 2038** to this declaration.

2. As can be seen from my CV, I have been deeply immersed in cutting tool technology for over 34 years, since my graduate research in cutting mechanics, machining dynamics, and mechanistic process modeling techniques from 1988 to 1992 at the University of Illinois at Urbana-Champaign, Illinois.

3. I am the founder and president of Endres Machining Innovations, LLC, of Houghton, Michigan, which designs and consults on advanced cutting tools of various types, <https://endresmachining.com/about-us/>. In that capacity I have led, many times as the creative impetus, multiple highly innovative (i.e., beyond ordinary skill in the art) cutting-tool development and commercialization projects with both commercial and government funding (for example, some results of which that are publicly disclosable can be seen at <https://revocut.com/>, https://www.youtube.com/channel/UCQaG6ntd7ZBO4ILKunwNA_w, and as a contracted R&D source for Rotary Technologies Corp. at <https://www.rotarytech.com/>). Approximately 25 years ago, I was hired by Vermont American Corp. (<https://vermontamerican.com/>) to prepare and deliver a short course on designing twist drills, some of the content from which is the basis for a chapter in my book entitled Machining Processes: Model-based Planning and Diagnostics (self/company-published).

4. I hold roughly nine patents, most of which are specifically directed to cutting tools.

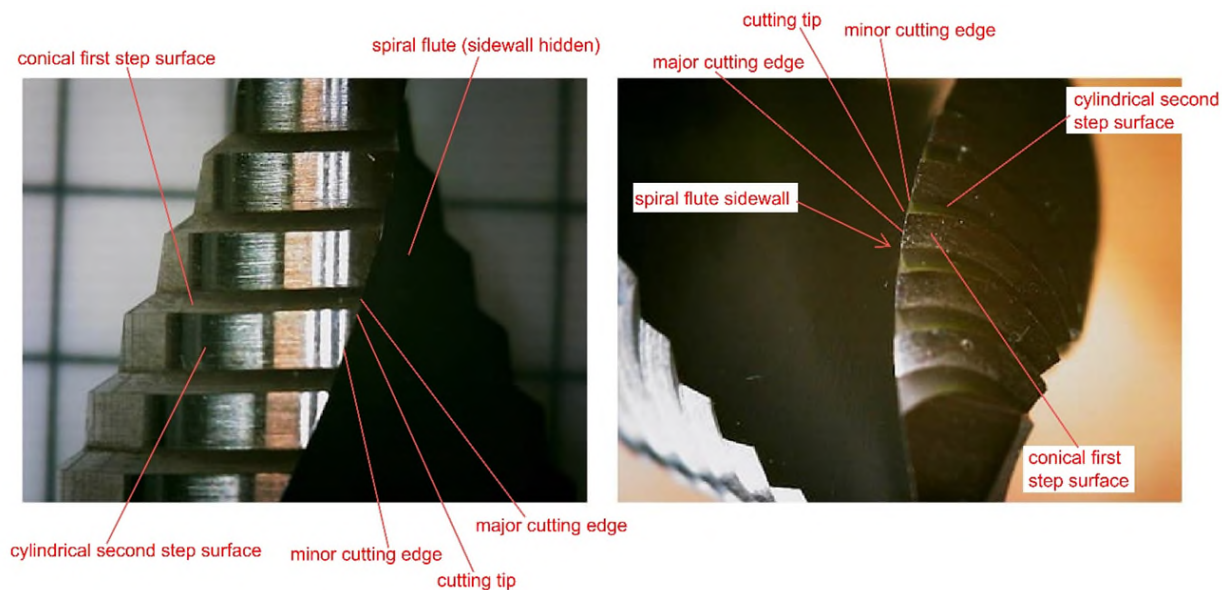
I. The Grounds Viking Asserts to Invalidate the '583 Patent Are Flawed

A. The Wang '900 Application Is Not Prior Art Because It Was Filed After the Priority Date for Each of the Challenged Patent Claims

dimensional curve traced by a point moving round and simultaneously advancing along a ... cone.” *The Shorter Oxford Dictionary*, Oxford University Press, 2007. The ‘583 Patent describes the spiral flute formation on the cone portion, describing that “at the cone portion 11, the cone surface intersects with the sidewalls of the spiral flute IV to form a plurality of first spiral lines 131” (**Ex. 1001**, *the ‘583 Patent*, col. 5:9-11). Further, “[a]n intersection of the first step surface 141 and the front flute sidewall of the spiral flute IV is a major cutting edge 143”. (**Ex. 1006**, col. 5:18-22). “The composite cutting blade groups conically and spirally extend along the rake face 133 of the spiral flute IV towards the shank (shank portion 2) and terminate at the maximum outer diameter of the twist drill 100.” (*Id.*, col. 6:10-13).

50. Without sufficient analysis, Petitioner argued that “Bannister shows a major cutting edges defined by the intersection of a step surface and the sidewall of the spiral flute.” In his report, Dr. Schmid opined that “[s]imply viewing Bannister Figure 2 and observing the intersection of the sidewall of the flute and the conical first step surface is sufficient to show that this element is present.” (**Ex. 1004**, ¶ 209). And “[s]imply viewing Bannister Figure 2 and observing the intersection of the sidewall of the flute and the cylindrical second step surface is sufficient to show that this element is present. (*Id.*, at ¶ 212). Dr. Schmid goes on to argue the presence generally of cutting edges.

51. Below are photographs of the ¾” Matco Tools Hyper-Step Part No. DBHS48 (within the scope of at least claims 1 and 8 of the ‘583 Patent) showing the uninterrupted curvature of the major cutting edges and the minor cutting edges along a spiral line of the flute due to being, in-part, defined by the sidewall of the spiral flute (where the sidewall must also be spiral). Although the major cutting edge and the minor cutting edge being curved rather than straight is not explicitly recited in the claims, the curved major and minor cutting edges are necessarily present when the claim limitations are met. This analysis is not meant to introduce new words into the claims, but rather is a tool to analyze whether Bannister discloses the limitations of Claims 1 and 8 (and their respective dependent claims).



II. There is a Nexus Between the Secondary Considerations and the Patent Claims

A. The Matco Hyper-Step, Astro ONYX TurboStep, Viking Vortex Point, Steel Vision Stepped Tip, and VIM HSSC29 Drill Bits Embody The Claims Of The '583 Patent

121. I have reviewed Paragraphs 7-9 of the Declaration of David Fisher concerning the Easy-Boost drill bits manufactured by Tsteigen and sold in the United States by Matco (under the Hyper-Step private label) and by Astro (under the ONYX TurboStep private label).

122. I understand that there are eight variations of the Easy-Boost drill bits sold in the United States: (1) Matco Hyper-Step High-Speed Steel; (2) Matco Hyper-Step High-Speed Steel, Reduced Shank; (3) Matco Hyper-Step High-Speed Steel Large Sizes; (4) Matco Hyper-Step High-Speed Steel Extra-Large Sizes; (5) Matco Hyper-Step Cobalt; (6) Matco Hyper-Step Cobalt, Reduced Shank; (7) Matco Hyper-Step Cobalt, Reduced Shank, Stubby; and (8) Astro ONYX TurboStep (collectively, the “Easy-Boost drill bits”)

123. I further understand that Patent Owner contends that all but the smallest six sizes of these Easy-Boost drill bits practice the claims of the '583 Patent. That is, the six smallest sizes of the drill bits contain a top blade and only one composite cutting blade group or none. But, Patent Owner correctly contends that the remaining drill bit sizes, those from 5/32” to 1/2” (by

arguably more than 150 years old, in my opinion, strongly supports the non-obviousness of their combination of stepped features and twist-drill features as described in the Wang '900 application and the '583 Patent.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on this day, October 31, 2023 at Houghton, Michigan .
(city) (state)



William J. Endres

Digitally signed by William J.
Endres (WJE)

Date: 2023.10.31 23:13:12

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William J. Endres, Ph.D.