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# Can an Article of Manufacture be an Abstract Idea?

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*In The Matter of Certain Polycrystalline Diamond Compacts and Articles Containing Same.* [2022-10-26 [DI 783166].Commission Opinion]

## US Patent 10,507,565. Owned by US Synthetic Corporation (USS).

(12) **United States Patent**  
Bertagnolli et al.

(10) **Patent No.:** US 10,507,565 B2  
(45) **Date of Patent:** \*Dec. 17, 2019

(54) **POLYCRYSTALLINE DIAMOND,  
POLYCRYSTALLINE DIAMOND  
COMPACTS, METHODS OF MAKING SAME,  
AND APPLICATIONS**

(52) **U.S. Cl.**  
CPC ..... B24D 3/10 (2013.01); C22C 26/00  
(2013.01); E21B 10/567 (2013.01);  
(Continued)

(71) Applicant: **US SYNTHETIC CORPORATION,**  
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(58) **Field of Classification Search**  
CPC ..... B24D 3/10; F16C 33/043; E21B 10/567  
See application file for complete search history.

International Trade Commission (ITC) Decision affirming the Initial Determination.

Claims directed to diamond composites used in drill bits were ineligible ‘abstract ideas’ under § 101.

# Claimed Invention

Claims directed to polycrystalline diamond compacts (PDCs), which can be used as the cutting elements in tools such rotary drill bits.

A PDC is composed of a diamond-containing layer (a “table”) bonded to a substrate. The diamond table is fabricated by mixing diamond grains with a metal-solvent catalyst and subjected to heat and pressure to cause the diamond grains to be bonded to each other and to the substrate.

# Claimed Invention

Disclosed method included fabricating the PDCs at pressures of at least 7.5 GPa. The pressure was disclosed as demonstrating improved diamond bonding and density and exhibiting higher thermal stability and resistance to wear.

The claims recite three kinds of properties: (i) structural properties, such as the size of the diamond grains; (ii) performance measures, such as the degree of thermal stability or wear resistance achieved in a compact; and (iii) parameters, such as electrical conductivity or magnetic coercivity of the table, that are said to reflect the amount of remaining metal-solvent catalyst or the distance between the diamond grains in the table.

# Representative Claim

18. 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 directly bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 30  $\mu\text{m}$  or less;

a 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 175 Oe;

wherein the unleached portion of the polycrystalline diamond table exhibits an average electrical conductivity of less than about 1200 S/m; and

wherein the unleached portion of the polycrystalline diamond table exhibits a thermal stability, as determined by distance cut, prior to failure in a vertical lathe test, of at least about 1300 m.

# Representative Claim

18. 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 directly bonded together via diamond-to-diamond bonding to define interstitial regions, the plurality of diamond grains exhibiting an average grain size of about 30  $\mu\text{m}$  or less;
    - a 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 175 Oe;**
  - wherein the unleached portion of the polycrystalline diamond table **exhibits an average electrical conductivity of less than about 1200 S/m;** and
  - wherein the unleached portion of the polycrystalline diamond table **exhibits a thermal stability**, as determined by distance cut, prior to failure in a vertical lathe test, **of at least about 1300 m.**

## *Current Policy on claimed properties*

*In re Swinehart*, 439 F.2d 210 (CCPA 1971). *Swinehart* considered the following claim to an infrared-transparent crystal:

24. A new composition of matter, transparent to infra-red rays and resistant to thermal shock, the same being a solidified melt of two components present in proportion approximately eutectic, one of said components being  $\text{BaF}_2$  and the other being  $\text{CaF}_2$ .

Specification disclosed growing of the instant bodies under controlled conditions.

## *Current Policy on claimed properties*

The court explained that the only issues from using such a mode of definition were (1) possible lack of novelty, where the functional characteristics were inherent in the prior art; (2) possible indefiniteness under § 112, where the language was not sufficiently precise to delineate the subject matter embraced by the claim, and (3) possible insufficient disclosure under § 112, where the breadth of the claim raised questions such as scope of enablement.



## *Current Policy on claimed properties*

*In re Miller*, 441 F.2d 689 (CCPA 1971), claimed powdered PTFE composition defined in part by desired results (such as tensile strength when sintered), and in part by ‘gratuitous’ properties (such as dielectric strength), where the recited properties arose from the process of grinding the powder.

*BASF v. Johnson Matthey*, 875 F.3d 1360 (Fed. Cir. 2017) the Federal Circuit relied on *Swinehart* to reverse a district court which had invalidated claims that defined a composition with functional language. Very much like the Commission in this case, the district court invalidated the claims for indefiniteness because they “recite a performance property the composition must display, rather than its actual composition.”

# Eligible Subject Matter Analysis

## Step 1:

Whether the claim, as a whole, is directed to patent ineligible subject matter, i.e., law of nature, natural phenomenon or abstract idea.

ITC recognizes that claims are directed to a composition of matter not found in nature but recite certain structural and design features, performance measures (wear resistance and thermal stability) and side effects (electrical and magnetic properties).

ITC found performance measures and side effects problematic as being relevant to drilling, rather than structural parameters.

# Eligible Subject Matter Analysis

Initial Determination of the ITC dismissed the electrical and magnetic properties recited by the claim as “gratuitous rather than inventive.”

The Commission’s decision found that the claims recite desired *properties* but not the way to *achieve* those properties:

- The claims here cover a set of goals for the PDCs that the specifications posit may be derived from enhanced diamond-to-diamond bonding. The claims do not recite a way of achieving the claimed characteristics; they simply recite the desired range of values for each characteristic.
- Acknowledged that the specification disclosed all conditions on how to make the PDCs with the recited properties, rejecting an assertion of non-enablement.

# Eligible Subject Matter Analysis

Claims incorporate “the abstract goal or result of a particular measure of wear resistance or thermal resistance (thermal stability), however achieved” and “certain electrical and magnetic side effects that themselves are simply imperfect proxies for unclaimed features.”

Identifies the abstract idea as being a PDC that achieves the claimed performance measures (wear resistance and thermal resistance) and has certain measurable side effects (electrical and magnetic) that the specification claims as resulting from enhanced diamond-to-diamond bonding.

# Eligible Subject Matter Analysis

ITC: Concept of stronger PCDs is an abstract idea.

USS: claimed parameters are indicative of the amount of diamond-to-diamond bonding and are therefore structural features.

- dismissed by ITC as being performance measurements.

Cited *American Axle v. Neapco* for asserting that patent eligibility inquiry requires that the claim “identify ‘how’ a functional result is achieved by limiting the claim scope to structures specified at some level of concreteness, in the case of a product claim, or to concrete action, in the case of a method claim.

# Eligible Subject Matter Analysis

Cited *American Axle* in asserting “unclaimed features of the manufacturing process ‘cannot function to remove [the claims] from the realm of ineligible subject matter.’” The claims were therefore directed only to the result or goal of a diamond table with the desired properties – an abstract idea under § 101.

Composition of matter or manufacture claim defined in part by effect or result, is patent-eligible under § 101 only if it additionally recites the process by which the claimed material is made. Otherwise, the claim is only directed to the abstract idea of achieving that result.

# Eligible Subject Matter Analysis

## Step 2:

ITC found that the recited physical elements are conventional.

Claims do not have an additional feature which is more than a drafting effort designed to monopolize the abstract idea.

# American Axle Manufacturing v. Neapco

U.S. Patent 7,774,911 ineligible for patent protection under Section 101 of the Patent Act in District Court of Delaware

(12) <b>United States Patent</b> Sun et al.	(10) <b>Patent No.:</b> US 7,774,911 B2 (45) <b>Date of Patent:</b> Aug. 17, 2010
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(54) <b>METHOD FOR ATTENUATING DRIVE LINE VIBRATIONS</b>	4,014,184 A 3/1977 Stark
	4,207,957 A 6/1980 Sivers et al.
	4,844,193 A 7/1989 Veselica et al.
(75) Inventors: <b>Zhaohui Sun</b> , Rochester Hills, MI (US); <b>David P Schankin</b> , Harper Woods, MI (US); <b>Dumitru F Patrascu</b> , West Bloomfield, MI (US); <b>Austin R Gerding</b> , Royal Oak, MI (US)	4,909,361 A 3/1990 Stark et al.
	5,056,763 A 10/1991 Hamada et al.
	5,326,324 A 7/1994 Hamada
	5,904,622 A 5/1999 Breese et al.
	5,976,021 A 11/1999 Stark et al.
(73) Assignee: <b>American Axle &amp; Manufacturing, Inc.</b> , Detroit, MI (US)	6,752,722 B2 * 6/2004 Armitage et al. .... 464/180
	6,874,228 B2 * 4/2005 Armitage et al. .... 29/888
	7,214,135 B2 5/2007 Laskey et al.
	7,533,756 B2 * 5/2009 Patrascu et al. .... 180/381

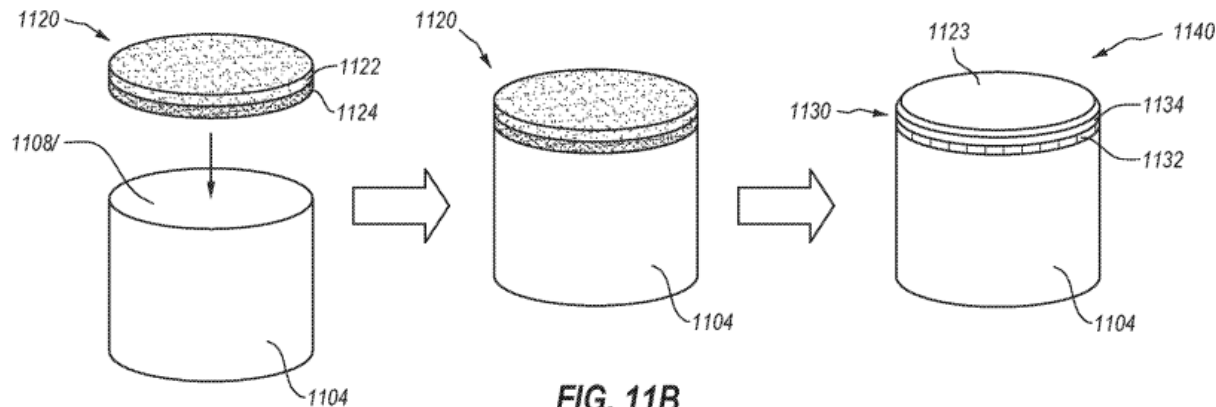
Federal Circuit affirmed the district court; directed to Hooke’s law and that there was no “inventive concept” other than “well-understood, routine, [and] conventional activities previously known to the industry

After appeal for rehearing *en banc*, panel reissued its opinion and affirmed the district court, but withdrew its reasoning as to Claim 1, sending claim 1 back to the District Court.



# American Axle Manufacturing v. Neapco

A method for manufacturing a shaft assembly of a driveline system, the driveline system further including a first driveline component and a second driveline component, the shaft assembly being adapted to transmit torque between the first driveline component and the second driveline component, the method comprising: providing a hollow shaft member; **tuning a mass and a stiffness of at least one liner**; and inserting the at least one liner into the shaft member; wherein the at least one liner is a tuned resistive absorber for attenuating shell mode vibrations and wherein the at least one liner is **a tuned reactive absorber for attenuating bending mode vibrations**.



## *American Axle Manufacturing v. Neapco*

Claim 22 here simply instructs the reader to tune the liner to achieve a claimed result, without limitation to particular ways to do so.

Judge Moore dissented in both panel decisions, arguing in the first panel decision that the claims did not claim a natural law and in both decisions that the majority had confused Section 101 with Section 112's written description and enablement requirements.

## *American Axle Manufacturing v. Neapco*

Claim was “directed to” the application of Hooke’s Law and that any “additional steps consist of well-understood, routine, conventional activity.”

“Claim 22 here simply instructs the reader to tune the liner to achieve a claimed result, without limitation to particular ways to do so.”[12] In *Flook*, claims relating to updating alarm limits using a mathematical formula were invalidated under Section 101 because they did not contain an “inventive application” of the mathematical formula. In this case, the panel found that the claim in question “does not specify how” to apply the natural law, instead it “simply instructs the reader . . . to achieve a claimed result.”

Questions?