2023-1217

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

US SYNTHETIC CORP.,
Appellant,
v.
INTERNATIONAL TRADE COMMISSION,
Appellee,
and

SF DIAMOND CO., LTD., SF DIAMOND USA, INC., ILJIN DIAMOND CO., LTD., ILJIN HOLDINGS CO., LTD., ILJIN USA INC., ILJIN EUROPE GMBH, ILJIN JAPAN CO., LTD., ILJIN CHINA CO., LTD., INTERNATIONAL DIAMOND SERVICES, INC., ZHENGZHOU NEW ASIA SUPERHARD MATERIAL COMPOSITE CO., LTD., SHENZHEN HAIMINGRUN SUPERHARD MATERIALS CO., LTD., GUANGDONG JUXIN NEW MATERIAL TECHNOLOGY CO., LTD.,
Intervenors.

Appeal from the United States International Trade Commission
in Investigation No. 337-TA-1236

RESPONSE BRIEF OF APPELLEE INTERNATIONAL TRADE COMMISSION

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LANGUAGE OF THE PATENT CLAIMS AT ISSUE

Independent claims 1 and 15 of U.S. Patent No. 10,508,502 provide:

1. A polycrystalline diamond compact, comprising:

a polycrystalline diamond table, at least an unleached portion of the polycrystalline diamond table including:

a plurality of diamond grains bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 μm or less; and

a catalyst including cobalt, the catalyst occupying at least a portion of the interstitial regions;

wherein the unleached portion of the polycrystalline diamond table exhibits a coercivity of about 115 Oe to about 250 Oe;

wherein the unleached portion of the polycrystalline diamond table exhibits a specific permeability less than about 0.10 $G \cdot cm^3/g \cdot Oe$; and

a substrate bonded to the polycrystalline diamond table along an interfacial surface, the interfacial surface exhibiting a substantially planar topography;

wherein a lateral dimension of the polycrystalline diamond table is about 0.8 cm to about 1.9 cm.

Appx106-107 (22:61-23:13).

LANGUAGE OF THE PATENT CLAIMS AT ISSUE (cont'd)

15. A polycrystalline diamond compact, comprising:

a polycrystalline diamond table, at least an unleached portion of the polycrystalline diamond table including:

a plurality of diamond grains bonded together via diamond-to-diamond bonding to define defining interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 μm or less; and

a catalyst including cobalt, the catalyst occupying at least a portion of the interstitial regions;

wherein the unleached portion of the polycrystalline diamond table exhibits:

a coercivity of about 115 Oe to about 250 Oe;

a specific magnetic saturation of about 10 $G \cdot cm^3/g$ to about 15 $G \cdot cm^3/g$; and

a thermal stability, as determined by a distance cut, prior to failure in a vertical lathe test, of about 1300 m to about 3950 m;

wherein a lateral dimension of the polycrystalline diamond table is about 0.8 cm or more.

Appx107 (23:65-24:17).

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STATEMENT OF RELATED CASES

The Commission is unaware of any case pending in this or any other court or agency that will directly affect or be directly affected by this Court's decision in the pending appeal.

STATEMENT OF THE CASE

The Commission instituted the underlying investigation on December 29, 2020, based on a complaint filed by Appellant US Synthetic Corporation ("USS"). Appx4045. The complaint alleged a violation of section 337(a)(1)(B) of the Tariff Act of 1930, 19 U.S.C. § 1337 ("section 337"), in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain polycrystalline diamond compacts and articles containing the same by reason of infringement of U.S. Patent Nos. 9,932,274 ("the '274 patent"); 10,508,502 ("the '502 patent"); 9,315,881 ("the '881 patent"); 10,507,565 ("the '565 patent"); and 8,616,306 ("the '306 patent"). Appx4045. The notice of investigation named the Intervenors, among others, as respondents.[1] Appx4046.

USS voluntarily withdrew the '274 and '881 patents from the investigation before the evidentiary hearing. Appx226. After the hearing and post-hearing

[1] The notice of investigation named other respondents that were terminated based on settlement or consent order. Appx4046; Appx225.

briefing, the presiding administrative law judge ("ALJ") issued a final initial determination ("ID"), finding the asserted claims of the '502, '565, and '306 patents invalid under 35 U.S.C. § 101 and the asserted claims of the '565 and '306 patents also invalid under 35 U.S.C. § 102(b). Appx4-5. The Commission substantially affirmed the ID's findings under §§ 101 and 102(b), and terminated the investigation with a finding of no violation of section 337. Appx17-18.

USS did not appeal the Commission's determination that the asserted claims of the '565 and '306 patents are invalid under §§ 101 and 102(b). Only the Commission's determination that claims 1, 2, 11, 15, and 21 of the '502 patent are invalid under § 101 are at issue on appeal.

I. THE TECHNOLOGY, PATENT, AND CLAIMS AT ISSUE

A. Polycrystalline Diamond Compact (PDC) Technology

The technology at issue in this investigation relates to **p**olycrystalline **d**iamond **c**ompacts ("PDCs"), which are compacts made of a **p**oly**c**rystalline **d**iamond ("PCD") table and a substrate. The substrate is often made from a cemented hard metal composite, like cobalt-cemented tungsten carbide. Appx98 (6:43-45); Appx100 (9:44-45); Appx102 (14:44-50). This general structure of a PCD table bonded to a carbide substrate for use in a PDC has been known for nearly a century. *See generally* Appx96 (1:28-32); Appx2880-2881 (German Tr. 1300:15-1301:9). This appeal is about whether claims directed to a PDC

exhibiting certain side effects or results of a fabrication process are patent-eligible under § 101.

The ’502 patent specification discloses that conventional PDCs are normally fabricated by placing a carbide substrate in a niobium container along with particles of diamond and a catalyst. Appx96 (1:42-51); Appx104 (17:21-29); Appx4119 (’418 patent)[2] (1:29-32). Under high pressure and high temperature (“HPHT”), the catalyst (often a metal such as cobalt) aids in bonding the diamond particles to one another (a process called “sintering”) to form a diamond layer (called a PCD “table”) attached to the substrate. Appx96 (1:46-54); Appx97 (3:66-4:5); Appx4119 (1:33-42).

The specification teaches that the PCD table does not become a completely solid mass following the HPHT process as interstitial regions form between diamond grains and the metal catalyst occupies some or all of the interstitial regions. Appx96 (1:54-61); Appx97 (4:26-35). The metal catalyst that remains in the interstitial regions following the HPHT process can produce undesirable characteristics that affect the performance of the PDC. Appx96 (1:62-2:7); Appx4119 (1:54-67) (“The presence of the solvent catalyst in the PCD table is

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[2] The ’502 patent claims priority and incorporates by reference the disclosure to U.S. Patent No. 7,866,418 (“’418 patent”), filed on October 3, 2008. Appx80-81.

believed to reduce the thermal stability" and "degrade the mechanical properties of the PCD table or cause failure.").

The metal catalyst can be partially removed by "leaching," or soaking the diamond table in acid. Appx4119 (2:1-3); Appx101 (12:20-47); Appx104 (18:25-60) (Table IV shows conventional leached PCD tables with metal catalyst concentration as low as 6.369 % by weight (example 40)). However, the leaching process "can be relatively time consuming" and "may decrease the mechanical strength of the PCD table." Appx4119 (2:4-7). "[M]anufacturers and users of PCD materials continue to seek PCD materials that exhibit improved mechanical and/or thermal properties." Appx4119 (2:8-11).

B. The '502 Patent Specification

The '502 patent, entitled "Polycrystalline Diamond Compact," discloses a method of fabricating a PDC purportedly "exhibiting enhanced diamond-to-diamond bonding." Appx96 (2:19-20); Appx80 (Abstract). It issued on December 17, 2019. Appx80.

In particular, the specification teaches that:

> It is currently believed by the inventors that forming the PCD by sintering diamond particles at a pressure of at least about 7.5 GPa may promote nucleation and growth of diamond between the diamond particles being sintered so that the volume of the interstitial regions of the PCD so-formed is decreased compared to the volume of interstitial regions if the same diamond particle distribution was sintered at a pressure of, for example, up

> to about 5.5 GPa and at temperatures where diamond is stable.
>
> * * * *
>
> This nucleation and growth of diamond in combination with the sintering pressure of at least about 7.5 GPa may contribute to the PCD so-formed having a metal-solvent catalyst content of less than about 7.5 wt %.

Appx98-99 (6:51-7:3). In other words, the specification states the inventors' belief that fabricating a PCD table at a sintering pressure of at least 7.5 GPa *may* promote "enhanced diamond-to-diamond bonding" or a "high-degree of diamond-to-diamond bonding" and result in a metal content of less than 7.5 weight % even before leaching. Appx97 (3:66-4:12, 4:21-24); Appx98 (6:39-50). Indeed, the specification disparages the conventional method of fabricating PCD tables at a lower sintering pressure. Appx98 (6:14-20, 6:39-45, 6:51-59).

Dr. Bertagnolli, a named inventor of the '502 patent, confirmed and explained this concept:

> [W]e had this hypothesis that, well, if we could make the diamond table more dense, so in a sense we want less metal, less of that cobalt metal and more diamond, if we can do that, then we could keep the cutter sharper longer and our customers would be more happy with our products.
>
> So early on in our sort of journey here, we were experimenting with ways to increase density. And one thing that we saw was that, as we increased sintering pressure, the pressure applied by the press, we saw that we would get, in the PDC, we would have a lower metal content.

> And so we thought that meant that instead of so much metal being there, that meant we had more diamond, more diamond-to-diamond bonding, greater diamond density. And, indeed, that turned out to have better wear characteristics.

Appx1643 (Bertagnolli Tr. 67:10-25).

The specification posits that "[m]any physical characteristics of the PCD may be determined by measuring certain magnetic properties of the PCD because the metal-solvent catalyst may be ferromagnetic." Appx97 (4:58-60). In particular, the specification teaches that one physical characteristic of the PCD, the "amount of the metal-solvent catalyst present in the PCD may be correlated with the measured specific magnetic saturation of the PCD." Appx97 (4:61-63). "A relatively larger specific magnetic saturation indicates relatively more metal-solvent catalyst in the PCD." Appx97 (4:63-65).

Another physical characteristic of the PCD, the "mean free path between neighboring diamond grains of the PCD may be correlated with the measured coercivity of the PCD." Appx97-98 (4:66-5:1). The specification teaches that a "relatively large coercivity indicates a relatively smaller mean free path," which may indicate enhanced diamond-to-diamond bonding. Appx98 (5:1-7); *see* Appx97 (3:66-4:12) (disclosing that increased growth of diamonds from employing a higher sintering pressure may result in a PCD being formed exhibiting a higher coercivity and a lower specific magnetic saturation than a PCD formed at

a lower sintering pressure). On the other hand, "a lower coercivity [is] indicative of a relatively greater mean free path between diamond grains, and thus may indicate relatively less diamond-to-diamond bonding between the diamond grains." Appx104 (17:63-18:4).

A third magnetic behavior disclosed in the specification, the "specific permeability," is simply "the ratio of specific magnetic saturation to coercivity[] of the PCD," which may be about 0.10 $G \cdot cm^3/g \cdot Oe$ or less. Appx98 (5:37-40).

The specification makes clear that the magnetic properties do not *necessarily* stem from a concrete implementation of a PDC (*i.e.*, a specific PDC structure). In sum, the specification teaches that:

> According to various embodiments, PCD sintered at a pressure of at least about 7.5 GPa *may* exhibit a coercivity of 115 Oe or more, a high-degree of diamond-to-diamond bonding, a specific magnetic saturation of about 15 G·cm3/g or less, and a metal-solvent catalyst content of about 7.5 weight % ("wt %") or less.

Appx97 (4:21-26) (emphasis added); *see also* Appx98 (5:22-27) ("The PCD defined collectively by the bonded diamond grains and the metal-solvent catalyst *may* exhibit a coercivity of about 115 Oe or more and a metal-solvent catalyst content of less than about 7.5 wt % as indicated by a specific magnetic saturation of about 15 G·cm3/g or less.") (emphasis added). USS's expert, Dr. Randall German, confirmed that the patent does not teach how to achieve the claimed magnetic properties using a sintering pressure *below* 7.5 GPa. Appx2889 (German

Tr. 1309:4-22); Appx103-104 (16:33-17:20) (all embodiments of PCD tables in Table I were fabricated using a sintering pressure of 7.8 GPa).

The specification further teaches that as the sintering pressure is increased *above* 7.5 GPa, which contributes to forming a PCD table having a metal-solvent catalyst content *below* 7.5 weight %, the PCD table *may* exhibit improved wear resistance and thermal stability as compared to a PCD table fabricated at a lower sintering pressure. Appx98 (5:63-6:38); *see also* Appx97 (4:46-57); Appx98-99 (6:51-7:3). The specification teaches that the thermal stability of a PCD table "may be evaluated by measuring the distance cut in a workpiece prior to catastrophic failure, without using coolant, in a vertical lathe test." Appx98 (6:22-34); *see* Appx1734 (German Tr. 158:4-19).

Notably, USS does not purport to have invented or discovered the concepts of how a PCD table behaves in a magnetic field (*e.g.*, coercivity, specific magnetic saturation), and how it performs when used to cut something (*e.g.*, thermal stability). These characteristics are by their nature side effects exhibited by all PCDs and may be a result of how they were made. *See* USS Br. at 11-13; Appx2917-2918 (German Tr. 1337:11-1338:19) (confirming that these "inherent material properties" are "universally" exhibited by "prior art cutters as well as present day cutters"); Appx2823 (German Tr. 1243:19-25) ("They are inherent

aspects of the material."); Appx2411-2412 (Schaefer[3] Tr. 832:21-833:22); Appx104 (18:26-33) (Tables III & IV listing conventional PCD tables with their coercivity, specific magnetic saturation, and/or specific permeability). Nor does USS purport to have invented the instruments and standards for measuring these characteristics of a PCD table. *See, e.g.*, Appx98 (5:8-19) (discussing the use of existing ASTM standards and commercially available instruments to measure specific magnetic saturation and coercivity). Indeed, as expressed by one of the inventors and disclosed in the specification, the claimed invention is the discovery that raising the sintering pressure above 7.5 GPa using existing press equipment *may* result in a stronger PDC—one that has a PCD table with less metal content and more ("enhanced") diamond bonding. Appx96 (2:19-20).

C. The Asserted '502 Patent Claims

Claims 1, 2, 11, 15, and 21 of the '502 patent are directed to PDCs having an unleached region of the PCD table[4] exhibiting certain magnetic behaviors and performance measures. The following chart summarizes certain features of the claimed PDCs:

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[3] Dr. Dale Schaefer was Intervenors' expert.

[4] The ALJ construed "an unleached portion of the polycrystalline diamond table" to mean "at least a portion of the polycrystallaine diamond table substantially unaffected by leaching." Appx194.

'502 Patent

Claim #	Depends from	Grain Size	Coercivity	Specific Magnetic Saturation	Specific Permeability	Thermal Stability
1	Ind.	<50	115 – 250	---	<0.10	---
2	1	<50	115 – 250	<15	<0.10	---
11	1	<50	115 – 250	---	<0.10	---
15	Ind.	<50	115 – 250	10 – 15	---	1300 – 3950
21	15	<50	115 – 250	10 – 15	<0.10	1300 – 3950

Appx15.

II. THE COMMISSION PROCEEDINGS[5]

A. The ALJ's Final Initial Determination

Following an evidentiary hearing and post-hearing briefing, on March 3, 2022, the ALJ issued a final ID finding no violation of section 337. Appx4. Relevant on appeal, the ALJ found all asserted claims of the '502 patent (and the '565 and '306 patents) are infringed by at least one accused product, but that those claims are patent-ineligible under § 101. Appx381.

With regard to the § 101 issue, Intervenors argued that claim 1 of the '565 patent was representative of all asserted claims, including those of the '502 patent. *See infra* Argument, Part II(A). Not only did USS fail to argue for the validity of any claim of the '502 patent separately, USS's entire § 101 analysis for the '502 patent rested on its patentability arguments for the '565 patent. Appx357.

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[5] The Commission is a quasi-judicial executive agency. The ALJs develop the record and issue a final ID on violation. The Commission decides whether to review that determination. If the Commission does not review, then the final ID becomes the final determination of the Commission. If the Commission reviews, then the Commission may issue an opinion expressing its views, as it did here.

Accordingly, the ALJ's patent eligibility analysis focused on claim 1 of the '565 patent.

For *Alice* step one, the ALJ found the asserted claims are directed to PDCs exhibiting certain magnetic side effects (*e.g.*, coercivity, specific magnetic saturation, specific permeability) and/or performance measures (*e.g.*, G_{ratio}, thermal stability), however achieved. Appx327-328. The ALJ found the performance measures and magnetic side effects are problematic because they are not design choices or manufacturing variables but are instead "a side effect or result of the fabrication processes and microscopic characteristics of a PDC." Appx325-326. The ALJ noted that the patents explain that the magnetic behaviors are also indirect measures of the effectiveness of other design choices and manufacturing variables. Appx326-327. The ALJ summarized the patented inventions as follows:

> In short, nothing in the asserted patents, or the rest of the record, suggests that any of these parameters solve any problems, rather than simply being measures of other, actually beneficial characteristics. Nor are the electrical and magnetic parameters sufficiently tied to any such beneficial characteristics through inherency, as explained above. There may be some causal connection between grain size, catalyst concentration, and other, unspecified design and fabrication choices, on the one hand, and electrical and magnetic behavior, on the other hand. But that causal connection is so loose and generalized that the claimed limitations appear to be little more than side effects; thus, the recitation of, say, an electrical conductivity of less than 1200 S/m appears to be gratuitous rather than inventive.

Appx327.[6] The ALJ acknowledged that an invention can be claimed by reciting its properties but the problem is that the properties the asserted claims "recite are results or effects, and thus abstract." Appx330.

At *Alice* step two, the ALJ found the asserted claims "invoke[] well-understood, routine, [and] conventional components to apply the abstract idea[s]" recited in the claims. Appx333 (quoting *Yu v. Apple Inc.*, 1 F.4th 1040, 1045 (Fed. Cir. 2021)). In particular, the ALJ found the "claims here recite several structural limitations (a polycrystalline table, an unleached portion, a plurality of diamond grains, a catalyst, and a substrate) that are generic to all PDCs." Appx332 (citing Appx3914-3915 (table presenting admissions by USS's expert that all claimed structures are well-understood, routine, and conventional)). "But the claims fail to recite structures, methods, or any other inventive feature to achieve the objectionable claimed limitations (G-Ratio, thermal stability, electrical and magnetic parameters)." Appx332.

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[6] The ALJ's analysis includes a discussion of claim limitations (*e.g.*, electrical conductivity and G_{ratio}) that are not found in the asserted claims of the '502 patent because the parties treated claim 1 of the '565 patent as representative of all asserted claims for purposes of the § 101 inquiry. *See infra* Argument, Part II(A). Claim 1 of the '565 patent recites a PDC exhibiting certain electrical conductivity and G_{ratio} properties, whereas claim 1 of the '502 patent does not. *Compare* Appx3295 (claim 1 of the '565 patent) *with* Appx106-107 (claim 1 of the '502 patent).

The ALJ also found that "the lack of inventive concepts in the challenged claims is partially explained by USS," who argued that the claimed "properties [are] associated with a higher percentage of diamond grains and lower amount of cobalt in the diamond microstructure." Appx331 (quoting Appx4572 (USS Post-hr'g Br.)). The ALJ found, however, that particular grain microstructures and cobalt concentrations are not claimed. Appx331. "Instead, the claims are directed to properties associated with such features only in a loose way, and the properties themselves are not clearly either favorable or unfavorable." Appx331 (quotations omitted). Thus, the ALJ found the asserted claims "do not recite any limitations that would 'transform the nature of the claim[s] into a patent eligible application' under *Alice* step 2." Appx332 (quoting *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014)).

With respect to the '502 patent claims in particular, the ALJ noted that "USS stands on its response to the same [§ 101] issues presented in connection with the 565 patent." Appx357 (citing Appx4644 (USS Post-hr'g Br.)). The ALJ found that the one limitation, specific permeability, that appears in the '502 patent but not in the '565 patent is "as much [a] result or effect as coercivity and specific magnetic saturation because it is simply a ratio of the two, and the claims otherwise recite only well-understood, routine, and conventional elements."

Appx357-358. Accordingly, the ALJ found all asserted claims of the '502 patent invalid under § 101.

Thereafter, USS filed a petition for review at the Commission challenging the ALJ's patent eligibility determination and other findings.

B. The Commission's Final Determination

The Commission determined to review in part the final ID. Appx4047. Relevant to this appeal, the Commission affirmed the ALJ's finding that the asserted claims of the '502 patent (and the '565 and '306 patents) are invalid as patent-ineligible under § 101. Appx17. Specifically, the Commission agreed with the ALJ that "the asserted claims are directed to the abstract idea of stronger PDCs that achieve the claimed performance measures and desired magnetic … results no matter how implemented" and that they do not recite elements that transform the subject matter into an eligible application of the abstract idea. Appx34.

At *Alice* step one, the Commission found the claims "cover a set of goals for the PDCs that the specification[] posit[s] may be derived from enhanced diamond-to-diamond bonding." Appx28. Reviewing the asserted claims in light of the specification, the Commission agreed with the ALJ that the claimed magnetic side effects and performance measures are the result of the sintering conditions and input materials that went into manufacturing the PDC and are simply imperfect proxies for unclaimed, physical features disclosed in the specification. Appx23;

Appx26. The Commission found USS's research and development efforts may very well have resulted in the ability to manufacture a PDC at higher pressure with lower metal content. However, rather than claiming a concrete compositional structure, a particular fabrication process, or any improvements to the manufacturing equipment itself, "USS purports to monopolize every potential structure or way of creating stronger PDCs with the claimed characteristics." Appx30.

At *Alice* step two, the Commission agreed with the ALJ that the "elements of the asserted claims—individually and as an ordered combination—do not transform the nature of the claims into something patent-eligible." Appx35. The Commission noted that the claimed magnetic side effects and performance measures "are the only thing that USS puts forward as non-conventional," but the very limitations that are found to be abstract cannot qualify as an "inventive concept." Appx35. Thus, the Commission found "there is nothing 'significantly more' to the claims than the abstract idea cloaked in physical elements." Appx35.

In view of the Commission's finding that all asserted claims are invalid, the Commission took no position on the economic prong of the domestic industry

requirement and terminated the investigation with a finding of no violation of section 337.[7] Appx57.

SUMMARY OF THE ARGUMENT

The Commission properly applied the Supreme Court's and this Court's § 101 precedent to the asserted claims of the '502 patent. As reflected repeatedly in § 101 case law, a "patent is not good for an effect, or the result of a certain process, as that would prohibit all other persons from making the same thing by any means whatsoever." *Le Roy v. Tatham*, 55 U.S. 156, 175 (1852). Rather, a claimed invention must embody a concrete solution to a problem having "the specificity required to transform a claim from one claiming only a result to one claiming a way of achieving it." *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1167 (Fed. Cir. 2018); *see Am. Axle & Mfg., Inc. v. Neapco Holdings LLC*, 967 F.3d 1285, 1302 (Fed. Cir. 2020), *cert. denied*, 142 S. Ct. 2902 (2022) ("[T]he claim itself … must go beyond stating a functional result.").

Here, USS characterizes the problem addressed by the '502 patent as the need "to create a new, stronger type of PDC by reducing the amount of metal

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[7] Commissioner Schmidtlein issued a dissenting opinion. Appx58-77. She would have found the asserted claims of the '502 patent are patent-eligible under § 101 and that USS satisfied the domestic industry requirement for the '502 patent. Appx18 (n.11). Accordingly, Commissioner Schmidtlein would have found a violation of section 337 as to the '502 patent.

catalyst (e.g., cobalt), thereby increasing the diamond bonding but without requiring [the prior art method of] leaching." USS Br. at 7-8. The inventors purportedly discovered a way of making a PCD table with a lower metal content and observed how the PCD table behaves in a magnetic field (*e.g.*, coercivity, specific magnetic saturation, specific permeability) and how it performs when used to cut something (*e.g.*, thermal stability). *Id.* at 8, 11-13. These observed characteristics, which are by their nature side effects of all PCD tables and how they were made, are measurable using conventional equipment and techniques.

While the patent posits that the claimed magnetic side effects may be indicative of physical characteristics of the PDC, such as the amount of metal and the extent of diamond bonds in the PCD table, those physical characteristics are not claimed. Rather, the Commission agreed with the ALJ that the magnetic side effects that are claimed are merely imperfect proxies of these "other, actually beneficial characteristics" and any connection between them "is so loose and generalized that the claimed limitations appear to be little more than side effects." Appx21 (quoting Appx327). Indeed, the record evidence demonstrates that Intervenors' infringing PDCs achieved the claimed side effects with much higher metal content and a different fabrication process than what is taught in the patent. This directly contradicts USS's argument that the claimed side effects characterize

the "microstructure of a novel composition of matter," USS Br. at 20, and are "objective measurements of its structure," *id.* at 26.

Claiming the mere observation of results or effects within a generic PDC structure in which all other elements are admittedly conventional in the art underscores that the focus of the asserted claims is the abstract idea of a stronger PDC. Instead of claiming a particular fabrication process or a concrete compositional structure, the asserted claims purport to preempt every potential solution to the problem—a stronger PDC that exhibits the desired side effects or results. USS's own expert confirmed this "case isn't as much about, you know, the structure of PDCs as it is about the measurable characteristics of sintered materials." Appx2874 (German Tr. 1294:1-6). That same expert explained the "measurable characteristics" relate to "the quality of [the PDC] product, showing us a range of properties that would be associated with the performance." Appx2823 (German Tr. 1243:12-23). Accordingly, the Commission properly found at *Alice* step one that each of the asserted claims is directed to the abstract idea of a stronger PDC exhibiting certain effects or results rather than a concrete implementation of an improved PDC.

The asserted claims likewise fail at *Alice* step two. As reflected in the specification itself, the prior art, and by USS's own admission, the claimed side effects or results are the only aspects of the asserted claims that USS puts forward

as non-conventional. However, the Commission agreed with the ALJ that these side effects cannot qualify as an "inventive concept" because they merely restate the abstract principle of a stronger PDC. Thus, the Commission found that there is nothing "significantly more" to the claims than the abstract idea cloaked in physical elements.

Finally, USS waived its argument that the Commission (and the ALJ) erred in not analyzing each specific claim of the '502 patent separately. Before the ALJ, Intervenors asserted that claim 1 of the '565 patent, which is not at issue on appeal and which the Commission found invalid under § 101, was representative of all asserted claims across all asserted patents, and USS did not challenge that assertion or argue that there were unique reasons why some claims were patent-eligible. Indeed, not only did USS fail to argue for the validity of any claim of the '502 patent separately, the ALJ found that USS's entire § 101 analysis for the '502 patent rested on its patentability arguments for the '565 patent. Thus, with respect to patent eligibility, USS's position below was that all asserted claims of the '565, '502, and '306 patents rise and fall together. And that is exactly what happened—the Commission found the asserted claims of all three asserted patents invalid as patent-ineligible under § 101.

ARGUMENT

I. STANDARD OF REVIEW

Commission final determinations are reviewed under the Administrative Procedure Act. 5 U.S.C. § 706; *Honeywell Int'l, Inc. v. Int'l Trade Comm'n*, 341 F.3d 1332, 1338 (Fed. Cir. 2003). USS challenges the Commission's findings on patent eligibility, which is a question of law that may be based on underlying factual findings. *Berkheimer v. HP Inc*., 881 F.3d 1360, 1365 (Fed. Cir. 2018), *reh'g en banc denied*, 890 F.3d 1369 (Fed. Cir. 2018), *cert. denied*, 140 S. Ct. 911 (2020).

This Court reviews the Commission's legal determinations *de novo* and factual findings for substantial evidence. *Honeywell*, 341 F.3d at 1338. Under the substantial evidence test, the Court "must affirm a Commission determination if it is reasonable and supported by the record as a whole, even if some evidence detracts from the Commission's conclusion." *Spansion, Inc. v. Int'l Trade Comm'n*, 629 F.3d 1331, 1344 (Fed. Cir. 2010) (quotation and citation omitted). "[T]he possibility of drawing two inconsistent conclusions from the evidence does not prevent an administrative agency's finding from being supported by substantial evidence." *Norgren Inc. v. Int'l Trade Comm'n*, 699 F.3d 1317, 1321 (Fed. Cir. 2012) (quotation and citation omitted).

II. THE ASSERTED CLAIMS OF THE '502 PATENT ARE PATENT-INELIGIBLE UNDER SECTION 101

Anyone who "invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof" may obtain a patent. 35 U.S.C. § 101. The Supreme Court has "long held that this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable." *Alice*, 573 U.S. at 216. Accordingly, in addressing patentability under § 101, the Court must distinguish between claims that merely set forth these "building blocks of human ingenuity" and those that "integrate the building blocks into something more." *Id.* at 216-17.

Under the two-step framework described by the Supreme Court, a claim is ineligible under § 101 if "(1) it is 'directed to' a patent-ineligible concept, *i.e.*, a law of nature, natural phenomenon, or abstract idea, and (2) if so, the particular elements of the claim, considered 'both individually and as an ordered combination,' do not add enough to 'transform the nature of the claim' into a patent-eligible application." *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016) (citing *Alice*, 573 U.S. at 217; *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 78-79 (2012)).

This Court has repeatedly recognized that claims directed to results or effects without a concrete solution are not patent-eligible subject matter. *See, e.g.*, *SAP Am.*, 898 F.3d at 1167. Here, USS claimed the abstract idea of a stronger

PDC that achieves certain results or effects without a concrete solution, so the Commission found the claims are not patent-eligible. The inventors may very well have discovered and disclosed in the patent specification a new way of making an improved PDC, and they may have been entitled to a patent covering the particular fabrication process and/or a concrete implementation of the improved PDC.[8] However, it does not matter whether the *specification* discloses a patent-eligible discovery. *See Synopsys, Inc. v. Mentor Graphics Corp*., 839 F.3d 1138, 1149 (Fed. Cir. 2016) ("[C]omplex details from the specification cannot save a claim directed to an abstract idea."). What matters is whether the *claims* are directed to a patent-eligible concept, and here, they are not.

[8] Indeed, USS procured claims directed to the fabrication process and the metal content. For instance, claim 1 of U.S. Patent No. 9,315,881, which is related to the '502 patent, recites a PDC "with characteristics of being formed in a high-pressure/high-temperature process at a cell pressure of at least 7.5 GPa" and a metal-solvent catalyst "in an amount greater than 0 weight % to about 7.5 weight %." Appx4013-4014 (24:55-25:8). USS originally asserted this claim against Intervenors in the investigation, but withdrew it before the hearing. Appx4045-4046 (Notice of Institution); Appx4050-4051 (Order No. 26); Appx4055-4056 (Comm'n Notice). Intervenors' accused products were not made under these conditions or with these structural characteristics. *See infra*, Part B(1)(d).

A. USS Did Not Argue for the Patentability of Any Claim Separately Before the ALJ and Any Such Arguments Presented on Appeal Are Waived

USS criticizes the Commission (and the ALJ) for failing to analyze each specific claim of the '502 patent separately. USS Br. at 49-53. This argument is disingenuous given the procedural posture below.

Before the ALJ, Intervenors asserted that claim 1 of the '565 patent, which is not at issue on appeal and which the Commission found invalid under § 101, was representative of all asserted claims across all asserted patents, and USS did not challenge that assertion or argue that there were unique reasons why some claims were patent-eligible. *See* Appx3912 (Intervenors' Post-hr'g Br.) ("USS's entire analysis on Section 101 hinges on claim 1 of the 565 Patent for all three Asserted Patents.") (citing Appx4355-4359; Appx4435; Appx4454 (USS Pre-hr'g Br.)); Appx3998 (Intervenors' Post-hr'g Br.) ("[I]f claim 1 of the '565 patent fails the *Alice* test so too does the '502 patent."); Appx4848 (Intervenors' Reply Post-hr'g Br.) (same) (citing Appx4568-4573; Appx4644; Appx4657 (USS Post-hr'g Br.)).

Not only did USS fail to argue for the validity of any claim of the '502 patent separately, USS's entire § 101 analysis for the '502 patent rested on its patentability arguments for the '565 patent. *See* Appx4354-4359; Appx4435 (USS Pre-hr'g Br.) (the entirety of USS's patent eligibility argument for the '502 patent claims consisted of "*See* Section V.G.1 above," which referred to arguments for

the ’565 patent); Appx4644 (USS Post-hr’g Br.) (other than noting the “Asserted Claims of the ’502 Patent additionally recite ‘specific permeability,’” USS’s patent eligibility argument for the ’502 patent again referred to its arguments for the ’565 patent); Appx4780 (USS Reply Post-hr’g Br.) (the entirety of USS’s patent eligibility argument for the ’502 patent claims consisted of: “*See supra* CPost-HB at 133 and Section II.C.1.”). Accordingly, USS never asserted before the ALJ that any claim should be differentiated from any other claim for purposes of the patent eligibility inquiry, and its attempt to do so on appeal should be deemed waived. *See Broadcom Corp. v. Int’l Trade Comm’n*, 542 F.3d 894, 901 (Fed. Cir. 2008) (complainant waived argument presented on appeal that it did not adequately present to the ALJ) (citing *Hazani v. Int’l Trade Comm’n*, 126 F.3d 1473, 1476-77 (Fed. Cir. 1997)).

In view of the parties’ arguments, the ALJ’s § 101 analysis focused on the asserted claims of the ’565 patent. Appx324-333 (finding the asserted claims of the ’565 patent, which recite a PDC exhibiting certain magnetic side effects (coercivity, specific magnetic saturation) and performance measures (G_{ratio}, thermal stability), are directed to an abstract idea). The ALJ found the ’565 patent claims are representative of the ’502 patent claims because they are linked to the same patent-ineligible abstract idea. Appx357 (“USS stands on its response to the same issues presented in connection with the 565 patent.”); Appx357 (“For the reasons

explained above, the claims of the 502 patent are as patent-ineligible, under both steps of Alice, as the claims of the 565 patent."). Addressing every claim of a challenged patent individually is not necessary where multiple claims are "substantially similar and linked to the same abstract idea." *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat. Ass'n*, 776 F.3d 1343, 1348 (Fed. Cir. 2014). On review, the Commission found the ALJ's analysis considered the claim language for each of the claims as a whole and affirmed the ALJ's finding that the asserted claims of the '502 patent are patent-ineligible under § 101.[9] *See supra* Statement of the Case, Part II(B).

Notwithstanding waiver, USS does not present any meaningful argument for the distinctive significance of any claim limitations other than those included in independent claims 1 and 15 of the '502 patent. Thus, claims 1 and 15 should be treated as representative of the asserted dependent claims. *See infra* Part B(3); *Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1256 n.1 (Fed. Cir.

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[9] In its petition for Commission review, USS changed its strategy and, for the first time, argued for the patentability of the asserted claims of the '502 patent separately from the '565 patent. *See* Appx412-436 (USS Pet. for Review); Appx4932-4933 (Intervenors' Resp. to USS Pet. for Review). However, USS failed to preserve these arguments before the ALJ and, therefore, the Commission did not find any error in the ALJ's approach. *Compare* Appx412-436 (patent eligibility arguments for the '502 patent claims in USS's Pet. for Review) *with* Appx4435 (USS Pre-hr'g Br.); Appx4644 (USS Post-hr'g Br.); Appx4780 (USS Reply Post-hr'g Br.).

2016) (treating certain claims as representative where no meaningful argument was made that other claims are materially different).

B. Under *Alice* Step One, Independent Claims 1 and 15 and Dependent Claims 2, 11, and 21 Are Directed to the Same Abstract Idea of a Stronger PDC Exhibiting Certain Side Effects or Results

1. Claim 1 Is Directed to an Abstract Idea

Independent claim 1 of the '502 patent recites a PDC having an unleached portion of a PCD table exhibiting two (2) magnetic side effects (in bold and italics below):

> A polycrystalline diamond compact, comprising:
>
> a polycrystalline diamond table, at least an unleached portion of the polycrystalline diamond table including:
>
> > a plurality of diamond grains bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 μm or less; and
> >
> > a catalyst including cobalt, the catalyst occupying at least a portion of the interstitial regions;
> >
> > wherein the unleached portion of the polycrystalline diamond table exhibits ***a coercivity of about 115 Oe to about 250 Oe***;
> >
> > wherein the unleached portion of the polycrystalline diamond table exhibits ***a specific permeability less than about 0.10 G·cm^3/g·Oe***; and
> >
> > a substrate bonded to the polycrystalline diamond table along an interfacial surface, the interfacial surface exhibiting a substantially planar topography;

> wherein a lateral dimension of the polycrystalline diamond table is about 0.8 cm to about 1.9 cm.

Appx106-107 (22:61-23:13) (emphasis added).

a. The Focus of the Claimed Advance Over the Prior Art Is the Observation of Certain Magnetic Side Effects or Results, Which Is Abstract

To determine whether a claim is "directed to" an abstract idea at *Alice* step one, the Commission evaluated "the focus of the claimed advance over the prior art to determine if the claim's character as a whole is directed to excluded subject matter." *Affinity Labs*, 838 F.3d at 1257 (quotations omitted); *see* Appx19; *Parker v. Flook*, 437 U.S. 584, 593 (1978) (stating the § 101 inquiry must focus on determining "what type of discovery is sought to be patented"). Here, the Commission found the focus of claim 1 is the observation of two magnetic behaviors, which is abstract. Appx25; Appx2874 (German Tr. 1294:1-6).

At *Alice* step one, the Commission found claim 1 of the '502 patent recites how a PDC behaves in a magnetic field (*i.e.*, coercivity, specific permeability). Appx23; Appx26-27. There is no dispute that coercivity and specific permeability are magnetic side effects exhibited universally by all PDCs—they flow naturally from the presence of a metal-solvent catalyst like cobalt within the PCD table and may be a result of the fabrication process. Appx26 (citing Appx2918-2919 (German Tr. 1338:24-1339:4)); USS Br. at 11; Appx2917-2918 (German Tr. 1337:11-1338:23) (confirming that these "inherent material properties" are

"universally" exhibited by "prior art cutters as well as present day cutters"); Appx2411-2412 (Schaefer Tr. 832:21-833:22) (explaining that coercivity is a material property of a ferromagnetic composite material).

The '502 patent specification teaches that the claimed magnetic side effects are observed in conventional PCD tables though not necessarily in the claimed range. *See* Appx104 (18:26-33) (Table III listing conventional PCD tables that all meet the coercivity limitation and Table IV listing conventional leached PCD tables (samples 36, 37, 38 and 40) that meet every coercivity, specific magnetic saturation, and specific permeability limitation).

The specification also teaches that the claimed magnetic behaviors *may* result from a certain fabrication process and the input materials used to make a PCD table. *See supra* Statement of the Case, Part I(B); Appx97 (3:66-4:12); Appx97 (4:21-26); Appx98 (5:20-22); Appx326-327; Appx2918-2919 (German Tr. 1338:24-1339:4) (confirming the magnetic characteristics are the result of the sintering conditions and input materials that went into manufacturing the cutter). Notably, the specification makes clear that the claimed magnetic ranges do not *necessarily* stem from a concrete implementation of a PDC (*i.e.*, a particular fabrication process or a concrete PDC structure). *See supra* p.7. Indeed, as discussed below, the Commission found that Intervenors' infringing PDCs

achieved the claimed magnetic effects with a different fabrication process and metal content than what is taught in the '502 patent. *See infra* pp. 36-38.

The claimed invention departs from prior art PDCs only by adding observed magnetic side effects. *See Flook*, 437 U.S. at 594-95 (the patent-ineligible claim "simply provide[d] a new and presumably better method for calculating alarm limit values"). Other than the claimed magnetic side effects, all other claim elements (*i.e.*, unleached PCD table, interstitial regions, diamond grains having average grain size of 50 μm or less, a cobalt catalyst, a substrate, a substantially planar topography, and a lateral dimension between 0.8 cm to 1.9 cm) are admittedly conventional in the art. *See infra* Part D; Appx343-344; Appx359 (finding Intervenors' anticipation arguments fail because the claimed magnetic properties are not disclosed by prior art PDCs); Appx4606-4608; Appx4644 (USS Post-hr'g Br.) (acknowledging that New Asia's RNC series products disclosed all limitations in the asserted claims of the '502 patent except the claimed magnetic properties).

Thus, looking at claim 1 as a whole, the claim requires a generic PDC structure that has been known for more than forty years to "exhibit" certain magnetic behaviors. This underscores that the focus of the claimed advance over the prior art is abstract, *i.e.*, the observation of certain magnetic side effects that purportedly indicate more diamond bonds, without reciting *how*—whether by particular process or concrete structure—the effects are accomplished. *See Finjan,*

Inc. v. Blue Coat Sys., Inc., 879 F.3d 1299, 1303 (Fed. Cir. 2018) (examining the patent's "'claimed advance' to determine whether the claims are directed to an abstract idea") (citing *Affinity Labs*, 838 F.3d at 1257).

b. Claiming the Mere Observation of Certain Side Effects or Results Within a Generic PDC Structure Underscores the Focus of the Claim is the Abstract Idea of a Stronger PDC

The Commission found at *Alice* step one that claim 1 of the '502 patent is directed to the abstract idea of a stronger PDC exhibiting certain magnetic side effects or results rather than a concrete implementation of an improved PDC. Appx25-28.

The ALJ found that *Yu v. Apple* was instructive. Appx328-329. In *Yu*, the representative claim required all of the following structures: multiple image sensors, multiple lenses, semiconductor conversion circuitry, device memory, and processing circuitry. 1 F.4th at 1042. In addition to these structural elements, the claim also required the idea of capturing two pictures and using one picture to enhance the other. *Id*. Because the structure did not lead to this claimed idea, the claim was improperly "directed to a result or effect that itself is the abstract idea and merely invoke[s] generic processes and machinery rather than a specific means or method that improves the relevant technology." *Id.* at 1043 (quotation omitted). In other words, the patent failed to claim the underlying structure or means for

accomplishing the abstract idea and, therefore, the claims were abstract and the patent claim was invalid.

In this case, like with *Yu*, claiming the mere observation of certain magnetic side effects within a generic PDC structure underscores that the focus of claim 1 is the abstract idea of a stronger PDC and not the particular fabrication process or concrete compositional structure discussed in the patent, which allegedly depart from the prior art.[10] *See McRO, Inc. v. Bandai Namco Games Am. Inc*., 837 F.3d 1299, 1314 (Fed. Cir. 2016) ("We … look to whether the claims … focus on a specific means or method that improves the relevant technology or are instead directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery."). USS's expert himself admitted that this "case isn't as much about, you know, the structure of PDCs as it is about the measurable characteristics of sintered materials." Appx2874 (German Tr. 1294:1-6).

Attempting to distinguish *Yu*, USS argues that the claim in *Yu* directly recited the abstract idea, whereas here, the abstract idea of stronger (*i.e.*, enhanced)

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[10] USS argues that the Commission improperly imposed a requirement that the manufacturing steps be recited in a product claim to achieve patent eligibility under § 101. *See* USS Br. at 40-43. The Commission imposed no such requirement. The Commission simply noted that reciting the fabrication process that resulted in the claimed side effects might have provided the requisite elements necessary to overcome the § 101 hurdle. *See* Appx28-29; *supra* p. 22, note 7.

bonds is not recited in claim 1. USS Br. at 38. However, this Court has recognized that the "directed to" inquiry for *Alice* step one does not require an express claim recitation of the natural law or abstract idea. *Compare Am. Axle*, 967 F.3d at 1292, 1298 (claim 22 of the patent at issue does not explicitly claim Hooke's Law but the Court inferred that claim 22 implicates a natural law) *with Flook*, 437 U.S. at 588 (claims of the patent at issue explicitly recited the mathematical formula). What matters is whether the claims are directed to a judicial exception for patent eligibility. *See Alice*, 573 U.S. at 217.

While claim 1 of the '502 patent does not expressly require "enhanced" bonding, it recites "diamond-to-diamond bonding" and the patent makes clear that all "[e]mbodiments of the invention relate to PCD exhibiting enhanced diamond-to-diamond bonding." Appx96 (2:19-20); Appx97 (3:66-67) (same); *see ChargePoint, Inc. v. SemaConnect, Inc*., 920 F.3d 759, 767 (Fed. Cir. 2019) ("The 'directed to' inquiry may also involve looking to the specification to understand 'the problem facing the inventor' and, ultimately, what the patent describes as the invention."). USS's expert, Dr. German, explained that "enhanced diamond-to-diamond bonding" in this context means "more bonding, stronger bonding, [and] larger bonds. That kind of thing would be enhanced diamond-to-diamond bonding over what had previously existed." Appx8 (quoting Appx1693 (German Tr. 117:14-22)). Dr. German confirmed that "the implications from the -- *the relative*

properties that follow in … [claim 1] would be satisfied by an enhanced level of bonding." Appx25 (quoting Appx1694 (German Tr. 118:12-22) (emphasis added)). He also testified that "enhanced diamond-to-diamond bonding"—"the key term [that] shows up in both the summary and the abstract"—is what "differentiates" "the PDCs in the asserted patents" "from PDCs that came before the asserted patents." Appx1692 (German Tr. 116:11-16); *see* Appx8-9; Appx25. Thus, as reflected in the specification and by USS's own admission, the focus of claim 1 is the abstract idea of a stronger PDC.[11]

c. The Claimed Magnetic Side Effects Are Imperfect Proxies of Unclaimed, Physical Characteristics of a PDC That May Be Associated With a Stronger PDC

While the patent posits that the claimed magnetic side effects may potentially be indicative of desirable, physical characteristics of a PCD table such as less metal content and more (*i.e.*, enhanced) diamond bonds, Appx97-98 (4:58-5:7), the Commission found they are merely imperfect proxies for these "other, actually beneficial characteristics" and any connection between them "is so loose and generalized that the claimed limitations appear to be little more than side effects." Appx21 (quoting Appx327); Appx27.

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[11] USS appears to agree that "enhanced diamond-to-diamond bonding" is "a mere abstract idea." *See, e.g.*, USS Br. at 49 ("The[] Asserted Claims of the '502 patent do not preempt the use by others of a mere abstract idea (such as, for example, 'enhanced diamond-to-diamond bonding.'").

The ’502 patent specification teaches that the magnetic side effects may be indicative of a stronger PDC with enhanced diamond bonding because the effects *may* correlate with unclaimed, physical characteristics such as lower metal content or particular grain microstructures (*e.g.*, smaller mean free path between diamond grains). *See supra* Statement of the Case at Part I(B); USS Br. at 11-12. One inventor, Debkumar Mukhopadhyay, and both parties’ experts acknowledged that the magnetic side effects are imperfect proxies for the metal content within a PCD table. *See* Appx4206-4208 (Mukhopdhyay Dep. 76:7-78:2) (“[A] change in coercive force will give you an indication [of] . . . which direction cobalt percentage is going,” but “you can’t just use coercive force … other factors are important, for example, what the diamond grain size is.”); Appx4175-4176 (Mukhopadhyay Dep. 45:18-46:3) (“Specific magnetic saturation just give[s] the magnetism, but it does not give the cobalt percentage.”); Appx2920 (German Tr. 1340:7-11) (testifying that cobalt weight percentage is the dominant factor in determining magnetic saturation, but “it is not the only factor”); USS Br. at 30 (citing Appx2407-2408 (Schaefer Tr. 828:24-829:19) (The “thresholds” for the magnetic properties “are just used as proxies for evaluating the metal catalyst content.”)).

USS asserts that these unclaimed, physical characteristics (*e.g.*, lower metal content and smaller mean free path) may be beneficial and help the PDC resist

failure. Appx331; USS Br. at 7-8. However, Dr. German admitted that other than grain size, the claimed invention is not limited to any particular compositional structure. Appx2911 (German Tr. 1331:8-16) ("Q… The microstructure of the diamond table is effectively what the diamond table looks like at a microscopic level. Is that fair? A. That's fair. Q. And other than grain size, you would agree with me that none of the asserted claims approach microstructure, right? A. That's correct."). Dr. German explained that none of the asserted claims have requirements defining mean free path, contiguity, or dihedral angle—three key microstructure components that define PDC structure. Appx2913-2914 (German Tr. 1333:1-1334:3). Rather, what is claimed are magnetic side effects that *may* be associated with more diamond bonds, but are not specifically indicative of the compositional structure of a PDC. Appx2823 (German Tr. 1243:12-23) ("What we're dealing with is a complicated microstructure. The claims are teaching us about how to do measurements of that microstructure of the ***quality*** of this product, showing us ***a range of properties that would be associated with the performance***.") (emphasis added).

Thus, instead of claiming a concrete compositional structure, claim 1 purports to preempt every potential solution to the problem by claiming certain magnetic side effects that are purportedly "associated with" beneficial, physical features, but only in a loose way. Appx331; Appx30. Whereas patenting a

particular solution "would incentivize further innovation in the form of alternative methods for achieving the same result," allowing claims like these here would "inhibit[ ] innovation by prohibiting other inventors from developing their own solutions to the problem without first licensing the abstract idea." *Elec. Power Grp.*, 830 F.3d at 1356.

d. The Record Evidence Shows That a PDC Exhibiting the Claimed Magnetic Side Effects Is Not a Concrete Implementation of a PDC and Would Preempt Substantially All Ways to Achieve Stronger PDCs

Courts have found that preemption is an indication that claims are directed to an abstract idea. *See ChargePoint*, 920 F.3d at 766 ("'[T]he concern that drives' the judicial exceptions to patentability is 'one of preemption[.]'") (quoting *Alice*, 573 U.S. at 216). In this case, claim 1 requires a generic PDC structure that has been known for more than forty years to "exhibit" certain magnetic effects to achieve the indistinct and abstract principle of a stronger PDC, regardless of how those effects are attained.

The Commission, however, found the magnetic effects that the specification posits may be attained through the disclosed, allegedly-novel fabrication method can also be attained in other ways. Specifically, every PDC embodiment disclosed in the '502 patent achieves the magnetic effects with a metal-solvent catalyst amount *below* 7.5 weight % and fabricated using a sintering pressure *above* 7.5 GPa, but every infringing PDC meets the claimed magnetic effects with a metal-

solvent catalyst amount *above* 7.5 weight % and some of those PDCs were fabricated using a sintering pressure *below* 7.5 GPa. *See* Appx2900 (German Tr. 1320:9-19); Appx1950-1951 (German Tr. 373:4-374:5); Appx31 (citing Appx4992-4993 (Intervenors' Sub. on Issues Under Review)); Appx4937-4939 (Intervenors' Resp. to USS Pet. for Review); Appx1952 (German Tr. 375:2-19). For instance, the accused S18 product made by Intervenor Haimingrun exhibits all of the claimed coercivity, magnetic saturation, and specific permeability behaviors. Appx31-32; Appx295-297; Appx893 (*e.g.*, tempID BHHHH-7). Yet, the Commission found that the S18 product was manufactured at a sintering pressure *below* 7.5 GPa and has a cobalt content of *more* than 7.5 weight %.[12] Appx31-32; Appx1473 (Pressure B); Appx893 (*e.g.*, tempID BHHHH-7). Similarly, the Dragon 2 product made by Intervenor New Asia exhibits all of the claimed magnetic side effects but was manufactured at a cell pressure *below* 7.5 GPa and

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[12] USS points to its own "annotated" version of Haimingrun's document in challenging the Commission's finding that the S18 product was manufactured at a sintering pressure below 7.5 GPa. USS Br. at 48 (citing Appx3326 (adding green dotted line and red and blue text)). However, that same page of Haimingrun's document expressly discloses the cavity pressure used by pressure B (the same pressure platform used to manufacture the S18 product) is below 7.5 GPa. Appx1474 (see text below table). Intervenor Haimingrun's use of a fabrication method that is disparaged by the '502 patent to make PDC products exhibiting the claimed magnetic effects but having a metal content more than 7.5 weight % conflicts with the teachings in the patent. *See supra* Statement of the Case, Part I(B).

has a cobalt content of *more* than 7.5 weight %.[13] Appx892 (*e.g.*, tempID BCCCC-7); Appx710 (Dr. German's Demonstratives); Appx4634-4638 (USS's infringement analysis for Dragon 2). In other words, the Commission found that there are no limits to how one can arrive at the claimed PDC and there are no limits to the structures that can form the claimed PDC.

Importantly, if the claimed magnetic effects are necessarily indicative of "structural aspects of the patented microstructure," as USS contends (USS Br. at 29), PDCs (like Intervenors) with different microstructures (*i.e.*, metal content above 7.5 weight %) should *not* be able to achieve the magnetic effects. Put differently, if, as USS proposes, the claimed magnetic effects identify a concrete implementation of a PDC, then it should follow that all infringing PDCs meeting these magnetic limitations (and, therefore, exhibiting enhanced diamond bonds)

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[13] USS argues the Commission's finding that the Dragon 2 product was manufactured at a sintering pressure "below 7.5 GPa" conflicts with testimony given by New Asia's corporate representative. USS Br. at 48 (citing Appx3412-3414; Appx3494-3496); Appx32. This argument is waived because at no point before the ALJ did USS challenge the "below 7.5 GPa" pressure reported by New Asia and USS's expert even reported it as such in his demonstrative. Appx32; Appx1951-1952 (German Tr. 374:23-375:19) (confirming that New Asia represented that the Dragon 2 product is manufactured at a cell pressure below 7.5 GPa and has a cobalt percentage of more than 7.5 weight %). Notwithstanding waiver, the testimony given by New Asia's corporate representative does not conflict with the Commission's finding. Appx3493-3494 (Heng Tr. 75:17-76:4) (testifying that he could not provide "an accurate value regarding … the cell pressure of Dragon2 during the sintering stage").

must have a metal content of less than 7.5 weight %, but they do not. This directly contradicts USS's assertion that the patent teaches that the "new PCD table with a reduced metal-solvent catalyst content exhibited 'a higher coercivity, a lower specific magnetic saturation, or a lower specific permeability (i.e., the ratio of specific magnetic saturation to coercivity) than [a] PCD formed at a lower sintering pressure.'" USS Br. at 11 (quoting Appx97 (3:66-4:17)). Indeed, the specification itself indicated only that PDCs with the claimed magnetic behaviors *may* have certain compositions, not that they *necessarily* do. At bottom then, PDCs can achieve the claimed magnetic behaviors even while substantially varying the inventive concepts that differentiate the PDCs disclosed in the specification from prior art PDCs.

USS misunderstands the Commission's concern with preemption when it asserts that the claims "do not preempt the use of *all* PDCs." USS Br. at 44 (emphasis in original). Undoubtedly, claim 1 cannot preempt the use of all PDCs since PDCs have been known and used for nearly a century. As discussed above, in this case, the inventors do not claim to be the first to make a PDC by sintering a catalyst with diamond particles in a press under HTHP conditions. Appx33-34. The discovery described in the '502 patent is far narrower—that using existing machinery to sinter diamond particles at a pressure of at least about 7.5 GPa *may* result in a PDC table with less metal content before leaching. Appx34; *see supra*

Statement of the Case, Part II(B). USS's contribution should not allow it to preempt every potential structure or way of fabricating PDCs with the claimed magnetic effects.

USS also asserts that the claims do not preempt all PDCs that have enhanced diamond bonds but only those PDCs having all the elements in the claims. USS Br. at 45-46. However, as discussed above, claim 1 departs from the prior art only by adding observed magnetic effects that purportedly indicate enhanced diamond bonds. All other claim elements (*i.e.*, unleached PCD table, interstitial regions, diamond grains having average grain size of 50 μm or less, a cobalt catalyst, a substrate, a substantially planar topography, and a lateral dimension between 0.8 cm to 1.9 cm) are admittedly conventional in the art. *See infra* Part D.

There is no dispute that the idea of creating stronger PDCs with more bonding has been a goal in the PDC industry for decades. Appx25 n.13 (citing Appx1695 (German Tr. 119:17-25) (USS's expert noting that "enhanced diamond-to-diamond bonding" is "really driving the economics" in the drill rig industry)). But instead of claiming the particular fabrication process or specific compositional structure of its PDC, claim 1 impermissibly attempts to preempt every potential solution to the problem—a stronger PDC that exhibits allegedly desirable magnetic behaviors. Accordingly, the Commission properly found at *Alice* step one that

claim 1 is directed to the abstract idea of a stronger PDC rather than a concrete implementation of an improved PDC.

2. Claim 15 Is Directed to the Same Abstract Idea

Independent claim 15 of the '502 patent fares no better at *Alice* step one. Claim 15 recites not only how a PDC behaves in a magnetic field (*i.e.*, coercivity, specific magnetic saturation), but also how it performs when used to cut something (*i.e.*, "a thermal stability" performance goal "of about 1300 m to about 3950 m"). Appx107 (24:12-14); *see* Appx107 (24:9) (reciting the same coercivity limitation found in claim 1); Appx107 (24:10-11) (reciting "a specific magnetic saturation of about 10 $G \cdot cm^3/g$ to about 15 $G \cdot cm^3/g$," which is a magnetic side effect that is proportional to coercivity and specific permeability).

The Commission found the claimed thermal stability is not only a result or effect, but is a performance measure. Appx21. According to one of Dr. Bertagnolli's published papers, the amount of metal in a PDC correlates with three "properties relevant to drilling," one of which is "thermal resilience":

> Metal content is known to correlate with mechanical properties of polycrystalline diamond. Tests have indicated that higher metal content correlates with lower thermal resilience, wear resistance, and fracture toughness of the cutter, the properties relevant to drilling. The primary mechanisms for metal content contributing to cutter degradation appear to be diamond-metal differential thermal expansion and diamond graphitization at higher temperatures, which mostly influence wear.

Appx326 (quoting Appx4061). Like the magnetic side effects, there is no dispute that all PDCs exhibit a thermal stability and that thermal stability can be measured using conventional equipment and techniques. *See* USS Br. at 61; Appx2918 (German Tr. 1338:9-19).

The '502 patent teaches that a metal content below 7.5 weight %—a threshold conventionally achieved by leaching or other processes—increases a PDC's ability to withstand the heat generated during the cutting process, thereby enhancing its thermal stability for subterranean drilling applications. Appx97 (4:54-57) ("By maintaining the metal-solvent catalyst content below about 7.5 wt %, the PCD may exhibit a desirable level of thermal stability suitable for subterranean drilling applications."); Appx98 (5:41-44) ("Despite the average grain size of the bonded diamond grains being less than about 30 μm in some embodiments, the metal-solvent catalyst content in the PCD may be less than about 7.5 wt % resulting in a desirable thermal stability.").

However, as with the magnetic side effects, certain infringing products in this case achieved the claimed thermal stability with much higher cobalt content than those disclosed in the patent. *E.g.*, Appx892 (Jingrui's R22-1613 product, tempID BGGGG-9); Appx4638-4640 (USS's infringement analysis for Jingrui's R22-1613 product). Thus, the record evidence shows that PDCs can achieve the claimed magnetic behaviors and thermal stability even while substantially straying

from the inventive concepts that differentiate the PDCs disclosed in the specification from prior art PDCs. This directly contradicts USS's assertion that "thermal stability represents a different way of characterizing and measuring the microstructure of the claimed PDCs." USS Br. at 61. It also suggests that claim 15, like claim 1, would broadly inhibit human ingenuity with regard to basic building blocks of technological activity.

Other than the claimed magnetic side effects and thermal stability goal, all other claim elements (*i.e.*, unleached PCD table, interstitial regions, diamond grains having average grain size of 50 μm or less, a cobalt catalyst, a substrate, and a lateral dimension about 0.8 cm or more) are well-understood or conventional in the art. Thus, looking at claim 15 as a whole, the claim is directed to the abstract idea of a stronger PDC and not to a concrete implementation of an improved PDC.

3. Dependent Claims 2, 11, and 21 Are Also Linked to the Same Abstract Idea

The additional limitations in dependent claims 2, 11, and 21 do not alter the *Alice* step one analysis. Dependent claim 2 limits the magnetic behavior, specific magnetic saturation, that is found in claim 15 to "about 15 $G \cdot cm^3/g$ or less." Appx107 (23:14-17). Dependent claim 11 recites a conventional structural parameter: limiting the size of the PCD table to "about 1.3 cm to about 1.9 cm." Appx107 (23:45-47); *see* Appx2883 (German Tr. 1303:11-22) (confirming that "long before the asserted patents, 13-millimeter, 16-millimeter, and 19-millimeter

cutters were well known for being used in PDC bits"). Dependent claim 21 recites a magnetic behavior, specific permeability, that is found in claim 1. Appx107 (24:34-37). USS never argued why these additional limitations result in a patent-eligible claim, and therefore any arguments to this effect were waived. *See supra* Part II(A). Accordingly, at *Alice* step one, the Court should find claims 2, 11, and 21 substantially similar and linked to the same abstract idea of a stronger PDC exhibiting certain side effects or results as claims 1 and 15. *Content Extraction*, 776 F.3d at 1348.

C. USS's Arguments Regarding *Alice* Step One Are Not Supported by the Case Law or Record Evidence

1. That the Asserted Claims Recite a "Manufacture" or a "Composition of Matter" Is Not Dispositive of Patent Eligibility; This Court Has Found Such Recitations Can Be Directed to a Patent-Ineligible Concept

USS argues that "this is the first time a composition of matter has been deemed an ineligible abstract idea." USS Br. at 3. However, case law going back more than 150 years has limited eligible subject matter.[14] The Supreme Court has

[14] *Digitech Image Technologies* does not support USS's argument that a claim falling within the permitted statutory categories is *per se* patent-eligible. *See* USS Br. at 21 (citing *Digitech Image Techs. v. Elecs. For Imaging*, 758 F.3d 1344, 1348-49 (Fed. Cir. 2014)). In that case, the Court held a claim directed to "device profile" does not fall within the statutory categories of eligible subject matter and, thus, the Court did not even reach the issue of whether a claim falling within the permitted statutory categories is necessarily patent-eligible. *See Digitech*, 758 F.3d

explained that recitation of a tangible system, "(in § 101 terms, a 'machine')," does not end the eligibility inquiry. *Alice*, 573 U.S. at 224; *see In re TLI Commc'ns LLC Patent Litig*., 823 F.3d 607, 611 (Fed. Cir. 2016) ("[N]ot every claim that recites concrete, tangible components escapes the reach of the abstract-idea inquiry.").

Amicus argues that the asserted claims "are more akin to composition of matter claims that the Supreme Court has held to be patent eligible." Amicus Br. at 8 (citing *Diamond v. Chakrabarty*, 447 U.S. 303, 305-06 (1980)). The Supreme Court in *Chakrabarty* interpreted the meaning of "manufacture" and "composition of matter" in § 101 and held that a live, human-made micro-organism constitutes a "manufacture" or "composition of matter" and is patentable subject matter under § 101. *Chakrabarty*, 447 U.S. at 308-10. But nothing in *Chakrabarty* precludes applying the abstract ideas exception to manufactures and compositions of matter. *See id.* at 309 ("This is not to suggest that § 101 has no limits or that it embraces every discovery. The laws of nature, physical phenomena, and abstract ideas have been held not patentable.").

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at 1349-50 ("Data in its ethereal, non-physical form is simply information that does not fall under any of the categories of eligible subject matter under section 101.").

Nor does *Chakrabarty* stand for the proposition that "manufacture" and "composition of matter" are *de facto* patent-eligible as Amicus seems to suggest. Amicus Br. at 8-9. The Supreme Court has explained the fact that a "machine" or, here, a manufacture or a composition of matter, "necessarily exist[s] in the physical, rather than purely conceptual, realm is beside the point." *Alice*, 573 U.S. at 224 (quotation and citation omitted). "[I]f that were the end of the § 101 inquiry … [it] would make the determination of patent eligibility 'depend simply on the draftsman's art,' thereby eviscerating the rule that '[l]aws of nature, natural phenomena, and abstract ideas are not patentable.'" *Id.* (citations omitted). What matters is the reality behind the manufacture or composition of matter language, whether or not it simply clothes abstract concepts.[15]

Indeed, tangible systems, products, and other manufactures have been found patent-ineligible for being directed to an abstract idea. *See, e.g.*, *Affinity Labs*, 838

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[15] *BASCOM Global* does not support USS's argument that "'[a] new and useful … composition of matter is not an abstract idea.'" USS Br. at 22 (quoting *BASCOM Global Internet Servs. v. AT&T Mobility LLC*, 827 F.3d 1341, 1353-54 (Fed. Cir. 2016) (Newman, J., concurring)). Judge Newman proposed a new framework for evaluating patent eligibility which would rely on other patentability statutory bars such as §§ 102, 103, and 112 to reign in abstract ideas. *See BASCOM*, 827 F.3d at 1353-54 (Newman, J., concurring). But Judge Newman's framework was not adopted by the majority. Indeed, the Supreme Court rejected the notion that "other statutory provisions" could adequately "perform th[e] screening function" served by § 101. *Mayo*, 566 U.S. at 89; *see Flook*, 437 U.S. at 593.

F.3d at 1258 (broadcast system); *Yu*, 1 F.4th at 1042 (digital camera); *Interactive Wearables, LLC v. Polar Electro Oy*, 501 F. Supp. 3d 162, 174-78 (E.D.N.Y. 2020), *aff'd*, 2021 WL 4783803 (Fed. Cir. 2021), *cert. denied*, 143 S. Ct. 2482 (2023) (content player); *ChargePoint*, 920 F.3d at 770 (electric vehicle charging station); *Chamberlain Grp. v. Techtronic Indus. Co*., 935 F.3d 1341, 1346-48 (Fed. Cir. 2019) (garage door opener); *Cardionet, LLC v. InfoBionic, Inc.*, 816 F. App'x 471, 475 (Fed. Cir. 2020) (unreported) (cardiac monitoring apparatus). There is no judicial precedent, therefore, supporting USS's and Amicus's argument that compositions of matter are exempt from the judicial exceptions to patent-eligible subject matter.[16]

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[16] Amicus argues that "in finding US Synthetic's composition claims to be patent ineligible, the Commission accused US Synthetic of over-claiming, and held that US Synthetic's claims would 'monopolize every potential structure or way of creating stronger PDCs with the claimed characteristics" but that "claim breadth is examined under the principles of Section 112." Amicus Br. at 13-14. The problem with these claims, however, is not merely their "breadth." Rather, as discussed herein, the claims are directed to an abstract idea and fail to recite an inventive concept to ensure that the patent does not seek simply to monopolize the abstract idea. *See Alice*, 573 U.S. at 217-18, 221; *Mayo*, 566 U.S. at 71 (holding that the patent statute excludes laws of nature, natural phenomena, and abstract ideas from patentability because "they are the basic tools of scientific and technological work" and "monopolization of those tools through the grant of a patent might tend to impede innovation more than it would tend to promote it."). The Commission thus appropriately considered the claims under § 101.

2. This Court Has Recognized That a Claimed Invention That is Directed to a Result, Even an Innovative Result, Without a Concrete Solution Poses Serious Risks Under Section 101

Both USS and Amicus argue that any and all properties of a composition of matter are *de facto* non-abstract. *See* USS Br. at 25 ("Reciting measured material properties in the claims does not cause the claims to be directed to an abstract idea under *Alice* step one."); Amicus Br. at 11 (same).

"[W]hile not all functional claiming is the same, simply reciting a functional result at the point of novelty poses serious risks under section 101." *Am. Axle & Mfg., Inc. v. Neapco Holdings LLC*, 966 F.3d 1347, 1356 (Fed. Cir. 2020) (Chen, J., concurring in denial of the petition for rehearing en banc). "[A]s 'reflected repeatedly in [this Court's] cases,' a claimed invention must embody a concrete solution to a problem having 'the specificity required to transform a claim from one claiming only a result to one claiming a way of achieving it.'" *Id.* (quoting *SAP Am.*, 898 F.3d at 1167 (collecting cases)); *see Am. Axle*, 967 F.3d at 1296 (same). For well over a century, the Supreme Court has repeatedly used the "abstract idea exception [to] prevent[] patenting a result where 'it matters not by what process or machinery the result is accomplished.'" *McRO*, 837 F.3d at 1312 (quoting *O'Reilly v. Morse*, 56 U.S. 62, 113 (1854)); *see also Diamond v. Diehr*, 450 U.S. 175, 182 n.7 (1981) (explaining that a patent may issue "for the means or method of producing a certain result, or effect, and not for the result or effect

produced"); Appx28 n.14 (citing *Le Roy*, 55 U.S. at 175 ("A patent is not good for an effect, or the result of a certain process," for such patents "would prohibit all other persons from making the same thing by any means whatsoever."); *Funk Bros. Seed Co. v. Kalo Inoculant Co*., 333 U.S. 127, 132-35 (1948) (J. Frankfurter, concurring)).

Recent decisions by this Court have echoed these principles set forth in the early cases. *See, e.g.*, *Affinity Labs*, 838 F.3d at 1262 (finding the patent "claims the general concept of out-of-region delivery of broadcast content through the use of conventional devices, without offering any technological means of effecting that concept"); *Yu*, 1 F.4th at 1043 (finding the representative claim was improperly "directed to a result or effect that itself is the abstract idea and merely invoke[s] generic processes and machinery rather than a specific means or method that improves the relevant technology").

Similarly, here, USS effectively claimed the general goal of a stronger PDC exhibiting certain side effects or results without reciting a way of achieving those desirable characteristics. In USS's own words, the problem addressed by the '502 patent is the need "to create a new, stronger type of PDC by reducing the amount of metal catalyst (e.g., cobalt), thereby increasing the diamond bonding, but without requiring a leaching process to do so." USS Br. at 7-8. The inventors may very well have discovered a new way of making an unleached PCD with a lower

metal content; but because they claim a PDC having certain side effects or results, rather than the particular fabrication process or compositional structure of the PDC, the asserted claims purport to monopolize every potential solution to the problem—any PDC that achieves stronger bonds. These claims are not the kinds of "discoveries" that § 101 was enacted to protect.[17] *See Flook*, 437 U.S. at 593.

D. Under *Alice* Step Two, the Asserted Claims Do Not Recite an Inventive Concept

At *Alice* step two, the Court looks for an "inventive concept"—"an element or combination of elements that is sufficient to ensure that the patent in practice

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[17] According to Amicus, the Commission's determination is an "expansion of the abstract idea judicial exception to render a composition of matter claim patent ineligible[, which] is unprecedented and contradicts Section 101's plain text." Amicus Br. at 4. Not so. The Commission did not find that all composition of matter claims are patent-ineligible abstract ideas. Rather, the Commission found that the particular claims here are directed to PDCs exhibiting certain side effects or results rather than a concrete implementation of an improved PDC. The Commission's determination is consistent with governing law as reviewed above, which does not confine patent ineligibility as to compositions of matter strictly to naturally occurring substances. To the extent that Amicus is also suggesting that the Commission's determination would render any composition of matter abstract, that assertion is incorrect as the Commission's determination is limited to the specific claims and the factual record. Illustrative of this point, as discussed above, the Commission agreed with USS's own expert that this "case isn't as much about, you know, the structure of PDCs [*i.e.*, composition of matter] as it is about the measurable characteristics of sintered materials [*i.e.*, functional result (abstract idea)]." Appx2874 (German Tr. 1294:1-6). Amicus's desire for a "[c]lear, strong, and predictable" patent system is served by § 101 as applied by the Supreme Court, this Court, and the Commission. Amicus Br. at 2. Amicus's "alarm" over the Commission's decision, however, is unwarranted. *Id*. at 8.

amounts to significantly more than a patent upon the [ineligible concept] itself." *Alice*, 573 U.S. at 217-18 (quotation omitted). The "mere recitation of concrete, tangible components is insufficient to confer patent eligibility to an otherwise abstract idea." *TLI Commc'ns*, 823 F.3d at 613. Rather, the inventive concept must amount to more than "well-understood, routine, [or] conventional activit[ies]," *Alice*, 573 U.S. at 225 (quoting *Mayo*, 566 U.S. at 73), which may involve underlying factual findings, *ChargePoint*, 920 F.3d at 773 (citing *Berkheimer*, 881 F.3d at 1368).

The Commission agreed with the ALJ that each of the asserted claims fail at *Alice* step two because there is nothing in the individual limitations or their ordered combination that transform the claim into patent-eligible subject matter. As reflected in the specification itself, the prior art, and by USS's own admission, beyond the abstract idea of stronger PDCs exhibiting certain side effects or results, the claims recite well-understood, routine, conventional structural elements. Appx35; Appx3926-3929; Appx3998-4001 (Intervenors' Post-hr'g Br.); Appx4926-4928 (Intervenors' Resp. to USS Pet. for Review); Appx5011-5014 (Intervenors' Sub. on Issues Under Review). The chart below shows the elements that are admittedly well-understood, routine, and conventional for claim 1:

Representative Claim 1	Patent Disclosure & USS's Admissions
A polycrystalline diamond compact, comprising:	Appx96 (1:21-25); Appx104 (Tables II-IV list conventional PCD tables, some of which were obtained from PDCs). Appx2881 (German Tr. 1301:2-9) ("**Q. [**T]he general structure … of a diamond table sintered to a substrate has been well-known, at least for 50 years[?] … **A.** the first development was at General Electric in the '70s, I think, so it sounds about right.").
a polycrystalline diamond table, at least an unleached portion of the polycrystalline diamond table including:	Appx104 (18:26-60) (Tables II-IV list conventional PCD tables having an unleached region). Appx2907 (German Tr. 1327:15-17) ("**Q. [**I]s it fair to say that virtually all cutters for all time have included at least an unleached portion? **A.** I would – yes.").
a plurality of diamond grains bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 50 μm or less; and	Appx96 (1:42-61); Appx104 (17:42-18:60) (Tables II-IV list conventional PCD tables having an unleached region in which cobalt is interstitially disposed between bonded diamond grains and at least the PCD tables listed in Table II have an average grain size of 20 μm). Appx2885 (German Tr. 1305:2-5) ("**Q.** You would agree with me that diamond grain size of less than 30 micrometers was also well-known prior to 2008, right? **A.** That's right.").
a catalyst including cobalt, the catalyst occupying at least a portion of the interstitial regions;	Appx96 (1:42-61); Appx104 (17:42-18:60) (Tables II-IV list conventional PCD tables having an unleached region in which cobalt is interstitially disposed between bonded diamond grains). Appx2898-2899 (German Tr. 1318:10-20) ("**Q.**

	Having a metal in the subtrate is important because during the sintering process, the metallic liquifies and acts as a catalyst to bond the diamond grains together, right? **A.** Yes, by a solution reprecitation process. **Q.** And you'd agree with me that cobalt is the most common metal catalyst used in the PDC industry? **A.** Yes.").
wherein the unleached portion of the polycrystalline diamond table exhibits a coercivity of about 115 Oe to about 250 Oe;	Magnetic side effect.
wherein the unleached portion of the polycrystalline diamond table exhibits a specific permeability less than about 0.10 G·cm3/g·Oe; and	Magnetic side effect.
a substrate bonded to the polycrystalline diamond table along an interfacial surface, the interfacial surface exhibiting a substantially planar topography;	Appx96 (1:62-2:15) (disclosing residual stresses occur near the PCD table/substrate interface). Appx2881-2883 (German Tr. 1301:10-1303:1) ("**Q.** Does what's shown there have a substantially planar topography? **A.** I think so. **Q.** And the idea of using a ripple like that was known before the asserted patents; is that fair? **A.** Yes. **Q.** Also having a flat interface between the substrate and the diamond table was well known before the asserted patents, right?

	A. Yes, that was first, I think.”).
wherein a lateral dimension of the polycrystalline diamond table is about 0.8 cm to about 1.9 cm.	Appx2883 (German Tr. 1303:11-22) (“**Q.** …here, the lateral dimension is – can we call it the size of the polycrystalline diamond table? **A.** Yes. **Q.** Now the idea of having a size for the cutter is so that it fits into the PDC bit, right? **A.** That’s correct. **Q.** You would agree with me that long before the asserted patents, 13-millimeter, 16-millimeter, and 19- millimeter cutters were well-known for being used in PDC bits, right? **A.** That’s correct.”).

USS did not challenge its own expert’s admissions cited above. *See* Appx4738-4740; Appx4780 (USS Reply Post-hr’g Br.); Appx427-436 (USS Pet. for Review) (arguing only that the combination of claimed magnetic properties was not known in the art); Appx35 (citing Appx3331-3332 (USS Reply Sub. on Issues Under Review)); *see also* USS Br. at 58-59.

USS argues that “the combination of all [claim] elements is directed to a PDC having a denser diamond microstructure, which provides significant utility in oil-drilling applications, such as wear resistance and thermal stability.” USS Br. at 57. But “[t]his amounts to no more than a restatement of the assertion that the desired results are an advance.” *Am. Axle*, 967 F.3d at 1299. “As a matter of law, narrowing or reformulating an abstract idea does not add ‘significantly more’ to

it." *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290 (Fed. Cir. 2018) (citing *SAP Am.*, 898 F.3d at 1168).

USS also argues that the combination of elements in the claims "reflect a novel PCD microstructure." USS Br. at 58. However, "the relevant inquiry is not whether the claimed invention as a whole is unconventional or non-routine"—that is an inquiry under §§ 102/103, not § 101. *BSG Tech*, 899 F.3d at 1290; *see Synopsys*, 839 F.3d at 1151 (explaining that the search for an inventive concept under § 101 is distinct from demonstrating novelty under § 102). Rather, the inquiry at step two is a "'search for an 'inventive concept' ... that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.'" *BSG Tech*, 899 F.3d at 1290 (quoting *Alice*, 573 U.S. at 217-18). Here, the only alleged unconventional features of the asserted claims are the claimed side effects. An abstract idea, however, "cannot supply the inventive concept that renders the invention 'significantly more' than that [abstract idea]." *Id.*; *see ChargePoint*, 920 F.3d at 774-75.

USS also argues that the "Commission erred by omitting all analysis of the numerical ranges recited in the Asserted Claims." USS Br. at 58. But other than citing its expert's testimony that the "range of properties []would be associated with the performance" of a PDC, there is no evidence to support finding the claimed ranges amount to anything more than the abstract concept itself. *Id.*

(quoting Appx2823 (German Tr. 1243:12-25)). As discussed above, the claimed ranges are merely side effects of the unclaimed manufacturing process and imperfect proxies for unclaimed, physical characteristics of a PDC. There is nothing in the individual limitations or their ordered combination that transform the claims into patent-eligible subject matter. Thus, the Commission correctly found the asserted claims of the '502 patent lack an inventive concept and are patent-ineligible under § 101.

CONCLUSION

For the foregoing reasons, the Commission respectfully requests that its final determination finding no violation of section 337 be affirmed.

Respectfully Submitted,

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CERTIFICATE OF SERVICE

I, Cathy Chen, hereby certify that, on this 28th day of August 2023, I caused a copy of the foregoing **RESPONSE BRIEF OF APPELLEE INTERNATIONAL TRADE COMMISSION**, to be served on counsel of record via the Court's CM/ECF system.

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CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION, TYPEFACE, AND TYPE STYLE REQUIREMENTS

Pursuant to Federal Rule of Appellate Procedure 32(g)(1) and Federal Circuit Rule 32(b)(3), I hereby certify that the attached brief complies with the type-volume limitation and typeface requirements of Federal Rule of Appellate Procedure 32(a)(7) and Federal Circuit Rules 32(b)(1) and 32(b)(2). The brief has been prepared in a proportionally-spaced typeface using Microsoft Office 365, in Times New Roman 14-point font. The brief contains a total of **13,134** words, including 13,067 words obtained from the word-count function of the word-processing system, including all footnotes, annotations, and claim language, and a manual count of 67 words appearing in the graphics and figures.

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