No. 20-

IN THE

Supreme Court of the United States

AMERICAN AXLE & MANUFACTURING, INC.,
Petitioner,

v.

NEAPCO HOLDINGS LLC AND
NEAPCO DRIVELINES LLC.,
Respondents.

ON PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

PETITION FOR WRIT OF CERTIORARI

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QUESTIONS PRESENTED

American Axle invented a new process for making a new, useful, and tangible thing – a quieter automobile driveshaft. It is the type of invention that has long been eligible for patenting. A split Federal Circuit panel found that the invention was not eligible for patenting under 35 U.S.C. § 101 because it was allegedly directed to a natural law. The Federal Circuit was "bitterly divided" (6-6 split) on whether to rehear this case *en banc*. To the six active judges that voted to rehear this case, the panel's decision represents a dangerous expansion of Section 101 jurisprudence that, despite this Court's admonitions, has "swallowed all of patent law." *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014). There is no end in sight for the division at the Federal Circuit. Our nation's lone patent court is "at a loss as to how to uniformly apply § 101."

The questions presented are:

1. What is the appropriate standard for determining whether a patent claim is "directed to" a patent-ineligible concept under step 1 of the Court's two-step framework for determining whether an invention is eligible for patenting under 35 U.S.C. § 101?

2. Is patent eligibility (at each step of the Court's two-step framework) a question of law for the court based on the scope of the claims or a question of fact for the jury based on the state of art at the time of the patent?

CORPORATE DISCLOSURE STATEMENT

Petitioner American Axle & Manufacturing, Inc. is a wholly owned subsidiary of American Axle & Manufacturing Holdings, Inc. No other publicly held corporation owns 10% or more of the stock of American Axle & Manufacturing, Inc.

RELATED PROCEEDINGS

The following proceedings are directly related to this case within the mearing of Rule 14.1(b)(iii):

- *American Axle & Manufacturing, Inc. v. Neapco Holdings LLC et. al.*, Case No. 1:15-cv-01168-LPS (D. Del.), judgment entered on February 27, 2018; and

- *American Axle & Manufacturing, Inc. v. Neapco Holdings LLC et. al.*, Case No. 18-1763 (Fed. Cir.), judgment entered on October 3, 2019, and modified judgment entered on July 31, 2020.

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JURISDICTION

The Federal Circuit entered judgment on October 3, 2019, granted panel rehearing on July 31, 2020, denied rehearing *en banc* on July 31, 2020, and entered a modified judgment on July 31, 2020. App. 1a-70a. This Court has jurisdiction pursuant to 28 U.S.C. § 1254(1).

On March 19, 2020, the Court extended the time to file a petition for a writ of certiorari to 150 days from the date of the lower-court judgment, order denying discretionary review, or order denying a timely petition for rehearing. That order extended the deadline for filing this petition to December 28, 2020.

STATUTORY PROVISION

Section 101 of Title 35 of the U.S. Code provides: "Whoever 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 therefor, subject to the conditions and requirements of this title."

INTRODUCTION

Judges, industry leaders, scholars, Directors of the USPTO, and the Solicitor General of the United States have warned for years that the recurring confusion and uncertainty surrounding patent eligibility under 35 U.S.C. § 101, and the steady expansion of the three non-textual exceptions to the statutory text (natural laws, natural phenomena, and abstract ideas), would lead to the invalidation of patent claims "which have historically been eligible to receive patent-law protection." *Diamond v. Diehr*, 450 U.S. 175, 184 (1981). The warnings are now a reality.

The Federal Circuit used Section 101 to invalidate patent claims directed to a new and useful industrial process for manufacturing an improved driveshaft for an automobile, "the type of process which has been eligible since the invention of the car itself." App. 80a (Moore, J., concurring in denial of motion to stay). American Axle's U.S. Patent No. 7,774,911 ("'911 patent") solved the problem of noisy driveshafts. It did so by describing and claiming a multi-step, industrial process. The steps include providing a hollow driveshaft, "tuning" "liners" (low cost, hollow tubes made of fibrous material such as cardboard), and inserting and positioning the liners into the hollow driveshaft to attenuate two types of driveshaft

vibration. C.A.J.A.35.

Thus, the '911 patent describes, according to the plain language of Section 101, "a new and useful process." 35 U.S.C. § 101. Performing the process steps leads to a new, useful, and tangible thing – a driveshaft that makes cars quieter. This is the type of invention that has been eligible for patenting since the dawn of patent law in the United States.

Yet, the Federal Circuit found that the claims—which do not recite any natural law and require several manufacturing steps beyond application of a natural law—invoked the equation, $F = kx$ ("Hooke's law"), "and nothing more." In doing so, the Federal Circuit expanded the reach of the three patent-ineligible concepts and confused Section 101 with the enabling-disclosure requirement of Section 112.

The Federal Circuit was evenly divided (6-6 split) on whether to rehear this case *en banc*. To the six active judges that voted to rehear this case, the Federal Circuit's decision represents a dangerous expansion of Section 101 jurisprudence that, despite this Court's admonitions, will "swallow all of patent law." *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 217 (2014).

There is no end in sight for the division at the Federal Circuit. Our nation's lone patent court is "at a loss as to how to uniformly apply § 101," and, instead, is "slowly creating a panel-dependent body of law." App. 77a-78a (Moore, J., concurring in denial of motion to stay). "What we have here is worse than a circuit split—it is a court bitterly divided." *Id.* at 77a.

Section 101 was already in a fragile state. The

Federal Circuit, though, pushed it past its breaking point. The entire patent system is desperate for the Court's guidance and has cried for its help. The Court should heed the calls for guidance.

STATEMENT OF THE CASE

A. The Plain Text of Section 101 and Three Judicially-Created Exceptions

Section 101 sets forth the types of inventions that are eligible for patenting. Eligibility is a threshold question. *Bilski v. Kappos*, 561 U.S. 593, 600 (2010). Several other requirements must be satisfied before a patent is granted—including that the claimed invention must be described adequately to enable its use by persons skilled in the art, 35 U.S.C. § 112.

Congress intentionally used broad language to describe patent-eligible subject matter: "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." *Id.*, § 101. A "process"—the type of invention claimed in the '911 patent—"is a mode of treatment to produce a given result. It is an act or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery." *Cochrane v. Deener*, 94 U.S. 780, 787 (1877). This broad language of Section 101 "fulfill[s] the constitutional and statutory goal of promoting 'the Progress of Science and the useful Arts' with all that means for the social and economic benefits envisioned by [Thomas] Jefferson," the statute's original author. *Diamond v. Chakrabarty*, 447 U.S. 303, 308–309, 315

(1980) (quoting U.S. Const. art. I, § 8).

The plain text of Section 101 does not recite any exceptions. The Court, though, has "long held that [Section 101] contains an important exception: Laws of nature, natural phenomena, and abstract ideas are not patentable." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 70 (2012). The premise of these non-textual exceptions is that "[s]uch discoveries are 'manifestations of ... nature, free to all men and reserved exclusively to none.'" *Diehr*, 450 U.S. at 185 (ellipses in original).

But the exceptions cannot sweep too broadly at the expense of the statutory text: "[A]ll inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas." *Mayo*, 566 U.S. at 71. The Court, therefore, has repeatedly cautioned that the exceptions must be construed narrowly, lest they "swallow all of patent law." *Alice*, 573 U.S. at 217. "Thus, an invention is not rendered ineligible for patent simply because it involves" one of these concepts. *Alice*, 573 U.S. at 217. Rather, "an *application* of [one of these concepts] to a known structure or process may well be deserving of patent protection." *Diehr*, 450 U.S. at 187 (emphasis in original).

The Court has established a two-step framework for determining whether a judicially-created exception to Section 101 bars patent protection at the threshold. At step 1, a court asks "whether the claims at issue are directed to one of those patent-ineligible concepts." *Alice*, 573 U.S. at 217. If not, the invention is patent eligible. At step 2, a court must "search for an 'inventive concept,'" one that "'transform[s] the

nature of the claim' into a patent-eligible application"—*i.e.*, "an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" *Id.* at 217–218 (alteration in original).

As this case shows, lower courts have struggled to apply the Court's two-step framework.

B. American Axle's now-copied methods for manufacturing driveshafts for automobiles

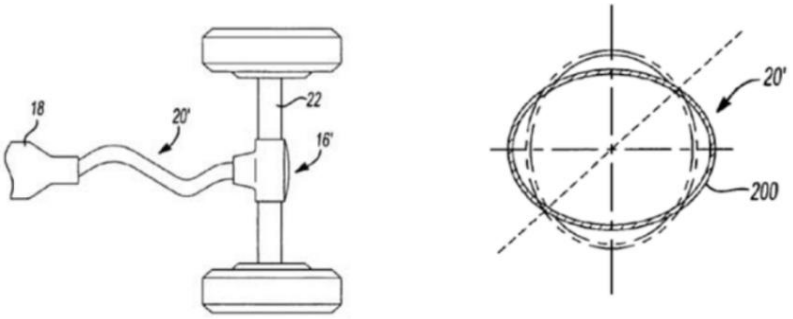
This case relates to manufacturing driveshafts for automobiles. A driveshaft (or propshaft) is a component of an automobile that transmits rotary power from the engine to the axles and wheels.

C.A.J.A.31, C.A.J.A.24; C.A.J.A.2021, C.A.J.A.2375; C.A.J.A.59–60.

Driveshafts are commonly formed of relatively thin-walled metal (e.g., aluminum) and, therefore, are susceptible to unwanted vibration. C.A.J.A.30. Vibration, in turn, causes noise that is readily detected by occupants who "increasingly expect" their

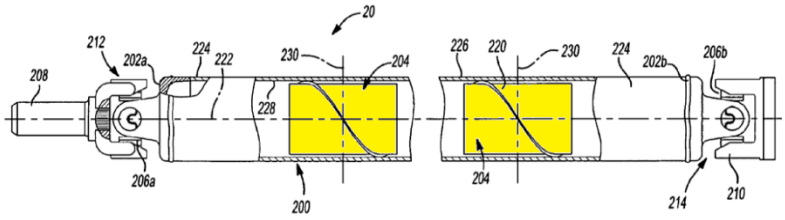
automobiles to be quiet, not noisy. *Id.*; C.A.J.A.1999.

There are several types of vibration that driveshafts experience. C.A.J.A.26. Two are at issue in this case: (1) "bending mode vibration," which causes a driveshaft to bend about its longitudinal axis, and (2) "shell mode vibration," which causes a driveshaft to deflect about its cross-section.



C.A.J.A.640; C.A.J.A.26.

American Axle solved the problem of noisy driveshafts. It discovered a new and useful process to manufacture an improved driveshaft that vibrates less and is not noisy. American Axle's process involves the positioning and insertion of "tuned liners" into driveshafts.



C.A.J.A.26; App. 206a. Before the invention, the industry used other, more costly techniques (e.g., dampers, plugs, or weights) to reduce bending mode vibration. C.A.J.A.30; C.A.J.A.1911. Untuned liners

were used only in rudimentary ways and only to reduce shell mode vibration. Liners were not suitable or understood to reduce bending mode vibration, let alone to reduce both bending mode and shell mode vibration. C.A.J.A.30; C.A.J.A.1327; C.A.J.A.23; C.A.J.A.3286; C.A.J.A.828.

American Axle changed all of that. It was the first to discover that liners could be "tuned" to a frequency of driveshaft vibration by adjusting characteristics of the liners. C.A.J.A.30; C.A.J.A.1327. It was also the first to discover that liners (let alone tuned liners) could be used to reduce bending mode vibration, and that tuned liners could reduce both bending mode and shell mode vibration when inserted and positioned correctly within the driveshaft. *Id*. American Axle described and claimed its new and useful process in the '911 patent. C.A.J.A.35. This is illustrated by claim 22, which recites numerous *process steps* for making an improved driveshaft:

> 22. 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.

C.A.J.A.35; C.A.J.A.1046-1047 (claim constructions).[1]

In addition, the specification describes how to perform the process steps. For example, one can "tun[e] a mass and a stiffness of at least one liner" by shaping the liner "in a desired manner," including shaping a liner's "fingers"; forming "void spaces" in the liner; adjusting the liner's wall thickness or material; adjusting the location and manner by which the liner is inserted into the hollow driveshaft, and more. C.A.J.A.33–34. The claims that depend from claim 22 track the specification and prescribe these additional process steps. C.A.J.A.35.

These teachings fulfilled a long-felt need in the driveshaft industry. C.A.J.A.4232; C.A.J.A.4234–4243; C.A.J.A.3459–3462. Just ask Neapco, which itself had an "issue" with attenuating both types of driveshaft vibration—until, of course, it discovered the '911 patent. On March 24, 2014, Neapco engineers emailed among themselves:

> Current focus [s]hould be understanding AAM v. NDL. Obviously, knowingly or unknowingly, they have solved the issue

[1] Claims 22–24, 26, 27, 31, and 34–36 are at issue in this appeal.

> with an extremely low cost solution. I want to know the mechanics.

C.A.J.A.3513; App. 209a. Neapco's engineers admitted that they had "more homework to do to really understand how to tune a liner." C.A.J.A.1915–1916. The next day, and to "catch[]-up" with American Axle, they circulated the '911 patent with the instruction that it taught "what [Neapco was] trying to achieve" for its driveshaft products. C.A.J.A.828; C.A.J.A.3510; App. 209a. Soon after, Neapco began manufacturing driveshafts using American Axle's patented manufacturing process. C.A.J.A.3531; C.A.J.A.3538–3539; C.A.J.A.6013–6018.

C. Proceedings below

In December 2015, American Axle sued Neapco in the U.S. District Court for the District of Delaware. Each party moved for summary judgment under Section 101. American Axle argued that the asserted claims are patent eligible. Neapco argued the claims are not because they are directed to two different "laws of nature"—(1) $F = kx$ ("Hooke's law") for the bending mode limitations, and (2) friction damping for the shell mode limitations.[2] C.A.J.A.1248–1251; C.A.J.A.1604–1605. The district court sided with Neapco, but found the claims directed to something

[2] Hooke's law, $F = kx$, describes the nature of certain spring-mass systems and may be used to calculate the frequency of periodic oscillation of a mass on a spring. C.A.J.A.1928–1931; C.A.J.A.1603–1605. Friction damping is damping that occurs due to the resistive friction between two surfaces. *Id.*

different, "applications of Hooke's law with the result of friction damping." C.A.J.A.11.

1. The Federal Circuit's initial panel decision

American Axle appealed. Neapco changed course on appeal and argued the claims were directed to an "abstract idea" instead of two different natural laws. App. 212a-213a; C.A.J.A.1248-1251, 1605-1605. A divided panel of the Federal Circuit affirmed. App. 1a-70a

At step 1, the panel majority held that the claims were directed to "Hooke's law, and possibly other natural laws"—without identifying the alleged other natural laws. According to the majority, the following just did not matter:

1. American Axle did not claim $F = kx$;
2. The most a driveshaft manufacturer could determine by using $F = kx$ is a frequency of an oscillating mass-spring system; $F = kx$ informs nothing about reducing vibration or the several, claimed process steps that result in an improved, quieter driveshaft; and
3. Neapco's own testing showed that tuning a liner—the only thing in the claims that can possibly be said to invoke $F = kx$—can actually *amplify* (rather than attenuate) driveshaft vibration, which proves that the invention (which does attenuate vibration) involves more than simply applying $F = kx$.

C.A.J.A.34–35; C.A.J.A.5217–5218; C.A.J.A.1887–1891; C.A.J.A.3417; C.A.J.A.2822–2823, C.A.J.A.2828; C.A.J.A.1659; C.A.J.A.6223–6224; C.A.J.A.3051, C.A.J.A.3060, C.A.J.A.3088, C.A.J.A.3096. Instead, what mattered to the majority was that the *claims* allegedly failed to teach how to make and use a tuned liner, even though Section 112 already requires the *specification* teach how to make and use the invention. App. 96a-105a; App. 120a-125a.

The panel majority also found there was no "inventive concept" under step 2, which renders a claim eligible if it involves more than performance of "well-understood, routine, [and] conventional activities previously known to the industry." *Alice*, 573 U.S. at 225. It did not matter that the record contained numerous disputed facts, including Neapco's admission that American Axle was the first to use liners to reduce bending mode vibration (much less both bending mode and shell mode vibration). C.A.J.A.1327. Nor did it matter that Neapco needed to copy the '911 patent to make its own driveshafts because, according to Neapco, American Axle "solved the issue with an extremely low cost solution." C.A.J.A.3513.

Judge Moore dissented. App. 111a-125a. She explained that the claims are not directed to some natural law or other ineligible concept. App. 111a-113a. She also identified the "***many***" "inventive concepts," "about which there exist at least questions of fact which should have precluded summary judgment." App. 114a. (emphasis in original). Judge Moore also criticized the majority for expanding

Section 101 to "subsume" Section 112: "This is now the law of § 101. The hydra has grown another head." App. 125a.

2. The Federal Circuit's modified panel decision

American Axle petitioned for panel rehearing and rehearing *en banc*. App. 201a-222a. The Federal Circuit granted panel rehearing, withdrew its previous opinion, and issued a modified (though, still divided) opinion. App. 148a-149a. The majority affirmed as to independent claim 22 (and its dependent claims), which remain at issue on this appeal. App. 10a-26a.

The panel majority determined that claim 22 was directed to a natural law, this time only $F = kx$ (Hooke's law), not "possibly other natural laws" as it asserted in the initial opinion.[3] *Compare* App. 10a *and* App. 100a. In doing so, the majority expanded the reach of the "directed to" inquiry. App. 23a; App. 30a-31a; App. 37a-38a; App. 47a-54a.

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[3] Neapco, the district court, and the panel majority have not been able to consistently articulate the ineligible concept to which the claims are allegedly directed. By American Axle's count, there are at least five different theories: (1) two different natural laws, $F = kx$ and friction damping (C.A.J.A.1248–1251; C.A.J.A.1604–1605); (2) "applications of Hooke's law with the result of friction damping" (Appx11); (3) an unidentified "abstract idea" (App. 212a-213a); (4) "Hooke's law, and possibly other natural laws" (App. 100a, App. 104a); and (5) "Hooke's Law and nothing more" (App. 33a). The inability of anyone to clearly articulate the ineligible concept underscores just how malleable Section 101 has become.

Even though Section 112 already requires every patent specification to sufficiently teach how to make and use the claimed invention, the panel majority's "directed to" inquiry imbued Section 101 with those same requirements. Under the majority's reasoning, patent *claims* (not just a patent specification) must sufficiently teach how to make and use the claimed invention:

> [T]he claim itself … must go beyond stating a functional result; it must identify "how" that 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.

App. 30a-31a. Under the majority's reasoning, a claim is "directed to" an ineligible concept if a judge decides that it does not meet these "how to" requirements and, instead, "invokes a [patent-ineligible concept], and nothing more, to achieve the claimed result." App. 23a.

Judge Moore again "dissent[ed] from this unprecedented expansion of § 101." App. 39a. According to Judge Moore, the majority's step 1 analysis amounted to a new test, which she called the "*Nothing More* test."[4] *Id.* at 47a-54a. She explained

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[4] As explained below, the active judges of the Federal Circuit cannot even agree on whether the panel majority created a "new test," let alone what to call that "new test." Either the majority created and applied "a new test (the *Nothing More* test)," or there

(Continued …)

how the majority imbued Section 101 with the enabling disclosure requirement of Section 112 to create a new defense, "Enablement on Steroids." *Id.* at 62a. This "blended 101/112 defense is confusing, converts fact questions into legal ones and eliminates the knowledge of a skilled artisan." *Id.* at 63a.

3. The Federal Circuit's evenly-divided (6-6 split) decision denying rehearing *en banc*

The active judges of the Federal Circuit were evenly divided, 6-6, on whether to grant rehearing *en banc* and, therefore denied American Axle's petition. Chief Judge Prost and Judge Hughes concurred in the denial without opinion, and Judge Lourie dissented without opinion. The other nine judges wrote or joined the five opinions that accompanied the Court's denial, laying bare their fractured views on Section 101. App. 150a-152a.

Judges Dyk and Taranto (the cosigners of the panel majority opinion), were joined only by Judge

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is "no 'new test.'" *Compare* App. 37a, App. 44a, App. 186a-187a, App. 194a-195a *and* App. 160a, App. 163a-169a; *see also infra* III.A. Thus, to the extent a "new test" was created, it does not represent the beginning of a potential solution to the Federal Circuit's intractable inability to consistently apply this Court's Section 101 jurisprudence. Rather, it represents the dead end at which the judges find themselves. App. 77a (Moore, J., concurring in denial of motion to stay) ("What we have here is worse than a circuit split—it is a court bitterly divided."). "New test" or not, the Federal Circuit expanded the non-textual exceptions to Section 101 in direct conflict with the precedent of this Court. *Infra* I and II.

Wallach in Judge Dyk's opinion concurring in the denial. App. 153a-162a. Judge Dyk repeated his view that claim 22 is ineligible because it "invoke[s] only a natural law." App. 154a.

Judge Chen, joined by Judge Wallach, concurred in the denial. App. 163a-173a. Judge Chen disputed that the panel majority created a new *Nothing More* test, suggesting, instead, that its decision is a "straightforward application" of the "*O'Reilly* test" (named after this Court's decision in *O'Reilly v. Morse*, 56 U.S. 62 (1853)) and is "consistent with long-standing precedent." App. 163a.

Judge Newman, joined by Judges Moore, O'Malley, Reyna, and Stoll, dissented from the denial. App. 174a-183a. Judge Newman explained how the panel majority put a "new spin on Section 101," one where any claims that might "draw on scientific principles" are "barred 'at the threshold' from access to patenting." App. 174a. She ultimately sounded the alarm bells: "The need for judicial provision of stable and comprehensible patent law is of increasing urgency." *Id*. at 183a; *see also at id*. at 174a.

Judge Stoll, joined by Judges Newman, Moore, O'Malley, and Reyna, dissented from the denial. *Id*. at 184a-192a. Judge Stoll disputed Judge Dyk's and Judge Chen's contention that the panel majority's decision was consistent with *O'Reilly*. She explained how "[i]t is difficult to square that outcome in *O'Reilly* with the majority's application of the 'nothing more' test here." *Id*. at 185a.

Judge O'Malley, joined by Judges Newman, Moore, and Stoll, dissented from the denial. *Id*. at 193a-197a. Judge O'Malley echoed Judge Moore's view that the panel majority shirked traditional notions of "fundamental fairness" and due process by performing "obstacle-avoiding maneuvers [that] fly in the face of our role as an appellate court." *Compare* App. 194a, App. 196a-197a *and* at App. 38a-39a, App. 67a-69a. One particularly concerning example was the "majority's choice to apply its new test to this case, again without briefing," where "the 'nothing more' test presents *factual* questions": "Does the claim clearly invoke a natural law? Which one? How do we know there is nothing more?" App. 195a. "[T]hese are scientific questions that must be answered by reference to expert testimony." *Id*.

REASONS FOR GRANTING THE PETITION

I. The Federal Circuit has pushed Section 101 well beyond its gatekeeping function to invalidate industrial manufacturing processes historically eligible for patent protection.

"All inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas." *Mayo*, 566 U.S. at 71. That is why Section 101 is a gatekeeper, not a barricade. Otherwise, nothing would be patentable.

Diamond v. Diehr is instructive. The claims in that case recited an industrial process for curing rubber that used $ln(v) = CZ + x$ ("Arrhenius equation"). *Diehr*, 450 U.S. at 187. Despite reciting and making direct use of the Arrhenius equation, the

Court concluded that the claimed rubber-curing process passed the Section 101 threshold. *Id*. at 188. The Court concluded that "[i]ndustrial processes such as this are the types which have historically been eligible to receive the protection of our patent laws." *Id*. at 184. Thus, under this Court's precedent in *Diehr*, an industrial process that makes use of a natural law to produce a tangible thing is eligible for patenting, and the inventor is entitled to a patent provided she meets all other statutory requirements. *Id*. at 188, 191.

The Court did not overrule *Diehr* when it later established the two-step framework in *Mayo* and *Alice*. Rather, the Court in *Mayo* and *Alice* applied Section 101 as intended—as a gatekeeper to weed out medical diagnostic and software patents that claimed only laws of nature and abstract ideas. *See, e.g.*, *Athena Diagnostics, Inc. v. Mayo Collaborative Servs.*, LLC, 927 F.3d 1333, 1337 (Fed. Cir. 2019) (Dyk, J., concurring in the denial of the petition for rehearing *en banc*) ("In the realm of abstract ideas, the *Mayo/Alice* framework has successfully screened out claims that few would contend should be patent eligible, for example, those that merely apply well-known business methods and other processes using computers or the Internet."); *id*. at 1336 (Lourie, J., concurring) (collecting cases on the proper application of *Mayo* to medical diagnostic patents); *see also* App. 79a-80a (Moore, J., concurring in denial of motion to stay); App. 188a-189a (Stoll, J., dissenting from denial of rehearing *en banc*).

But scholars have warned for years that misapplication of the Court's two-step framework

might ultimately lead to the invalidation of patent claims which have "historically been eligible." *Id.* at 184. In 2014, for example, Professor Adam Mossoff proposed—as a *reductio ad absurdum*—reducing an internal combustion engine of an automobile to an application of the laws of thermodynamics. Adam Mossoff, *A Brief History of Software Patents (and Why They're Valid)*, 56 Ariz. L. Rev. Syllabus 65, 71 (2014). He and others warned that an overly restrictive application of the Court's two-step framework "would invalidate all patents if applied equally to other inventions." *Id.*; *see also* Michael Risch, *Nothing is Patentable*, 67 FLORIDA L. REV. F. 45, 51–52 (2015) (casting doubt on this country's most famous patented inventions—including the cotton gin (U.S. Patent No. X72), electric motor (U.S. Patent No. 132), and Thomas Edison's light bulb (U.S. Patent No. 223,898)).

The warnings are now a reality. The Federal Circuit invalidated claims to manufacturing processes for producing improved driveshafts for cars. American Axle, like *Diehr*, did not "attempt to patent a mathematical formula," $F = kx$. *Diehr*, 450 U.S. at 192. Instead, even if American Axle's invention involves an application of $F = kx$, it still "perform[s] a function which the patent laws were designed to protect (*e.g.*, transforming or reducing an article to a different state or thing)," in this case, manufacturing driveshafts with improved performance characteristics, such as vibrating less and being less noisy. *Id.* at 192–93. Such industrial processes "have historically been eligible to receive the protection of our patent laws." *Id.* at 184. No more. Section 101 has reached Detroit.

The panel majority's reliance on *O'Reilly* is woefully misplaced. App. 45a-46a (Moore, J., dissenting). In that case, the boundless claim at issue (claim 8) covered any use of electromagnetism at a distance. *O'Reilly v. Morse*, 56 U.S. 62, 112 (1853). The claim was unconstrained by the specification and recited zero process steps. The Court correctly concluded that "the claim [was] too broad, and not warranted by law." *Id.* at 113. American Axle's claims, by contrast, not only recite several specific process steps, but are also circumscribed by the disclosures of the specification, which evidence shows was used by Neapco to create a competing product.

Meanwhile, *Diehr* is law, not nostalgia. And it has not gone unnoticed that this case conflicts with *Diehr* and dramatically expanded the non-textual exceptions to Section 101. Judge Stoll explained how "the result in this case suggests that this court has strayed too far from the preemption concerns that motivate the judicial exception to patent eligibility." App. 189a (citations omitted); *see also* App. 78a-80a (Moore, J., concurring in denial of motion to stay).

Judge Stoll is right. Since *Mayo* and *Alice*, there has been a steady expansion of the exceptions to Section 101. *See Am. Axle & Mfg., Inc. v. Neapco Holdings LLC, et al.*, 2018-1763, Dkt. 113-1 at 2 (Fed. Cir. Dec. 12, 2019) (Brief for 12 Law Professors as Amicus Curiae) ("The panel majority's decision reflects a five-year trend of courts severely narrowing the range of inventions and discoveries eligible for patent protection…, contrary to historical practice and precedent."). The *exceptions* now include subject matter that has historically been patent-eligible.

Lower courts have "strayed too far." The Court should grant review not only to resolve the palpable conflict between this case and *Diehr*, but to recalibrate Section 101 jurisprudence and ensure that the types of inventions at the heart of our country's patent system for centuries remain eligible for patent protection.

II. The Federal Circuit's improper expansion of the non-textual exceptions to Section 101 is in conflict with this Court's precedent and the patent statutes.

A principal purpose for which the Court uses its certiorari jurisdiction in patent cases is to review decisions by the Federal Circuit that conflict with decisions of this Court. S. Ct. R. 10(c). The Court has often warned that the non-textual exceptions to Section 101 must be construed narrowly, lest they "swallow all of patent law." *Alice*, 573 U.S. at 217. Yet, this case is proof that the Federal Circuit has expanded the exceptions well beyond their already-swollen state.

American Axle did not patent the equation, $F = kx$, or seek to preempt its use. C.A.J.A.35. No, American Axle patented its new and useful process for manufacturing improved driveshafts that vibrate less and are not noisy. *Supra* Statement of the Case, B.

The record on summary judgment, which contained, in Neapco's own words, "hotly dispute[d]" questions of fact, should have been a roadblock to summary judgment. *Am. Axle*, Dkt. 36 at 57 (Fed. Cir.

Sept. 21, 2018); App. 215a. But the Federal Circuit just maneuvered around it. It did so by expanding the reach of the non-textual exceptions to Section 101, and then wrongly faulting American Axle's patent claims for falling prey to its expansion. According to the Federal Circuit, patent claims alone must sufficiently teach how to make and use the claimed invention. App. 30a-31a; *supra* Statement of the Case, C.2. If a patent claim does not satisfy these "how to" requirements and, instead, "invokes a [patent-ineligible concept], and nothing more, to achieve the claimed result," the claim is "directed to" a patent-ineligible concept. *Id.*; App. 21a.

The problem is that Section 112 already requires every patent specification to sufficiently teach those skilled in the art how to make and use the claimed inventions:

> The specification shall contain … the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.

35 U.S.C. § 112(a). This is the "enablement" requirement of our patent laws. The basic test for enablement is whether "one of ordinary skill in the art could not practice [the claims'] full scope without undue experimentation." *Wyeth & Cordis Corp. v. Abbott Labs.*, 720 F.3d 1380, 1384 (Fed. Cir. 2013). Enablement raises quintessential questions of fact for

juries to decide, including what experimentation is necessary and whether it is undue?

The Federal Circuit's decision eviscerates the important role the patent specification plays in our patent system. The Federal Circuit imbued Section 101 with the enablement requirement of Section 112, and requires patent *claims* to sufficiently teach how to make and use the claimed invention. And it does so without respect for the concomitant questions of fact that should be answered by a jury and assessed from the perspective of one of ordinary skill. Under the new expansion, whether a patent claim "invokes a [patent-ineligible concept], and nothing more" is for a district court judge to decide as a matter of law and for the Federal Circuit to review and decide *de novo*. Make no mistake—Article III judges in this case first raised and decided *sua sponte* that American Axle's multi-step, manufacturing process claims "clearly invoke a natural law," that the natural law invoked is $F = kx$, and that there was allegedly "nothing more." The panel majority wrongly assumed that $F = kx$ (and nothing more in the claims) is what attenuates two types of vibration, and that the remaining process steps played no contributing role. App.20a-22a; App. 30a-31a.

These are all factual questions of physics that a jury should answer. Jurors should weigh, for example, conflicting testimony of the parties' experts. They should reference Neapco's testing that shows how even if an engineer could use $F = kx$ to "tune" a liner, doing so might *amplify* (not attenuate) driveshaft vibration. Or, of course, they could read the emails among Neapco's engineers discussing their need to copy the '911 patent and its teachings so they could actually learn "how to" make and use tuned liners and attenuate two types of vibration in Neapco's driveshafts. These facts should preclude summary judgment. But no more. As Judge Moore explained: "The majority's new *Nothing More* test leaves the science to the appellate judges to decide de novo." App. 47a.

This expansion of Section 101 is troubling. Judge Moore warns how "[t]he majority's new blended 101/112 defense"—"Enablement on Steroids"—"is confusing, converts fact questions into legal ones and eliminates the knowledge of a skilled artisan." App. 62a-63a. Ultimately, it will "lead to insanity":

> The majority's *Nothing More* test, like the great American work *The Raven* from which it is surely borrowing, will, as in the poem, lead to insanity. The majority has concluded that on appeal, as a matter of law, we judges can decide as a matter of physics whether claim 22's results—attenuating two types of vibration—are accomplished by Hooke's law and nothing more. To say this feels

> like a bit of an overreach is an understatement.

App. 47a.

Several other judges agree. Judge Stoll (joined by Judges Newman, Moore, O'Malley, and Reyna) explained how the panel majority "blur[s] the line between patent eligibility and enablement," and even "seems to go further, potentially incorporating a heightened enablement requirement into § 101." App. 187a-188a. She also found it inappropriate for the majority to resolve patent eligibility on its own, when "significant evidence, including expert testimony, contradicts the notion that the two types of vibrations identified in the claims can be reduced by Hooke's law and 'nothing more.'" *Id*. at 189a-190a. Judge O'Malley echoed that "the 'nothing more' test presents *factual* questions," and surmised "the majority was just too deep in the § 101 hole it originally dug to give up control" so it "took it upon itself to invalidate these claims *today*." App. 195a-196a (emphasis in original).

This expansion of Section 101 to subsume Section 112 is also fundamentally unfair to patent owners. Section 112 law is well-developed and predictable. Amicus curiae Biotechnology Innovation Organization ("BIO") explained below how patent owners rely on this predictability when "they expend great effort during patent prosecution to meet the rigorous written description and enablement requirements," and during litigation where proving non-compliance "almost always involves intensive fact-discovery and thorough expert testimony." *Am*.

Axle, 2018-1763, Dkt. 115 at at 2, 7–8 (Dec. 12, 2019). The panel majority, however, dispenses with traditional evidentiary and procedural safeguards afforded to patent owners under Section 112. It "supplants this searching analysis with a Section 101 analysis that is less fact-bound, highly dependent on a judge's intuition," and "is more free-flowing and less reliable." *Id*. at 8; *id*. at 4.

This case epitomizes the unfairness that patent owners should now expect. Sure, some judges of the Federal Circuit may have concerns that certain claims of the '911 patent do not satisfy Section 112, though American Axle certainly disagrees. Neapco raised Section 112 issues below, American Axle defended against those challenges, and a jury should decide their fate.

American Axle also defended itself against the only Section 101 challenge actually raised by Neapco, that the claims are directed to two different "laws of nature." C.A.J.A.1248–1251; C.A.J.A.1604–1605. But that did not matter. American Axle was never afforded the opportunity to argue or present evidence that its claims were not "directed to" (1) "applications of Hooke's law with the result of friction damping," as the district court held (C.A.J.A.11); (2) "Hooke's law, and possibly other natural laws," as the panel majority held *sua sponte* in its initial decision (App. 100a); or (3) "Hooke's law and nothing more," as the panel majority held *sua sponte* in its modified decision. *Supra* n.3. App. 10a, App. 32a-33a; *see also* App. 38a-39a, App. 67a-69a; App. 193a-197a.

Process doesn't matter anymore for Section 101 cases. Judges now have a malleable *de novo* tool unencumbered by evidentiary and procedural safeguards traditionally afforded to patent owners under other provisions like Section 112. Judges have free reign to use this tool, they have used it, and they will continue to use it to deprive patent owners of their property rights whenever they, as judges, have qualms or personal reservations about a patent. That should not be the law.

The Court has often corrected the Federal Circuit when it has "defied precedent or strayed from [its] mandate by claiming *de novo* dominion over factual issues." App. 80a-81a (Moore, J., concurring in denial of motion to stay) (collecting cases). The Federal Circuit "repeat[ed] this mistake again" in this case. *Id*. at 81a. The Court should grant certiorari.

III. The entire patent system is calling for guidance from the Court.

A. The Federal Circuit is "bitterly divided" on Section 101, but unanimous in its cries for help.

The Supreme Court often grants certiorari to resolve circuit splits that render the state of the law inconsistent and chaotic. *See, e.g.*, *Braxton v. United States*, 500 U.S. 344, 347 (1991). An evenly-divided Federal Circuit is as close as it comes to a "circuit split" in patent law because the Federal Circuit is the nation's lone patent court. Moreover, "[w]hat we have here is worse than a circuit split—it is a court bitterly divided." App. 77a (Moore, J., concurring in denial of

motion to stay). "If a circuit split warrants certiorari, such an irreconcilable split in the nation's only patent court does likewise." *Id.* at 78a.

"This case is a model of [the Federal Circuit's] divide" on Section 101. *Id.* at 78a-79a. According to the active judges, either the majority's decision is "in direct conflict with our precedent and a dramatic expansion of § 101," or it is "consistent with precedent and narrow in its scope." *Compare* App. 42a *and* App. 153a. Either the majority created and applied "a new test (the *Nothing More* test)," or there is "no 'new test.'" *Compare* App. 37a, App. 44a, App. 186a-187a, App. 194a-195a *and* App. 160a, App. 163a-169a; *supra* n.4. And either the majority created a new defense—"Enablement on Steroids"—through a "blended 101/112 analysis" that "expands § 101" and "converts factual issues into legal ones," or that criticism is flat wrong, and "rests on a failure to distinguish two different 'how' requirements in patent law." *Compare* App. 37a, App. 62a-67a, App. 177a-179a, App. 187a-188a *and* App. 30a, App. 171a-172a.

So, who is right? The answer depends on the panel. The Federal Circuit has "struggled to consistently apply the judicially created exceptions to this broad statutory grant of eligibility, slowly creating a panel-dependent body of law." App. 78a (Moore, J., concurring in denial of motion to stay). Nearly every judge agrees.

In this case, Judge Newman (joined by Judges Moore, O'Malley, Reyna, and Stoll) observed how "[t]he court's rulings on patent eligibility have become so diverse and unpredictable." App. 174a. In opinions accompanying the Federal Circuit's denial of

rehearing *en banc* in *Athena*, Judge Hughes (joined by Chief Judge Prost and Judge Taranto) explained that "[t]he multiple concurring and dissenting opinions … are illustrative of how fraught" Section 101 has become; Judge Chen noted how the current law is "considerably harder to apply consistently" and "more aggressive in its reach" than earlier precedent (*Diehr*); Judge O'Malley called Section 101 jurisprudence "the most baffling concept in the whole catalogue of judicial efforts to provide postulates for indefinitely varying occasions"; and Judge Newman (joined by Judge Wallach) collected an entire "outline of this court's inconsistent rulings." *Athena*, 927 F.3d at 1337 (Hughes, J., concurring); *id.* at 1348 (Chen, J., concurring); *id.* at 1367–1368 (Newman, J., dissenting); *id.* at 1372 (O'Malley, J., dissenting).

Simply put, every patent case involving Section 101 is now an arbitrary, "litigation gamble." App. 183a (Newman, J., dissenting from denial of rehearing *en banc*). This comes with terrible consequences. It is "destroying the ability of American businesses to invest with predictability." App. 78a (Moore, J., concurring in denial of motion to stay); *see also* App. 174a (Newman, J., dissenting from denial of rehearing *en banc*); App. 191a (Stoll, J., dissenting from denial of rehearing *en banc*).

That is why all twelve active judges of the Federal Circuit—though hopelessly confused and divided on substance—unanimously agree that they need help. App. 77a-78a (Moore, J., concurring in denial of motion to stay). This Court should heed their "unprecedented plea for guidance"—"the nation's lone patent court [is] at a loss." *Id.* at 78a-79a.

B. Current and former directors of the USPTO agree that Section 101 is a problem that "must be addressed now."

Current Director Andrei Iancu declared patent eligibility as "the most important substantive patent law issue in the United States today. And it's not even close." Davis, *Courts*, *Can Resolve Patent Eligibility Problems, Iancu Says*, Law360 (Apr. 11, 2019), https://bit.ly/34o6DV2. The need for a fix is urgent: Section 101 "must be addressed now." Nurton, *Iancu Calls on Federal Circuit to Fix Section 101 Problem*, IP Watchdog (May 2, 2019), https://bit.ly/3anG1qX.

His pleas echo those of former USPTO directors. David Kappos testified that "patent eligibility law truly is a mess" with courts and the USPTO "spinning their wheels on decisions that are irreconcilable, incoherent, and against our national interest." *State of Patent Eligibility, Part I*, at 1–2, https://bit.ly/34rNIIS; *see also id*. (Former Director Q. Todd Dickenson), https://bit.ly/3ar7sQC.

The instability of Section 101 jurisprudence has had a real, troubling effect on the USPTO. Patent examiners have tried, but failed, to "consistently distinguish between patent-eligible subject matter and subject matter falling within a judicial exception." 2019 Revised Patent Subject Matter Eligibility Guidance. That is because the exceptions to Section 101 are "increasingly more difficult for examiners to apply" and examiners often "reach inconsistent results." *Id*.; App. 191a (Stoll, J., dissenting from denial of rehearing *en banc*).

C. Industry leaders, practitioners, and

scholars all agree that the Court's guidance is needed.

Several stakeholder organizations, including the Intellectual Property Owners Association ("IPO"), the Biotechnology Innovation Organization ("BIO"), and the Alliance of U.S. Startups and Inventors for Jobs ("USIJ"), served as amici curiae and filed briefs in support of American Axle's petition for rehearing. As IPO explained: "In the years since the *Alice/Mayo* two-step test was announced, there has been confusion and uncertainty concerning its application. The *American Axle* decision adds to this ambiguity." *Am. Axle*, 2018-1763, Dkt. 96 at 4–5 (Dec. 2, 2019).

Practitioners and scholars agree. The President of the American Intellectual Property Law Association ("AIPLA") testified that Section 101 jurisprudence "ha[s] created significant uncertainty," which has "reduced investment in new technologies, produced inconsistency and uncertainty about patent rights and their enforceability, cast a cloud over licensing and other intellectual property transactions, and driven industry to foreign jurisdictions." *State of Patent Eligibility, Part II*, at 2, https://bit.ly/34qWved (testimony of Barbara Fiacco); *see also* Letter Re: Request for Comments Related to Patent Subject Matter Eligibility from Donna Suchy, Chair, ABA Section of Intell. Prop. L. to Michelle Lee, Director, PTO (Jan. 18, 2017), https://bit.ly/37u9fCu. Professor Mark Lemley (Stanford) likewise observed that "[t]he law of patentable subject matter is a mess" and only getting "less, not more, certain over time." *State of Patent Eligibility, Part I*, at 1–2, https://bit.ly/3nx0b5n; *see also Am. Axle*, 2018-1763,

Dkt. 113-1 at 2 (Brief for 12 Law Professors).

D. The Solicitor General of the United States agrees that "[t]he confusion created by this Court's recent Section 101 precedent warrants review in an appropriate case."

The recurring confusion in our patent system led the Solicitor General to recently state, twice, that the Court should grant review in the appropriate Section 101 case.

First, the Court invited the Solicitor General to file a brief in *Hikma Pharms. USA Inc. v. Vanda Pharms. Inc.*, No. 18-817, a Section 101 case that concerned methods of using drugs to treat medical conditions. The Solicitor General agreed that "the Court's recent Section 101 decisions have fostered substantial uncertainty," and that "[t]he confusion created … warrants review in an appropriate case." *Hikma*, Brief for the United States at 8 (December 6, 2019). The *Hikma* case, however, involved method-of-medical-treatment claims that, "[h]istorically, … were well understood to be patent-eligible." *Id*. The case, therefore, was "not an appropriate vehicle for bringing greater clarity because the court of appeals majority arrived at the correct result" when it held the claims were patent eligible. *Id*. at 8–9. The Solicitor General concluded: "The Court should await a case in which lower courts' confusion about the proper application of Section 101 and this Court's precedents makes a practical difference." *Id*. at 9.

Second, the Court invited the Solicitor General to file a brief in *HP Inc. v. Berkheimer*, No. 18-415, a case

that concerned only the procedural allocation of decision-making authority under Section 101 and presented no question about the substantive standards for patent eligibility. Again, the Solicitor General acknowledged the acute need for the Court's review of a Section 101 case. *HP*, Brief for the United States at 9–10 (December 6, 2019). The *HP* case was just not the appropriate case. Instead, the Solicitor General recommended: "The Court should grant review in an appropriate case to clarify the substantive Section 101 standards and then address any ancillary issues that remain." *Id*. at 10.

The Court does not need to wait any longer for the appropriate case. This case concerns industrial manufacturing processes that, "[h]istorically, … were well understood to be patent-eligible," but, unlike *Hikma*, the Federal Circuit did not "arrive[] at the correct result." *Hikma*, Brief for the United States at 8. And, unlike *HP*, this case presents both the substantive and procedural questions plaguing the lower courts. The Court should grant review in this case, and provide the clarity the Solicitor General has called for.

IV. The Court (not Congress) can and should resolve the confusion and uncertainty surrounding the Court's judicially-created exceptions.

There is zero confusion about the plain text of Section 101. Only the three non-textual, judicially-created exceptions to the statute have precipitated chaos and uncertainty in our patent system. It is backwards to expect Congress to fix the problems

surrounding Section 101 when the statutory text is crystal clear and never in dispute. Our problems are judge-made. The Court should provide the fix.

The Court has previously recognized that it is the most appropriate branch to clarify or correct such judicially-created doctrines. *See Pearson v. Callahan*, 555 U.S. 223 (2009) ("[T]he *Saucier* rule is judge made"—"Any change should come from this Court, not Congress."). And there should be no doubt that the Court can provide the change, guidance, or clarity that the patent system so urgently needs. Director Iancu stated the following: "There's absolutely no question the courts can solve the issue if they would like to." Davis, *Courts Can Resolve Patent Eligibility Problems, Iancu Says*, Law360 (April 11, 2019), https://bit.ly/34o6DV2. "Let's hash it out. It's not brain surgery. It's a solvable issue." *Id.*

Passing legislation, on the other hand, "is no easy task," even without a deadlocked Congress in the midst of a global pandemic. *Kimble v. Marvel Entm't, LLC*, 576 U.S. 446, 471 (2015) (Alito, J., dissenting). Legislation must withstand a "finely wrought and exhaustively considered, procedure." *INS v. Chadha*, 462 U.S. 919, 951 (1983). And even "[w]ithin that onerous process, there are additional practical hurdles." *Kimble*, 576 U.S. at 471 (Alito, J., dissenting).

There should be no expectation that Congress acts on Section 101. Quite the opposite, actually. Congress will likely do nothing. For years, stakeholders have called on Congress to provide a legislative fix to the non-textual exceptions. Congress failed to act. *See, e.g.*, King, *Patent Eligibility:*

Legislative Change Still Appears Far Away, Bilski Blog (Oct. 15, 2020), https://bit.ly/34NwXbj (Senator Tillis: legislation has "stalled"). The Court can act and should act.

V. This case presents the ideal vehicle for the Court to provide much-needed guidance on Section 101.

This is not your run-of-the-mill Section 101 case. American Axle's claims "are not directed to a business method, internet or financial method, the likes of which the Court dealt with in *Alice* or *Bilski*. Nor does this case map onto the Court's holding in *Mayo* regarding the patent eligibility of diagnostic inventions, as did [the Federal Circuit's] decisions in *Ariosa* and *Athena*." App. 79a-80a (Moore, J., concurring in denial of motion to stay). This case is different—American Axle's claims "are directed to a process for manufacturing car parts—the type of process which has been eligible since the invention of the car itself." *Id*. at 80a. Mechanical and industrial processes like American Axle's have, until now, "historically been eligible." *Diehr*, 450 U.S. at 184. This case, therefore, presents the Court with a unique opportunity to clarify the law on Section 101 as to all technologies and industries and, at the same time, reign in the non-textual exceptions that have steadily crept into our nation's manufacturing sector.

American Axle also presents two important questions that have plagued lower courts—one about the substantive standard for Section 101, and one about the procedural allocation of decision-making authority. This case is an ideal vehicle for the Court

to address both questions. *C.f. HP*, Brief for the United States at 10 (December 6, 2019) ("The Court should grant review in an appropriate case to clarify the substantive Section 101 standards and then address any ancillary issues that remain."). Several features of this case provide the Court flexibility to answer these important questions in the manner it deems most appropriate and with the broadest applicability.

First, this case provides the Court an ideal opportunity to clarify the substantive test for step 1 of the two-step framework: How does one determine if a patent claim is "directed to" a patent-ineligible natural law, natural phenomena, or abstract idea?

The widespread confusion about how to answer this question is no more apparent than in this case. The parties grappled with this question, and were worlds apart in their answers.

The lower courts grappled with this question too. The district court came up with a different answer than the parties. It held that American Axle's claims were "directed to" "applications of Hooke's law with the result of friction damping." C.A.J.A.11. The divided panel of the Federal Circuit then came up with something different. Twice. In its initial opinion, the panel majority held that the claims were "directed to" "Hooke's law, and possibly other natural laws." App. 100a. And it changed course in its modified opinion, holding that the claims were "directed to" "Hooke's law and nothing more." App. 33a. Judge Moore, in both of her panel dissents, shared a much different view. App. 39a; App. 112a. And when American Axle asked the full Federal

Circuit to take this case *en banc* and resolve this substantive question, the twelve active judges were evenly-divided (6-6) in their vote. App. 150a-197a.

Simply put, the Court is served a jump-ball. As the nation's final arbiter, the Court has the opportunity to intervene and answer this difficult question completely and finally. In doing so, the Court can provide the patent system the clarity and guidance it so desperately needs.

Second, the Federal Circuit's expansion of the non-textual exceptions to Section 101 is another feature of this case that makes it an ideal vehicle. The Court has often warned that the exceptions must be construed narrowly, lest they "swallow all of patent law." *Alice*, 573 U.S. at 217. Yet, despite the Court's admonitions, the Federal Circuit expanded Section 101 to subsume the enabling disclosure requirement of Section 112.

Third, this case is an ideal vehicle for the Court to clarify procedural questions that surround Section 101: are steps 1 and 2 questions of law for the court to decide or questions of fact for a jury to decide?

As to step 1, both American Axle and Neapco relied on technical experts to help determine whether the claims are "directed to" a patent-ineligible concept. The record is rife with factual disputes, including conflicting expert testimony and evidence that should only be weighed by a jury and not, as here, resolved by a judge on summary judgment.

What's more, the Federal Circuit forged its *Nothing More* test and then immediately applied it to American Axle's patent claims. But as Judge

O'Malley explained, that test also "presents *factual* questions": "Does the claim clearly invoke a natural law? Which one? How do we know there is nothing more?" App. 195a. American Axle's claims "say nothing about any *natural law*." *Id.* Yet, appellate judges concluded as a matter of law that "Hooke's law and nothing more reduces two types of vibration in propshafts." App. 52a (Moore, J., dissenting). It is now "a clear rule of law—judges, not experts, will determine as a matter of law, when claims are directed to a natural law and *nothing more*." *Id.* (emphasis in original).

Judges are generally not experts in physics and certainly should not be resolving disputed questions of physics as a matter of law. Not so, says the Federal Circuit: "We are the scientific experts now." *Id.* The Court should grant review and provide the Federal Circuit a much-needed course correction.

As to step 2, whether the claims contain an "inventive concept," "[t]here are many here, articulated in the claims themselves, about which there exist at least questions of fact that should have precluded summary judgment." *Id.* at 56a. One of the unknown and unconventional activities claimed by American Axle (and "[a]rgued below and throughout the appeal," *id.* at 56a) is that, before the '911 patent, liners had never been used to attenuate bending mode vibration. *Id.*; C.A.J.A.30–31; C.A.J.A.1327. Neapco admitted this. C.A.J.A.1327. It also had to copy the '911 patent to manufacture its own driveshafts because, according to Neapco, American Axle "solved the issue with an extremely low cost solution." C.A.J.A.3513.

This case confirms that steps 1 and 2 implicate factual questions. Or, in Neapco's own words, "hotly dispute[d]" factual questions. *Am. Axle*, 2018-1763, Dkt. 36 at 57; App. 215a. These factual questions should be answered by juries, not judges as a matter of law (on summary judgment no less).

The substantive standard for Section 101, and the procedural allocation of decision-making authority, are two critical issues for the patent system. This Court should resolve the issues now, and it should decide the issues in this case.

CONCLUSION

The Court should grant certiorari.

Respectfully submitted,

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DECEMBER 28, 2020

APPENDICES

APPENDIX A — OPINION AND DISSENT OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, DATED JULY 31, 2020

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2018-1763

AMERICAN AXLE & MANUFACTURING, INC.,

Plaintiff-Appellant,

v.

NEAPCO HOLDINGS LLC,
NEAPCO DRIVELINES LLC,

Defendants-Appellees.

OPINION ISSUED: October 3, 2019
OPINION MODIFIED: July 31, 2020*

Appeal from the United States District Court
for the District of Delaware in No. 1:15-cv-01168-LPS,
Chief Judge Leonard P. Stark.

Before DYK, MOORE, and TARANTO, *Circuit Judges.*

Opinion for the court filed by *Circuit Judge* DYK.

Dissenting opinion filed by *Circuit Judge* MOORE.

DYK, *Circuit Judge.*

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* This opinion has been modified and reissued following a petition for rehearing filed by Appellant.

Appendix A

American Axle & Manufacturing, Inc. ("AAM") sued Neapco Holdings LLC and Neapco Drivelines LLC (collectively, "Neapco") alleging infringement of claims of U.S. Patent No. 7,774,911 ("the '911 patent").[1] The parties filed cross-motions for summary judgment as to the eligibility of the asserted claims of the '911 patent under 35 U.S.C.

§ 101. The district court granted Neapco's motion and held that the asserted claims are ineligible under § 101. We affirm in part and vacate and remand in part.

Background

I

The '911 patent generally relates to a method for manufacturing driveline propeller shafts ("propshafts") with liners that are designed to "attenuat[e] . . . vibrations transmitted through a shaft assembly." '911 patent, col. 1, ll. 6-7. Propshafts are "employed [in automotive vehicles] to transmit rotary power in a driveline." *Id.* col. 1, ll. 38-39. Because these propshafts are typically made of a "relatively thin-walled steel or aluminum tubing [they]

1. AAM's complaint alleged infringement of two other patents—U.S. Patent Nos. 8,176,613 ("the '613 patent") and 8,528,180 ("the '180 patent"). During claim construction, the district court held the asserted claims of the '613 patent indefinite. Neapco Mot. for Summ. J. 3, *American Axle & Manuf., Inc. v. Neapco Hldgs. LLC*, No. 15-01168 (D. Del. Aug. 11, 2017), ECF No. 164. AAM also withdrew the asserted claims of the '180 patent. *Id.* Neither the '613 nor the '180 patent is at issue on appeal.

can be receptive to various driveline excitation sources." *Id.* col. 1, ll. 40-42. These excitation sources, in turn, can cause the propshaft to vibrate in three modes: bending mode, torsion mode, and shell mode. *Id.* col. 1, ll. 42-44. The '911 patent describes these vibration modes as follows:

> Bending mode vibration is a phenomenon wherein energy is transmitted longitudinally along the shaft and causes the shaft to bend at one or more locations. Torsion mode vibration is a phenomenon wherein energy is transmitted tangentially through the shaft and causes the shaft to twist. Shell mode vibration is a phenomenon wherein a standing wave is transmitted circumferentially about the shaft and causes the cross-section of the shaft to deflect or bend along one or more axes.

Id. col. 1, ll. 44-52. These vibration modes correspond to different frequencies. Because such vibrations cause undesirable noise, "techniques [had, prior to the '911 patent,] been employed to attenuate vibrations in propshafts including the use of weights and liners." *Id.* col. 1, ll. 53-54.

AAM agreed that "[t]he methods for determining natural frequencies and damping are well known in the art." AAM Op. Br. 8. Some of these are described in the specification. Those techniques include "the use of weights and liners." *Id.* col. 1, l. 54. Elaborating, the patent first describes the use of "plugs or weights" that are inserted to frictionally engage a propshaft to damp certain vibrations.

Id. col. 1, l. 53-col. 2, l. 4. It then describes several prior-art dampers and "hollow liners." *See, e.g., id.* col. 2, ll. 5-37; col. 6, ll. 49-53. The specification describes prior art hollow liners as tubes made of a fibrous material (like cardboard) with outer resilient members that "frictionally engage the inner diameter of the [propshaft]." *Id.* col. 6, ll. 56-65.

Two types of attenuation are relevant here: resistive attenuation and reactive attenuation. "[R]esistive attenuation of vibration refers to a vibration attenuation means that deforms as vibration energy is transmitted through it . . . so that the vibration attenuation means absorbs . . . the vibration energy." *Id.* col. 1, ll. 61-65. A liner that is properly tuned to attenuate shell mode vibration through resistive attenuation "matches" the shell mode vibration (i.e., a particular natural frequency) of the propshaft such that it absorbs, through friction damping, the shell mode vibration of the propshaft. J.A. 1933, 2000-02. "[R]eactive attenuation of vibration refers to a mechanism that can oscillate in opposition to the vibration energy [of the propshaft] to thereby 'cancel out' a portion of the vibration energy." '911 patent, col. 2, ll. 15-18. Thus, to design a liner to perform reactive attenuation of a bending mode vibration "the liner frequency must match the propshaft frequency and involve translation of the liner to effectively couple with the propshaft bending mode." AAM Op. Br. 6 (citing J.A. 2076-77, 4036-37, 5218).

According to the '911 patent's specification, prior art weights, dampers, and hollow liners that were designed to individually attenuate each of the three propshaft vibration modes—bending, shell, and torsion—already

existed. '911 patent, col. 1, l. 53-col. 2, l. 38. But these prior art damping methods were assertedly not suitable for attenuating two vibration modes simultaneously. *See id.* Thus, the patent identified "a need in the art for an improved method for damping various types of vibrations in a hollow shaft" that "facilitates the damping of shell mode vibration as well as the damping of bending mode vibration" simultaneously. *Id.* col. 2, ll. 39-43. AAM argues that the invention is the tuning of a liner in order to produce frequencies that dampen both the shell mode and bending mode vibrations simultaneously. It argues as well on appeal that the use of liners to dampen bending mode vibration is itself inventive.

The district court treated independent claims 1 and 22 of the '911 patent as representative of the asserted claims (claims 1-6, 12, 13, 19-24, 26, 27, 31, 34-36). Those two claims recite methods of manufacturing:

> 1. 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 at least one liner to attenuate at least two types of vibration transmitted through the shaft member; and

positioning the at least one liner within the shaft member such that the at least one liner is configured to damp shell mode vibrations in the shaft member by an amount that is greater than or equal to about 2%, and the at least one liner is also configured to damp bending mode vibrations in the shaft member, the at least one liner being tuned to within about ±20% of a bending mode natural frequency of the shaft assembly as installed in the driveline system.

* * *

22. 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.

'911 patent, col. 10, ll. 10-27; *id.* col. 11, ll. 24-36.

II

AAM sued Neapco on December 18, 2015, alleging infringement of the '911 patent. The parties filed cross-motions for summary judgment as to patent eligibility under § 101. On February 27, 2018, the district court granted Neapco's motion for summary judgment, and denied AAM's cross-motion. Applying the two-step analysis of *Mayo Col-laborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 132 S. Ct. 1289, 182 L. Ed. 2d 321 (2012), and *Alice Corp. Pty. Ltd. v. CLS Bank International*, 573 U.S. 208, 134 S. Ct. 2347, 189 L. Ed. 2d 296 (2014), the court held that the asserted claims of the '911 patent are invalid because they claim ineligible subject matter under § 101.

The district court construed the claim 1 limitation "tuning at least one liner to attenuate at least two types of vibration transmitted through the shaft member" to mean "controlling *characteristics* of at least one liner to configure the liner to match a relevant frequency or frequencies to reduce at least two types of vibration transmitted through the shaft member." J.A. 1046. The district court construed the claim 22 limitation "tuning a mass and a stiffness of at least one liner" to mean "controlling the mass and stiffness of at least one liner

to configure the liner to match the relevant frequency or frequencies." J.A. 15, 1047. No party contests the district court's construction on appeal.

At step 1 of the *Mayo/Alice* analysis, the district court concluded that the Asserted Claims, "considered as a whole," are "directed to the mere application of Hooke's law," treating claims 1 and 22 as representative. J.A. 4-5, 11. The district court held that the claims' direction to tune a liner to attenuate different vibration modes amounted to merely "instruct[ing] one to apply Hooke's law to achieve the desired result of attenuating certain vibration modes and frequencies" without "provid[ing] [a] particular means of how to craft the liner and propshaft in order to do so." J.A. 17. The district court made no distinction between claims 1 and 22 in its analysis. *See* J.A. 15 n.3.

Hooke's law is an equation that describes the relationship between an object's mass, its stiffness, and the frequency at which the object vibrates. Friction damping is a natural phenomenon whereby damping "occur[s] due to the resistive friction and interaction of two surfaces that press against each other as a source of energy dissipation." J.A. 1604.

At step 2 of the *Mayo/Alice* analysis, the district court determined that the claimed "additional steps consist of well-understood, routine, conventional activity already engaged in by the scientific community . . . and those steps, when viewed as a whole, add nothing significant beyond the sum of their parts taken separately." J.A. 16 (quoting *Mayo*, 566 U.S. at 79-80). The district court concluded that the claims were not patent eligible. *Id.*

AAM appeals. We have jurisdiction under 28 U.S.C. § 1295(a)(1). We review a district court's grant of summary judgment de novo, applying the same test on review that the district court applied. Summary judgment is appropriate where "there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). The issue of patent eligibility under § 101 is a question of law, reviewed de novo. *In re BRCA1– and BRCA2– Based Hereditary Cancer Test Patent Litig.*, 774 F.3d 755, 759 (Fed. Cir. 2014). "While patent eligibility is ultimately a question of law," the underlying issue of "[w]hether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a factual determination." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1369 (Fed. Cir. 2018), *cert. denied*, 140 S.Ct. 911, 205 L. Ed. 2d 454, 2020 WL 129532 (Jan. 13, 2020).

Discussion

Section 101 provides that "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof" may be eligible to obtain a patent. 35 U.S.C. § 101. But the Supreme Court has long recognized that § 101 "contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable." *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589, 133 S. Ct. 2107, 186 L. Ed. 2d 124 (2013) (brackets omitted) (quoting *Mayo*, 566 U.S. at 70). The Supreme Court has stated that "without this exception, there would be considerable danger that the grant of patents would 'tie up' the use of such tools and thereby 'inhibit future innovation premised upon them.'" *Id.* (quoting *Mayo*, 566 U.S. at 73).

Our analysis of § 101 follows the Supreme Court's two-step test established in *Mayo* and *Alice*. At step one of the *Mayo/Alice* test, we ask whether the claims are directed to a law of nature, natural phenomenon, or abstract idea. *Alice*, 573 U.S. at 217 (citing *Mayo*, 566 U.S. at 77). If the claims are so directed, we then ask whether the claims embody some "inventive concept"—i.e., whether the claims contain "an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.'" *Id.* at 217-18 (brackets omitted) (quoting *Mayo*, 566 U.S. at 72-73).

We conclude that independent claim 22 of the '911 patent is patent ineligible under section 101 because it simply requires the application of Hooke's law to tune a propshaft liner to dampen certain vibrations. Independent claim 36 and asserted claims that depend from claim 22 are also ineligible. Because claim 1 also requires "positioning" in addition to tuning and may reflect a broader definition of tuning, we remand to the district court to address the eligibility of claim 1 and its dependent claims in the first instance.

I. Claim 22

We first address claim 22.

A

To determine what a claim is "directed to" at step one, we look to the "focus of the claimed advance." *See, e.g., Trading Techs Int'l, Inc. v. IBG LLC*, 921 F.3d 1378, 1384

(Fed. Cir. 2019).[2] A claim to a method of manufacturing can be directed to a natural law.[3] The '911 patent claims a method of manufacturing a driveline propshaft containing a liner designed such that its frequencies attenuate two modes of vibration simultaneously and (according to the patentee on appeal) a manufacturing method to tuning liners to attenuate bending mode vibration. At step 1, the question is whether the claimed methods are directed to laws of nature.

The Supreme Court's cases focus on the claims, not the specification, to determine section 101 eligibility. As

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2. *Accord Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1338 (Fed. Cir. 2017); *Intellectual Ventures I LLC v. Erie Indemnity Co.*, 850 F.3d 1315, 1325 (Fed. Cir. 2017); *Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257-58 (Fed. Cir. 2016); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016); *Genetic Techs. Ltd. v. Merial LLC*, 818 F.3d 1369, 1375-76 (Fed. Cir. 2016).

3. *See Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 224, 134 S. Ct. 2347, 189 L. Ed. 2d 296 (2014) ("The fact that a computer 'necessarily exist[s] in the physical, rather than purely conceptual, realm,' is beside the point. There is no dispute that a computer is a tangible system (in § 101 terms, a 'machine') . . . ."); *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 113, 14 L. Ed. 601 (1853) ("Neither could the man who first discovered that steam might, by a proper arrangement of machinery, be used as a motive power to grind corn or spin cotton, claim the right to the exclusive use of steam as a motive power for the purpose of producing such effects."); *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 770 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 983, 206 L. Ed. 2d 135 (2020) ("[A]s the Supreme Court indicated in *Alice*, whether a device is 'a tangible system (in § 101 terms, a "machine")' is not dispositive." (quoting *Alice*, 573 U.S. at 224)).

the Supreme Court said in *Mayo*: "We must determine whether *the claimed processes* have transformed these unpatentable natural laws into patent-eligible applications of those laws." *Mayo*, 566 U.S. at 72 (emphasis added); *see also Alice*, 573 U.S. at 221 ("[W]e must examine *the elements of the claim* to determine whether it contains an 'inventive concept.'" (emphasis added) (internal quotation marks omitted)).

Similarly, we have repeatedly held that features that are not claimed are irrelevant as to step 1 or step 2 of the *Mayo/Alice* analysis. *See, e.g., ChargePoint*, 920 F.3d at 769 ("[A]ny reliance on the specification in the § 101 analysis must always yield to the claim language. . . . [T]he specification cannot be used to import details from the specification if those details are not claimed."); *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1149 (Fed. Cir. 2016) ("The § 101 inquiry must focus on the language of the Asserted Claims themselves."); *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) (rejecting an alleged inventive concept because it was "not the invention *claimed* by the . . . patent" (emphasis added)); *Accenture Glob. Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1345 (Fed. Cir. 2013) ("[Where t]he limitations of the . . . claims . . . do not provide sufficient additional features or limit the abstract concept in a meaningful way[,] . . . the level of detail in the specification does not transform a claim reciting only an abstract concept into a patent-eligible system or method."); *see also Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 809 F.3d 1282, 1286 (Fed. Cir. 2015) (Lourie, J., concurring) (noting that the appropriate focus is "on the *claims we have* rather than those we might have had" (emphasis added)).

In contrast to a number of other natural law cases, the patentee here does not even claim to have discovered a previously unknown natural law. Instead, it defines a goal ("tuning a liner" to achieve certain types of vibration attenuation). Claim 22 explicitly provides for "tuning a mass and a stiffness of at least one liner." '911 patent, col. 11, l. 31. Under the district court's construction, "tuning a mass and a stiffness of at least one liner" in claim 22 means "controlling the mass and stiffness of at least one liner to configure the liner to match the relevant frequency or frequencies." J.A. 15, 1047. Thus, claim 22 requires use of a natural law of relating frequency to mass and stiffness—i.e., Hooke's law. Claim 22 confers patent coverage if the attenuation goal is achieved by one skilled in the art using any method, including any method implemented by computer modeling and trial and error. That claim 22 here merely describes a desired result is evident from the face of the claim. The claim on its face does not identify the "particular [tuned] liners" or the "improved method" of tuning the liners to achieve the claimed result. AAM Op. Br. 27; '911 patent, col. 2, ll. 39-43. No factual finding was or is required.

In arguing that patent claim 22 does not merely claim a result and so is not directed to whatever natural laws make the result possible, AAM does not dispute that Hooke's law mathematically relates the mass and/or stiffness of an object to the frequency with which that object oscillates (vibrates). In fact, both parties' witnesses agree that Hooke's law undergirds the design of a liner so that it exhibits a desired damping frequency pursuant to the claimed invention. For example, Neapco's expert,

Dr. Becker, stated that "the phrase 'tuning a mass and a stiffness of at least one liner' claims Hooke's law." J.A. 1604. Dr. Sun, one of the named inventors of the '911 patent, stated in his deposition:

> Q. But to change the frequency of any damper, it comes down to basic physics, doesn't it; changing the mass or the stiffness of that damper that will adjust the frequency?
>
> A. You change a tuned liner, yeah, by adjusting the controlling variables and to get to the tuning that is needed.
>
> Q. And one of those variables is stiffness, correct?
>
> A. Correct.
>
> Q. And one of them is the mass, correct?
>
> A. Yes.

J.A. 1757 (92:15-25). AAM's engineering manager likewise admitted that "if [one] do[es] something to control the stiffness [or mass]" of a liner—the variables directly implicated by Hooke's law—that person is "directly controlling tuning." J.A. 2547 (20:23-21:1).

Rather, AAM asserts that tuning a liner such that it attenuates two different vibration modes (or just dampens bending mode vibrations) is complicated in

practice, involving more than simple application of Hooke's law. AAM Op. Br. 19 ("Complicated objects—such as propshaft liners—cannot be simplified to a single degree-of-freedom mass-spring damper such that their behavior is governed simply by Hooke's law."); *see also id.* at 39-41, 43. AAM insists that the process of tuning a liner according to natural laws may involve extensive computer modelling, including finite element analysis ("FEA"), and experimental modal analysis (that is, trial and error).[4] And while recognizing that "methods for determining natural frequencies and damping are well known in the art," including use of "FEA models" and "testing for natural frequencies and damping of propshafts by performing experimental modal analysis," AAM Op. Br. 8-11, 20-21, AAM contends that it invented an improved method of tuning.[5]

But neither established processes nor "improved" processes for implementing the underlying natural laws

4. "Experimental modal analysis involves [physically] exciting the propshaft and/or liner using an actuator, measuring the response using a sensor, and calculating the natural frequencies and damping ratios using a computer algorithm." J.A. 5207.

5. While the patent makes no references to computer modeling and trial and error, AAM pointed to computer modeling in its briefing in the district court, *see* note 4, *supra*, and it has done the same in its briefs in this court. *See, e.g.*, AAM Op. Br. 20 ("American Axle uses 'very sophisticated FEA models.'" (quoting Dr. Sun, one of the named inventors of the '911 patent)) *id.* at 45 ("American Axle . . . uses sophisticated FEA models during its design process . . . ."); Reply Br. 12 ("Dr. Sun's cited testimony . . . concerned the use of FEA analysis . . . to simplify otherwise complex liners to model and predict their performance.").

are claimed. While AAM may have discovered patentable refinements of the prior art process, such as particular uses of "sophisticated FEA [finite element analysis] models during its design process," *id.* at 45, neither the specifics of any novel computer modelling, nor the specifics of any experimental modal analysis are included as limitations in claim 22.[6] These unclaimed features cannot function to remove claim 22 from the realm of ineligible subject matter. *See ChargePoint*, 920 F.3d at 766.

To be clear, we do not suggest that such specific novel computer or experimental processes could not be claimed. This case would be significantly different, if, for example, specific FEA models were included in claim 22. But they are not. What is missing is any physical structure or steps for achieving the claimed result. The focus of the claimed advance here is simply the concept of achieving that result, by whatever structures or steps happen to work.

The breadth of claim 22 is illustrated by the testimony of AAM's expert "that tuning involves controlling the characteristics (e.g., mass and stiffness) of the liner

6. The specification describes tuning in terms of the result achieved, rather than the particular process by which the result is accomplished. For instance, the specification states that "a liner 204 will be considered to be tuned to a relevant frequency if it is effective in attenuating vibration at the relevant frequency." '911 patent, col. 8, ll. 28-31. Later in the same column, the patent gives an example of a "liner [that is] considered to be tuned to a relevant shell mode frequency if it damps shell mode vibrations by an amount that is greater than or equal to about 2%." *Id.* at col. 8, ll. 44-47. The specification's concept of tuning is merely results-based.

through, for example, its design, manufacturing, and installation to reduce vibration at a relevant frequency," J.A. 169, and by AAM's admission during the claim construction hearing, where AAM argued one could infringe claim 22 of the '911 patent by whatever means will achieve the result "[e]ven if you didn't try to [tune] and didn't know you did it." J.A. 699. Thus, the problem is that claim 22's instruction to tune a liner essentially amounts to simply claiming a result.

B

Claiming a result that involves application of a natural law without limiting the claim to particular methods of achieving the result runs headlong into the very problem repeatedly identified by the Supreme Court in its cases shaping eligibility analysis. *See Mayo*, 566 U.S. at 71-73; *Parker v. Flook*, 437 U.S. 584, 590-95, 98 S. Ct. 2522, 57 L. Ed. 2d 451 (1978); *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94-101, 59 S. Ct. 427, 83 L. Ed. 506, 1939 Dec. Comm'r Pat. 857 (1939); *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 112-17, 14 L. Ed. 601 (1853). The Supreme Court has long held that claims that state a goal without a solution are patent ineligible. As early as *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 14 L. Ed. 367 (1852), the Court held that claiming a concept without the particular steps of carrying it out "would prohibit all other persons from making the same thing by any means whatsoever," and that such claims are ineligible for patentability. *Id.* at 174-75; *Corning v. Burden*, 56 U.S. 252, 268, 14 L. Ed. 683 (1853) ("It is for the discovery or invention of some practicable method or means of producing a beneficial

result or effect, that a patent is granted, and not for the result or effect itself."), quoted by *Diamond v. Diehr*, 450 U.S. 175, 182 n.7, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981).

Our cases as well have consistently rejected such claims as unpatentable. As "reflected repeatedly in our cases," to avoid ineligibility, a claim must "ha[ve] the specificity required to transform [the] 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) (collecting cases).[7] Similarly, in *Interval*

7. *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1258 (Fed. Cir. 2016) (claim is an ineligible abstract idea because "[t]here is nothing in the claim that is directed to *how* to implement out-of-region broadcasting on a cellular telephone"); *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1241 (Fed. Cir. 2016) (claims found ineligible and "directed to an abstract idea" because they "d[id] not claim a particular way of programming or designing the software to create menus . . . , but instead merely claim[ed] the resulting systems"); *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1348 (Fed. Cir. 2015) (finding claim abstract because it "contain[ed] no restriction on how the result is accomplished"); *Secured Mail Sols. LLC v. Universal Wilde, Inc.*, 873 F.3d 905, 911 (Fed. Cir. 2017) (finding claims abstract because they were "not limited by rules or steps that establish[ed] how the focus of the methods [wa]s achieved"); *ChargePoint*, 920 F.3d at 770 (finding claims directed to abstract idea where broad claim language "would cover any mechanism for implementing network communication on a charging station" rather than a specific way of doing so); *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1345-46 (Fed. Cir. 2018) (claims ineligible "because they consist[ed] of generic and conventional information acquisition and organization steps that are connected to, but do not convert, the abstract idea . . . into a particular conception of *how to carry out* that concept" (emphasis added)); *Innovation Scis., LLC v. Amazon.com, Inc.*, 778 F. App'x

Licensing LLC v. AOL, Inc., 896 F.3d 1335 (Fed. Cir. 2018), we reiterated the importance of this distinction in describing prior Supreme Court cases in which inventors "lost . . . claim[s] that encompassed all solutions for achieving a desired result" because the "claims failed to recite a practical way of applying an underlying idea . . . [and] instead were drafted in such a result-oriented way that they amounted to encompassing 'the principle in the abstract' no matter how implemented." *Id.* at 1343; *see also Electric Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1355-56 (Fed. Cir. 2016) (noting that "the essentially result-focused, functional character of claim language has been a frequent feature of claims held ineligible under § 101").

859, 863 (Fed. Cir. 2019) (finding ineligible a claim reciting coverage "in merely functional, result-oriented terms"); *Univ. of Fla. Research Found., Inc. v. Gen. Elec. Co.*, 916 F.3d 1363, 1364, 1368 (Fed. Cir. 2019) (finding claims to be "directed to an abstract idea" where "[n]either the . . . patent, nor its claims, explain[ed] *how* the drivers do the conversion that [Appellant] points to."); *Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (claim ineligible abstract idea where "[t]he claim require[d] the functional results of 'converting,' 'routing,' 'controlling,' 'monitoring,' and 'accumulating records,' but d[id] not sufficiently describe how to achieve these results in a non-abstract way"); *see also Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299, 1305 (Fed. Cir. 2018) ("*Apple, Affinity Labs*, and other similar cases hearken back to a foundational patent law principle: that a result, even an innovative result, is not itself patentable."); *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016) ("[In section 101 analysis w]e . . . 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.").

While many of these cases involved the abstract idea category, the same principle necessarily applies in natural law cases. In *Mayo*, the Court concluded that "to transform an unpatentable law of nature into a patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words 'apply it.'" 566 U.S. at 72; *see also id.* at 82 ("[S]imply appending conventional steps, *specified at a high level of generality*, to laws of nature, natural phenomena, and abstract ideas cannot make those laws, phenomena, and ideas patentable." (emphasis added)). Similarly, in *Diamond v. Diehr*, 450 U.S. 175, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981), the Court recognized "that when a claim recites a mathematical formula (*or scientific principle or phenomenon of nature*), an inquiry must be made into whether the claim is seeking patent protection for that formula in the abstract." *Id.* at 191 (emphasis added).

The Supreme Court's decisions in *Le Roy* and *O'Reilly* may be viewed as applying this principle in the natural law context. For example, in *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 14 L. Ed. 601 (1853), the Supreme Court held claim for "use of the motive power of the electric or galvanic current . . . for marking or printing intelligible characters . . . at any distances" ineligible because "it matter[ed] not by what process or machinery the result [wa]s [to be] accomplished." *Id.* at 113-20. Both claim 8 in *O'Reilly* and claim 22 here recite a natural law (electromagnetism in *O'Reilly* and Hooke's law here) and a result to be achieved (printing characters at a distance in *O'Reilly* and producing a liner to dampen specific vibrations). And just as claim 8 in *O'Reilly* did not recite

any engineering or techniques to achieve this result, claim 22 likewise provides no details. Thus, claim 22, like claim 8 in *O'Reilly*, is directed to a natural law because it clearly invokes a natural law, and nothing more, to accomplish a desired result.

More recently, the Supreme Court's decision in *Parker v. Flook*, 437 U.S. 584, 98 S. Ct. 2522, 57 L. Ed. 2d 451 (1978), also exemplified this principle. In *Flook*, the Supreme Court considered the patent eligibility of a method for updating alarm limits during catalytic conversion processes. 437 U.S. at 585. The method involved an initial step of measuring temperature, a second step of using a formula to calculate an updated alarm-limit value, and a final step in which the alarm limit is adjusted to the updated value. *Id.*; *see also id.* at 596-98 (quoting and describing claim). What was missing from the claimed method reflected what was missing from the patent application as a whole, which "d[id] not purport to explain how to select . . . any of the . . . variables" involved, or "purport to contain any disclosure relating to the chemical process at work, the monitoring of process variables, or the means of setting off an alarm or adjusting an alarm system." *Id.* at 586.

The Court in *Flook* held that the claimed method contained no patent-eligible invention. *Id.* at 594. Though the Court recognized that the use of a mathematical formula or law of nature did not alone make a claim patent ineligible, it explained that what was required was "an inventive application of the principle." *Id.* at 593-94. Such an inventive application, the Court concluded, was not present in the claimed method. *Id.* at 594.

Diehr, on the other hand, involved a situation in which a patent application claimed a new and specific process of molding rubber products "which incorporate[d] in it a more efficient solution of the [Arrhenius] equation" (a natural law). 450 U.S. at 188. Though the Supreme Court in *Diehr* explained that a mathematical formula itself was not patent eligible subject matter, it concluded that the alleged invention claimed in that case was patent eligible. The invention involved a new rubber-curing process with a specific and detailed series of steps (one of which included the use of a natural law) that limited the possibility of preempting the natural law itself. *Id.* at 187-88, 191-92. In *Diehr*, unlike this case, "[t]hese other steps apparently added to the formula something that in terms of patent law's objectives had significance—they transformed the process into an inventive application of the formula." *Mayo*, 566 U.S. at 81 (discussing *Diehr*, 450 U.S. at 187). Nevertheless, the Court reaffirmed *Flook*'s teaching that "[a] mathematical formula does not suddenly become patentable subject matter simply by having the applicant acquiesce to limiting the reach of the patent for the formula to a particular technological use" nor through the addition of "token postsolution activity." *Diehr*, 450 U.S. at 191-92 & n.14.[8]

8. *See also Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1375 (Fed. Cir. 2016) (finding claim to be directed to ineligible law of nature because it "cover[ed] essentially all applications, via standard experimental techniques, of the law of linkage disequilibrium to the problem of detecting coding sequences of DNA"); *Athena Diagnostics, Inc. v. Mayo Collaborative Servs., LLC*, 927 F.3d 1333, 1359 (Fed. Cir. 2019) (Moore, J., dissenting) (order denying petition for en banc rehearing) ("[T]he Supreme Court suggests we should

Like the claims in *Flook*, claim 22 of the '911 patent is directed to the use of a natural law: Hooke's law. As in *Flook*, where the claimed method did not specify how variables were measured or how the alarm system functioned, claim 22 here does not specify how target frequencies are determined or how, using that information, liners are tuned to attenuate two different vibration modes simultaneously, or how such liners are tuned to dampen bending mode vibrations. Claim 22 here simply instructs the reader to tune the liner to achieve a claimed result, without limitation to particular ways to do so. This holding as to step 1 of *Alice* extends only where, as here, a claim on its face clearly invokes a natural law, and nothing more, to achieve a claimed result.

C

As to *Mayo/Alice* step 2, nothing in claim 22 qualifies as an "inventive concept" to transform it into patent eligible matter. AAM contends that claim 22 includes numerous inventive concepts that were neither previously known, nor conventional or routine. AAM's arguments in this respect essentially amount to an assertion that prior to the '911 patent, liners had never been tuned to damp propshaft vibrations or, at least, had not been used to damp two different vibration modes simultaneously

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consider the level of specificity in the claims to determine whether the claim is even directed to the natural law."); *id.* at 1362 ("The concreteness and specificity of the claims in *Athena* move them from reciting a law of nature to a particular application of a law of nature.").

(or perhaps just to damp bending mode vibrations).[9] This amounts to no more than a restatement of the assertion that the desired results are an advance. We have already explained that, insofar as claim 22 here merely claims the achievement of results, they are directed to ineligible matter. As we held in *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281 (Fed. Cir. 2018), "a claimed invention's use of the ineligible concept to which it is directed cannot supply the inventive concept" required to cross the line into eligibility. *Id.* at 1290; *see also Trading Techs.*, 921 F.3d at 1385 ("The abstract idea itself cannot supply the inventive concept, 'no matter how groundbreaking the advance.'" (quoting *SAP*, 898 F.3d at 1170)); *ChargePoint*, 920 F.3d at 775 ("[T]he abstract idea itself . . . cannot supply the inventive concept at step two.").

Claim 22 discloses no other inventive concept. The real inventive work lies in figuring out how to design a liner to damp two different vibration modes simultaneously, and no such inventive work is recited in claim 22. The remaining steps of claim 22, like the steps involved in the *Flook* patent, amount to no more than conventional pre-and post-solution activity. There is no other inventive concept at step two in the claims and no dispute of any material fact.

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9. To the extent that AAM's opening summary judgment brief as to § 101 patent eligibility can be understood to argue that there are disputed issues of material fact as to whether the patent discloses an inventive concept, it relies only on Dr. Rahn's testimony that dual-damping of bending mode and shell mode vibrations was new and unconventional. AAM Mot. for Summ. J. 8-9, *American Axle & Manuf., Inc. v. Neapco Hldgs. LLC*, No. 15-01168 (D. Del. Aug. 11, 2017), ECF No. 160.

Claim 22 is not patent eligible. Claim 36[10] is virtually indistinguishable from claim 22 and was not argued separately on appeal or in district court. It is thus likewise not patent eligible.

II. Claims Depending from Claim 22

Having determined that independent claim 22 is not patent eligible under § 101, we need not separately determine eligibility of the asserted dependent claims. The district court found independent claim 22 collectively representative of all claims dependent from this claim. AAM

10. Claim 36 recites:

> 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 a ratio of a mass of the at least one liner to a mass of the shaft member is about 5% to about 30%;
>
> 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 at least one of bending mode vibrations and torsion mode vibrations.

did not argue before the district court that the dependent claims change the outcome of the eligibility analysis. Nor did AAM make such an argument in its opening brief on appeal.[11] Although at oral argument AAM disagreed that 22 is representative of the others and stated that it never acceded to such a finding, Oral Arg. 30:07-40, it was unable to identify any part of its opening brief that presented such an argument and admitted that it was "not suggesting that the other claims should come out differently," *id.* at 30:40-31:16. We therefore find any such argument waived. *See Affinity Labs*, 838 F.3d at 1256 n.1 (treating certain claims as representative where no meaningful argument made that other claims are materially different); *Electric Power*, 830 F.3d at 1352. We note that in the rehearing petition concerning the earlier panel decision, AAM did not argue that the decision with respect to the dependent claims was erroneous, other than to say in a footnote that "AAM did not waive any arguments about these [dependent] claims." Petition 14 n.3.

III: Claim 1

Claim 1 is different from claim 22. While it is true that both claims require "tuning," claim 1 is more general. It requires "tuning at least one liner to attenuate at least two types of vibration transmitted through the shaft member."

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11. While AAM's Reply Brief for the first time argued that specific limitations of dependent claims may render these claims independently eligible, *see* Reply Br. 27, those arguments were not properly preserved. *SmithKline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1319 (Fed. Cir. 2006) ("Our law is well established that arguments not raised in the opening brief are waived.").

'911 patent, col. 10, ll. 19-28. The district court construed this term to mean "controlling *characteristics* of at least one liner to configure the liner to match a relevant frequency or frequencies to reduce at least two types of vibration transmitted through the shaft member." J.A. 1046 (emphasis added). The specification indicates or may suggest that the "characteristics" that can be "tuned" in claim 1 include variables other than mass and stiffness.[12] In addition, claim 1, unlike claim 22 has an additional limitation of "positioning the at least one liner."[13] '911 patent, col. 10, ll. 19-28.

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12. The specification recites a nonexclusive list of variables that can be altered to change the frequencies exhibited by a liner and a solitary example of a tuned liner (though not the process by which that liner was tuned). These variables include:

> mass, length and outer diameter of the liner 204, diameter and wall thickness of the structural portion 300, material of which the structural portion 300 was fabricated, the quantity of resilient members 302, the material of which the resilient members 302 was fabricated, the helix angle 330 and pitch 332 with which the resilient member 302 are fixed to the structural portion 300, the configuration of the lip member(s) 322 of the resilient member 302, and the location of the liners 204 within the shaft member 200.

'911 patent, col. 7, l. 60-col. 8, l. 2.

13. The claim 22 limitation of "inserting the at least one liner into the shaft member" is not equivalent to claim 1's "positioning" limitation, and AAM never argued otherwise in the district court or on appeal. As discussed *supra* in Section II, any argument that dependent claims 34 and 35 have a "location limitation," *see* Dissent Op. 27-28, have been waived by AAM.

In light of the district court's construction of claim 1, which requires only controlling characteristics and positioning the liner, we cannot conclude that it is merely directed to Hooke's law. In contrast with claim 22, which as construed recites nothing more than a desired result and an instruction to apply Hooke's law, we cannot say claim 1 as construed is directed to a particular natural law and nothing more. The mere fact that any embodiment practicing claim 1 necessarily involves usage of one or more natural laws is by itself insufficient to conclude the claim is directed to such natural laws. The district court's opinion suggests that the broader concept of tuning is an abstract idea, J.A. 16-17, and the same question may be raised about the broad concept of positioning. On appeal, Neapco relied on both the natural law and abstract idea categories of ineligibility in defending the district court's decision. *See, e.g.*, Neapco Resp. Br. 21, 24. But the abstract idea basis was not adequately presented and litigated in the district court. We think that it is appropriate to vacate the judgment as to claim 1 and its dependent claims and remand the case for the district court to address this alternative eligibility theory in the first instance.

IV

Some brief response to the dissent is required.

First, contrary to the dissent, we are not "depart[ing] from existing § 101 precedent," Dissent Op. 9, but rather faithfully following it in the narrow circumstances of this case.

Second, the dissent argues that "[o]ne important difference between this natural law case and every other one ever decided is that these claims do not actually recite any particular natural law." Dissent Op. 7. One problem with this argument is its characterization of this case as not involving a recitation of the natural law. Claim 22 expressly requires varying frequency attenuation (tuning) based on mass and stiffness, as the dissent recognizes (Dissent Op. 26 (under claim 22, "the liner is tuned to a given frequency by adjusting its mass and stiffness")). As is undisputed, what Hooke's law does is precisely to relate frequency to mass and stiffness. *See supra* at 7. In all but name, therefore, claim 22 recites Hooke's law. To be clear, however, our holding should not be read as an invitation to raise a validity challenge against any patent claim that requires the application of an unstated natural law; our ruling as to claim 1 should make that clear enough. Rather, our holding is limited to the situation where a patent claim on its face and as construed clearly invokes a natural law, and nothing else, to accomplish a desired result.

There is, moreover, a more fundamental problem with the dissent's argument about claim recitation of a natural law. It is true that in *Mayo* and many other cases the natural law itself was stated in the claim. *See, e.g., Mayo*, 566 U.S. at 74-75. But the longstanding rejection of eligibility for a claim to a "result" or "effect," *see Diehr*, 450 U.S. at 182 n.7; *Corning*, 56 U.S. at 268; *Le Roy*, 55 U.S. at 175, is not limited to claims that also state the natural law that produces the result or effect. Moreover, nothing in *Mayo* or any other case suggests that the natural law exception requires an express claim

recitation of a natural law: the analysis is a substantive one about whether the claim is "directed to" ineligible matter and, if so, whether there is enough other than the ineligible matter itself to create eligibility. *See Alice*, 573 U.S. at 217-18; *Mayo*, 566 U.S. at 72-73, 77. If patentees could avoid the natural law exception by failing to recite the law itself, patent eligibility would depend upon the "draftsman's art," the very approach that *Mayo* rejected. *Id.* at 72. Significantly, both *Mayo* and *O'Reilly* rely on a foundational English case, *Neilson v. Harford*, Webster's Patent Cases 295, 371 (1841), which involved this very situation, where the patent did not recite the natural law, because the inventor was "not aware of the nature and principle of his discovery." *Id.* at 344. "[T]he principle," "regarded as well known," "that hot air would promote the ignition of fuel better than cold," was not in the patent but was "embodied in th[e described] machine." *O'Reilly*, 56 U.S. at 116; *see also Mayo*, 566 U.S. at 82-84. The patent was held eligible only because it "explained how the principle could be implemented in an inventive way." *Mayo*, 566 U.S. at 83.

Third, the dissent criticizes our analysis as improperly merging enablement and eligibility, arguing that the failure of the claims to designate how to achieve the desired result is exclusively an issue of enablement. Dissent Op. 23-26. But we think the criticism rests on a failure to distinguish two different "how" requirements in patent law. The first such requirement, that of eligibility, is that the claim itself (whether by its own words or by statutory incorporation of specification details under section 112(f)) must go beyond stating a functional result;

it must identify "how" that 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. The Supreme Court has so required dating back at least to the Court's rejection of Morse's claim 8 in *O'Reilly v. Morse*, and this requirement is an eligibility requirement we have applied repeatedly, as explained above.[14]

The second, distinct "how" requirement applies to the specification, not the claim: once the required concrete

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14. In *O'Reilly*, the specification contains a number of detailed technical drawings and corresponding descriptions, which all claims but claim 8 incorporated. *See* Reissue Patent No. 117 (issued June 13, 1848) (Figure 1-5 and pages 2-3). In contrast, claim 8 of *O'Reilly* specifically did not limit itself to the specification and for that reason was, unlike claims 1-7, found ineligible:

> Eighth. I do *not propose to limit myself to the specific machinery, or parts of machinery, described in the foregoing specifications* and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electro-magnetism, however developed, for making or printing intelligible characters, letters, or signs, at any distances, being a new application of that power, of which I claim to be the first inventor or discovered.

O'Reilly, 56 U.S. at 86 (emphasis added). Subsequently, the Supreme Court explained that claim 8 in *O'Reilly* was struck down precisely because it "was a claim 'for a patent for an effect produced by the use of electro-magnetism, distinct from the process or machinery necessary to produce it,'" whereas other claims incorporated the descriptions of how to produce the effect. *Dolbear v. Am. Bell Tel. Co.*, 126 U.S. 1, 534, 8 S. Ct. 778, 31 L. Ed. 863, 1888 Dec. Comm'r Pat. 321 (1888).

physical structures or actions are set out in the claim, the specification must set forth enough information for a relevant skilled artisan to be able to make and use the claimed structures or perform the claimed actions. This is the enablement requirement, which is distinct from the eligibility requirement.[15] Although the word "how" is used in both contexts, neither requirement replaces the other. Enablement is concerned with whether "the specification of a patent . . . teach[es] those skilled in the art how to make and use the full scope of the claimed invention." *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993). Section 101 is concerned with whether the claims are directed to a natural law, not whether the specification has adequately described how to make and use the concretely claimed structures and steps. The Supreme Court in *Mayo* made clear that section 101 serves a different function than enablement. *Mayo*, 566 U.S. at 90 ("[T]o shift the patent-eligibility inquiry entirely to these later [statutory] sections risks creating significantly greater legal uncertainty, while assuming that those sections can do work that they are not equipped to do.").

Fourth, the dissent argues that "[n]o party introduced evidence that the desired result of claim 22 (reducing two types of vibration) is accomplished by application of Hooke's law *and nothing more*." Dissent Op. 11. The dissent also argues that the claim element "wherein the at least one liner is a tuned resistive absorber for attenuating

15. In fact, none of the amici, some of whom argued that the issue is enablement, attempted to distinguish the cases holding claims that state a goal without a solution to be patent ineligible. *See* IPO Br. 6; BIO Br. 9; USIJ Br. 8.

shell mode vibrations" of claim 22 "is not achieved by Hooke's law, but rather is achieved by application of a different natural law—friction damping." Dissent Op. 13. The dissent's arguments do not alter our conclusion that claim 22 in all but name recites Hooke's Law and nothing more to tune the liner to achieve the claimed result of reducing two types of vibration.

As the dissent observes, the "directed to" inquiry does not look for all natural laws that are "involved" in a claimed method. Dissent Op. 6-7. Yet that is the most one can say about friction damping in the language of claim 22. What claim 22 says is that "tuning a mass and stiffness of at least one liner" achieves both the attenuations stated in the "wherein" clauses—each of which requires a "tuned" liner.[16] Tuning a mass and stiffness, as explained above, without further guidance is nothing but an invocation of Hooke's Law.

Neapco has noted that friction damping is involved in a liner's functioning as "a tuned resistive absorber for attenuating shell mode vibrations," but AAM has consistently taken the position that the invention is the "tuning" that achieves this claimed result. AAM Op. Br. 13 ("The American Axle inventors . . . conceiv[ed] of the novel and unconventional concept of 'tuning' a liner to damp

16. Claim 22 requires: "tuning a mass and a stiffness of at least one liner" "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." '911 patent, col. 11, ll. 31-36.

specific propshaft vibration modes." (emphasis added)).[17] To be sure, the tuned liner is in contact with the propshaft, and when it is put into use, that contact allows the tuning to achieve the desired result of friction damping of the tuning-focused frequencies. This is so because, as the district court and AAM's own expert recognized, friction damping is a law of nature or natural phenomenon for any contact between two surfaces. J.A. 11 (citing and quoting J.A. 1930). It is the tuning used to create the liner, not the post-creation use, that is claimed. And AAM itself has not pointed to the role of friction damping in dual-mode attenuation as a reason that the manufacturing claim is not directed to a natural law under the § 101 test.

We read the district court as effectively adopting AAM's own view when it recognized that both Hooke's law and friction damping are at least involved but that their roles are critically different. The court said that "[t]he claimed methods are applications of Hooke's law *with the result of friction damping*," J.A. 11 (emphasis added), and that friction damping is a "result that is achieved from performing the method rather than an active step in the

17. AAM's expert Dr. Rahn asserted that "[f]riction damping is unrelated to . . . 'tuning a mass and stiffness of at least one liner.'" J.A. 1930-31. This is also made clear in AAM's own motion for summary judgement, where it stated that "[t]he Asserted Claims are not directed to friction damping[,]" explaining that they are limited to "tuned liners," J.A. 4333-34, and that "the Asserted Claims involve the transformation [of] a liner to a 'tuned' liner by 'controlling its mass and stiffness,' *such that* the tuned liner is both a 'tuned resistive absorber for attenuating shell mode vibrations' and a 'tuned reactive absorber for attenuating bending mode vibrations,'" J.A. 4336 (emphasis added).

method." *Id.* at 16. Those conclusions accurately reflect the role of friction damping in post-manufacturing, unclaimed use of the device whose manufacture is what is claimed. The recited alleged invention of "tuning a mass and a stiffness of at least one liner" does not recite anything other than the invocation of Hooke's law.

Moreover, AAM could gain nothing by saying that claim 22 is directed to both Hooke's law and friction damping. That assertion would simply leave it with a claim directed to two identified natural laws. J.A. 11 (quoting AAM's expert, at J.A. 1930, stating that friction damping "is a property of physics experienced by any two surfaces in contact"). If claim 22's language could be properly interpreted in a way such that it invokes friction damping as it does with Hooke's law, the claim would still on its face clearly invoke natural laws, and nothing more, to achieve a claimed result.

Finally, the dissent argues that the majority rejected AAM's step two arguments "with no explanation at all" and that "[i]t is inconsistent with precedent to hold claims ineligible without analyzing the step two arguments." Dissent Op. 21. The majority does apply step two. What it concludes is what this court has elsewhere concluded on earlier occasions: the only asserted "inventive concept" is ineligible subject matter. *See BSG Tech*, 899 F.3d at 1290; *Trading Techs.*, 921 F.3d at 1385; *ChargePoint*, 920 F.3d at 775.

Appendix A

CONCLUSION

We affirm as to claim 22 and its asserted dependent claims, and as to claim 36, which claim ineligible subject matter under § 101. We vacate as to claim 1 and its dependent claims and remand for further proceedings consistent with this opinion.

AFFIRMED IN PART, VACATED IN PART, AND REMANDED

Costs

No costs.

Appendix A

MOORE, *Circuit Judge*, dissenting.

The majority's decision expands § 101 well beyond its statutory gate-keeping function and collapses the *Alice/Mayo* two-part test to a single step—claims are now ineligible if their performance would involve application of a natural law. The majority makes three critical errors of law and in doing so, has inflated § 101 beyond the statutory language and Supreme Court precedent. First, the majority finds claims *directed to* natural laws, yet they clearly contain no such natural law. The majority creates a new test for when claims are *directed to* a natural law despite no natural law being recited in the claims, the *Nothing More* test. The majority refuses to ask the parties for supplemental briefing on the application of its new *Nothing More* test or to remand to the district court to assess the applicability of the new test in the first instance. The majority instead holds that we appellate judges, based on our background and experience, will resolve questions of science de novo on appeal. We will determine whether Hooke's law *and nothing more* results in a reduction of two types of vibration in a propshaft. The majority reaches this conclusion despite all of the briefing and record evidence contradicting it. Second, the majority refuses to consider the unconventional claim elements. Third, the majority has imbued § 101 with a new superpower—enablement on steroids. The majority's blended 101/112 analysis expands § 101, converts factual issues into legal ones and is certain to cause confusion for future cases.

The claims at issue contain a specific, concrete solution (inserting a liner inside a propshaft) to a problem

(vibrations in propshafts). Although some degree of trial and error in modifying the mass, stiffness, and location of the liner to optimize the reduction in vibration of a given shaft could (if undue) create an enablement concern, that is not a § 101 problem. American Axle (AAM) and the many amici believe each of these errors of law are likely to create confusion for the district courts and to expand § 101 profoundly.[1] I agree.

The majority claims this is a narrow decision—I think not. This case turns the gatekeeper into a barricade. Unstated natural laws lurk in the operation of every claimed invention. Given the majority's application of its new test, most patent claims will now be open to a § 101 challenge for being directed to a natural law or phenomena.

Finally, though not a legal question, I am troubled by the deprivation of property rights without due process. The majority declares claims representative

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1. *See, e.g.*, USIJ Br. at 1 ("The panel decision, if allowed to stand, will add further confusion to a body of jurisprudence regarding patent eligibility that already has proven to be difficult if not wholly impenetrable to apply with any consistency."); *id.* at 5 (quoting *Alice*) ("The majority decision, in short, threatens to 'swallow all of patent law,' because 'at some level, all inventions . . . embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.'"); IPO Br. at 8 ("the decision has the potential to blur the lines between the section 101 and 112 analysis. This will increase confusion and uncertainty in the law of patent eligibility and could open the door to hybrid eligibility and written description-enablement arguments."); BIO Br. at 2 ("it is now Section 101 that has engulfed the other statutory sections").

despite the fact that no party argued below or to this court that there were representative claims, and AAM argued the import to the § 101 analysis of dependent claim limitations throughout these proceedings. And the majority finds against the patentee by reaching a claim construction issue of the majority's own creation. The majority concludes, though no party argued it at any point in this litigation or appeal, that the claim terms "positioning" and "inserting" have different meanings. And only because of its newly proffered, completely *sua sponte* construction, claim 22 is deemed ineligible. There is simply no justification for the majority's application of its new *Nothing More* test other than result-oriented judicial activism. This is fundamentally unfair. I dissent from this unprecedented expansion of § 101.

I. These claims are not directed to a natural law

A. The majority's expansion of "*directed to*"

The '911 patent, directed to a method of manufacturing a drive shaft assembly for a car, is the type of traditional manufacturing patent of automotive parts which has been eligible for patent protection since the invention of the car itself. "Industrial processes such as this are the types which have historically been eligible to receive the protection of our patent laws." *Diamond v. Diehr*, 450 U.S. 175, 184, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981).

The majority's holding that these claims to manufacturing an automotive drive shaft are ineligible has sent shock waves through the patent community.

"It's unthinkable the courts found this invention, a manufacturing process for making a key automotive part, as patent ineligible." Rep. Doug Collins. *American Axle* is a "poster child for how the current test for patent eligibility is being applied to reach rather absurd results." Perry Cooper, *Ball in Federal Circuit's Court on Patent Eligibility Clarity*, Bloomberg News (Jan. 30, 2020) (quoting Professor David Taylor). "[I]f 'industrial-process,' physically-based patents like these are ineligible under *Mayo/Alice* , then seemingly every patent is in ineligibility jeopardy." Michel Br. at 7. "'The optics are challenging for this, because you're talking about a way to make a drive shaft for a car, and that sounds like the kind of thing that's been getting patented for 100 years,' . . . The decision brings to the foreground an issue that has been bubbling in patent eligibility cases for some time, which is that every invention at some level operates according to natural laws." Ryan Davis, *Drive Shaft Ruling May Expand Challenges to Patent Eligibility*, Law 360 (Oct. 24, 2019). "This is a specific, practical application of the laws of thermodynamics in an industrial process—an innovative process deemed patentable by the courts since the nineteenth century." Law Profs. Br. at 4. *See also* Michael Cicero, *Patent Ineligibility Defense Expands to Mechanical Subject Matter*, Bloomberg News (Dec. 4, 2019); Jonathan Osha, *American Axle: The Latest Twist of Patent Eligibility* Oshaliang Newsletter (Oct. 17, 2019) (*American Axle* is "a new low in patent eligibility jurisprudence . . . if a *method of manufacturing a propeller shaft* is not eligible subject matter, it is difficult to imagine

where a future line might be drawn.").[2] These claims do not preempt use of a natural law and the majority significantly broadens the *directed to* test to find otherwise.

In this case, the natural law which the claims are purportedly directed to has been a constantly moving target. Neapco argued and its expert testified that claim 22 was directed to the application of two natural laws working together to achieve the claimed reductions in vibration: Hooke's law (which reduces bending mode vibration) and friction damping (which reduces shell mode vibration). The district court held that claim 22 is directed to "laws of nature: Hooke's law and friction damping.'" J.A. 10. On appeal, Neapco continues to assert that claim 22 is directed to the application of two natural laws:

> Hooke's Law and friction damping are two separate laws of nature. Indeed, the [district court] opinion states that "the issue presented is whether the Asserted Claims as a whole are directed to laws of nature: Hooke's law ***and*** friction damping."

Neapco Br. at 56 (emphasis in original). The prior majority opinion in this case explained that the claimed invention is "more complex than just a bare application of Hooke's Law,

2. "*Amici* once proposed as a *reductio ad absurdum* that even an automobile engine can be framed as a mere application of the laws of thermodynamics and thus deemed unpatentable. Adam Mossoff, *A Brief History of Software Patents (and Why They're Valid)*, 56 Ariz. L. Rev. 65, 71 (2014). The panel majority decision has made this absurdity a legal reality." Law Prof. Br. at 3.

and that other natural laws may be relevant." Prior Maj. at 20. It further explained that the claims are directed to "Hooke's law and possibly other natural laws." *Id.*

Changing course on rehearing, the majority now concludes claim 22 is directed to Hooke's law and only Hooke's law "because it simply requires the application of Hooke's law to tune a propshaft liner to dampen certain vibrations." Maj. at 9. And revising history, the majority now claims that the district court itself held that the claims were directed to Hooke's Law and nothing more. Maj. at 7. This is contrary to both parties' understanding about the district court's holding and the majority's own prior conclusion about the district court's holding:

> "The district court concluded that 'the Asserted Claims as a whole are directed to laws of nature: Hooke's Law and friction damping. J.A. 10.'"

Prior Maj. at 7. Attempting to revise history is not good: "The past was erased, the erasure was forgotten, the lie became the truth." GEORGE ORWELL, 1984.

1. The majority's holding conflicts with precedent

The majority's holding is in direct conflict with our precedent and a dramatic expansion of § 101. As we have explained,

> The "directed to" inquiry . . . cannot simply ask whether the claims involve a patent-ineligible concept, because essentially every routinely

> patent-eligible claim involving physical products and actions involves a law of nature and/or natural phenomenon—after all, they take place in the physical world. Rather, the 'directed to' inquiry applies a stage-one filter to claims, considered in light of the specification, based on whether "their character as a whole is directed to excluded subject matter."

Enfish LLC v. Microsoft Corp., 822 F.3d 1327, 1335 (Fed. Cir. 2016) (citations omitted). "[A]t step one, it is not enough to merely identify a patent-ineligible concept underlying the claim; we must determine whether that patent-ineligible concept is what the claim is *directed to*." *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 766 (Fed. Cir. 2019) (internal citations omitted). A claim is not *directed to* a natural law simply because it touches upon, implicates, uses or involves a natural law.

The majority cites *Diehr*, *Flook*, *O'Reilly*, and *Mayo* as supporting its conclusion that these claims are *directed to* a natural law. But, in each of those cases, the natural law was undeniably, expressly articulated in the claim. "When a claim recites a mathematical formula (or scientific principle or phenomena of nature), an inquiry must be made into whether the claim is seeking patent protection for that formula in the abstract." Maj. at 18 (quoting *Diehr*). One important difference between this natural law case and every other one ever decided is that these claims do not actually recite any particular natural law and likely implicate many (as all mechanical inventions must comply with the laws of physics).

Claim 22 does not recite a natural law, about that there can be no doubt. Hooke's law is not mentioned by name or formula anywhere in the claims, specification or prosecution history. The majority overcomes this defect by articulating a new test (the *Nothing More* test) for when a claim is directed to a natural law despite not reciting one:

> This holding as to step 1 of Alice extends only where, as here, a claim on its face clearly invokes a natural law, ***and nothing more, to achieve the claimed result.***

Maj. at 21. The majority explains that claim 22 is directed to Hooke's law because the tuning element in claim 22 includes "controlling the mass and stiffness . . . Thus, claim 22 requires use of a natural law." Maj. at 11-12. Every mechanical invention requires use and application of the laws of physics. It cannot suffice to hold a claim *directed to* a natural law simply because compliance with a natural law is required to practice the method.

Section 101 is monstrous enough, it cannot be that use of an unclaimed natural law in the performance of an industrial process is sufficient to hold the claims *directed to* that natural law. The majority's only citation in support of this dramatic expansion of our law is an English case from 1841, *Neilson v. Harford*, Webster's Patent Cases 295, 371 (1841). There was no claim in *Neilson* as claiming practice did not exist and the English court actually held the patent eligible: "the plaintiff does not merely claim a principle, but

a machine embodying a principle." *Id.*[3] I cannot discern the logic in the majority's suggestion that this English case supports its decision to depart from existing U.S. precedent. It cannot be that a claim is *directed to* a natural law when there is no specific natural law discernable in the claim or even the specification. All physical methods must comply with, and apply, the laws of physics and the laws of thermodynamics. The fact that they do does not mean the claims are *directed to* all such laws.

The majority also attempts to justify its result by comparing claim 22 to claim 8 in *O'Reilly*. Claim 8 in O'Reilly reads:

> Eighth. I do not propose to limit myself to the specific machinery or parts of machinery described in the foregoing specification and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electromagnetism, however developed for marking or printing intelligible characters, signs, or letters, at any distances, being a new application of that power of which I claim to be the first inventor or discoverer.

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3. The majority claims that in *O'Reilly* and *Mayo*, the Supreme Court held that in *Neilson* the principle "was not in the patent but was embodied in th[e described] machine." Maj. at 27. Neither decision holds nor indicates that the principle was not disclosed in the patent. When discussing *Neilson*, the Supreme Court stated: "the claimed process included not only a law of nature but also several unconventional steps . . . that confined the claims to a particular, useful application of the principle." *Mayo*, 566 U.S. at 84.

56 U.S. (15 How.) 62, 112, 14 L. Ed. 601 (1854). The Supreme Court held claim 8 ineligible because the claim was not limited to "specific machinery or parts of machinery described," but instead claimed electromagnetism [(the natural phenomenon was actually articulated in the claim)] developed by any means to mark or print at any distance. *Id.* The Supreme Court's concern was not, as the majority contends, that an artisan would not know "how" to print at any distance using electromagnetism. The concern was that Morse's claim 8 was not limited to *any* specific "process or machinery," and that the expressly limitless claim would preclude "some future inventor . . . [who] discover[s] a mode of writing or printing at a distance by means of the electric or galvanic current, without using any part of the process or combination set forth in the plaintiff's specification" from practicing his invention. *Id.* at 112-113. Unlike Morse claim 8, claim 22 does not preclude all use of, or even expressly recite, the natural law and it does expressly articulate the "machinery" used to achieve the result of dampening specific vibrations—the liner.

Amici are understandably troubled, as am I, by the majority's departure from existing § 101 precedent. "The panel seems to conclude that step one can be satisfied even if the natural law, or laws, at issue are not identified. . . . General and non-specific statements should not be enough to satisfy step one." IPO Br. at 8-9. "The specification invokes Hooke's Law no more than it does the law of gravity . . . the majority elected to sweep into its analysis one or more unidentified natural laws in addition to Hooke's Law in order to assert that the claims were

indeed 'directed to' some number of natural laws." BIO Br. at 6. "Just because an invention operates according to laws of nature (as all inventions must) cannot mean that it is 'directed to' these laws." BIO Br. at 7.

2. The majority's new *Nothing* More test leaves the science to the appellate judges to decide de novo

The majority's *Nothing More* test, like the great American work *The Raven* from which it is surely borrowing, will, as in the poem, lead to insanity. The majority has concluded that on appeal, as a matter of law, we judges can decide as a matter of physics whether claim 22's results—attenuating two types of vibration—are accomplished by Hooke's law and nothing more. To say this feels like a bit of an overreach is an understatement. Today, contrary to all arguments in the case, the record, the district court's decision, and its own prior opinion, the majority concludes that claim 22 is directed to "Hooke's law and *nothing more*," to accomplish the claimed results of reducing two kinds of vibrations.

The district court did not hold that claim 22's results—attenuated shell mode vibration and bending mode vibration in the propshaft—were achieved by Hooke's law and *nothing more*. In fact, as the majority previously recognized, the district court clearly held that they were achieved by the combination of Hooke's law and friction damping. Prior Maj. at 7. Neither party argued that claim 22 is directed to Hooke's law and *nothing more*. Even Neapco argued it was the combination of Hooke's law and friction damping, "two separate natural laws" which

accomplished the claimed vibration damping. Neapco Br. at 56.[4]

No party introduced evidence that the desired result of claim 22 (reducing two types of vibration) is accomplished by application of Hooke's law *and nothing more*. In fact, both parties' experts expressly and unequivocally testified to the contrary.[5] All evidence in this case is

4. In its summary judgment briefing Neapco argued that claim 22 was directed to "well-known laws of physics," including both Hooke's law and "the law of nature or natural phenomenon for friction damping." J.A. 1248-50. On appeal, Neapco likewise argues that the claims are "directed to natural laws (Hooke's laws and the law of friction damping)." Neapco Br. at 30. Neapco leaves no doubt when responding to AAM's argument:

> "[The district court opinion] states that Hooke's law and friction damping are two separate laws of nature. Indeed, the opinion states that 'the issue presented is whether the Asserted Claims as a whole are directed to laws of nature: Hooke's law *and* friction damping.' The opinion goes on to accurately describe Hooke's law . . . [and] observed that friction damping, a separate law of nature, 'is a property of physics experience by two surfaces in contact.'"

Id. at 56.

5. AAM's expert testified that Hooke's law is not required to practice claim 22 nor is application of Hooke's law sufficient to practice claim 22:

> Nor do any of the above claim limitations (and their constructions) require the application of Hooke's law or any variation thereof. Hooke's law is simply a linear relationship between the force F and displacement x of a spring with stiffness k. Taking the first limitation

to the contrary. "The testimony of opposing technical experts was refreshingly harmonious; perhaps because these principles of classical electricity are beyond debate." *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528, 1536 (Fed. Cir. 1987) (Newman, J., dissenting).

Lest there be any doubt, the accused infringer's (Neapco's) expert analyzes claim 22's three claim elements related to reducing vibrations:

> 1. "tuning a mass and a stiffness of at least one liner;"
>
> 2. "wherein the at least one liner is a tuned reactive absorber for attenuating bending mode vibrations;" and
>
> 3. "wherein the at least one liner is a tuned resistive absorber for attenuating shell mode vibrations."

J.A. 1602-05, ¶¶ 172-79. Neapco's expert testifies that the first two elements can be achieved by application of Hooke's law *and nothing more*:

> as an example, e.g., "tuning a mass and stiffness of at least one liner," claim 22 involves a method having the step of "controlling a mass and stiffness of at least one liner to configure the liner to match a relevant frequency or frequencies." One can perform that step, like the other steps of claim 22, without considering, applying, or even knowing of Hooke's law.

J.A. 1928. Experts for both sides agree that claim 22 is not directed to Hooke's law and nothing more.

> 176. Thus, the phrase "tuning a mass and a stiffness of at least one liner" claims Hooke's law. Similarly, the claim element "tuned reactive absorber for attenuating bending mode vibrations" claims nothing more than Hooke's law again, how one body will react to the mass spring mass damper.

However, when it comes to the third element (reducing shell mode vibration), this expert is crystal clear that it is not achieved by Hooke's law, but rather is achieved by application of a different natural law—friction damping:

> 177. Similarly, the claim element "tuned resistive absorber for attenuating shell mode vibrations" claims *nothing more* than the law of nature/natural phenomenon for friction damping. Friction damping has been modeled as both Coulomb damping and viscoelastic damping which occur due to the resistive friction and interaction of two surfaces that press against each other as a source of energy dissipation.

Shell mode vibration, according to Neapco, is reduced by insertion of the liner into the propshaft in a manner to cause a press fit which will reduce shell mode vibrations by friction damping.

Neapco's expert directly contradicts the majority's current conclusion. His opinion is that claim 22 is directed to and requires application of two different natural laws

to achieve the result of reducing two types of vibration in the propshaft:

> 179. In short, the claimed invention claims nothing more than the law of nature and/or natural phenomenon of Hooke's Law ***and friction damping.***

Rather than address these, the parties' arguments, as we are bound to do as appellate judges, the majority recasts these arguments as "the dissent's arguments" and dismisses them in conclusory fashion.[6] The majority claims that the "most one can say about friction damping in the language of claim 22" is that it is merely "involved" in the claimed method.[7] Maj. at 30. Not only can the parties and

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6. In an attempt to deflect and cause confusion, the majority cites AAM's arguments that claim 22 is not directed to friction damping or any other natural law. First, AAM has not been given an opportunity to respond to the majority's new *Nothing More* test. Second, AAM's argument that claim 22 is not directed to or preempts friction damping does not in the least support the majority's conclusion that Hooke's law and nothing more achieves the reduction of two types of vibrations. Finally, even if this twisted logic could be followed, it would at most create a question of fact about which the parties disagree and it would thus be improper to grant summary judgment.

7. Acknowledging in the end, that Hooke's law alone may not achieve the reduction of two types of vibration, the majority pivots and states that the claim is still ineligible if multiple unclaimed natural laws working together are used to achieve the claimed results. Maj. at 31-32. The majority's conclusion that a claim is ineligible because multiple unclaimed natural laws could be involved in achieving the claimed results is an incredibly broad ruling and will invite a § 101 challenge in every case.

the district court say more, they did. The parties and their experts uniformly agree that the claims are not directed to Hooke's law and nothing more. The majority's conclusion to the contrary, without so much as acknowledging the parties' arguments or evidence, casts a cloud of confusion not just over the bounds of this case, but over our role as judges. The majority's conclusion that Hooke's law and nothing more reduces two types of vibration in propshafts amounts to a clear rule of law—judges, not experts, will determine as a matter of law, when claims are directed to a natural law and *nothing more*. We are the scientific experts now. Whether Hooke's law and nothing more achieves reduction in two types of vibration in propshafts should be a question of fact, but the majority concludes otherwise. It decides this question of physics as a matter of law on appeal in the first instance even at summary judgment.

The majority also holds that determining whether a claim "invokes" a natural law, though no natural law is articulated in the claim is also a question of law for the court to decide. It is undisputed that claim 22 does not mention a natural law either by name or formula. Since Hooke's law is not mentioned by name or formula anywhere in the intrinsic record, how can we conclude, as a matter of law, the claim nonetheless clearly invokes Hooke's law?

As appellate judges, we are well-equipped to discern meaning from legal documents. But things get murkier as we muddle our way into the intersection of science and the law. Thus, the Supreme Court has wisely announced

a line between that which we can evaluate de novo (the intrinsic record, composed largely of legal documents) and that which we cannot (everything extrinsic to the record, including expert testimony). *See Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 324-28, 135 S. Ct. 831, 190 L. Ed. 2d 719 (2015); *see also Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1125 (Fed. Cir. 2018); *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1365 (Fed. Cir. 2018). Where, as here, *nothing* in the intrinsic record so much as mentions Hooke's law, we are unquestionably in the extrinsic category. There is nothing in the '911 patent that "clearly invokes a natural law." Yet the majority concludes, as if it would be apparent to anyone who looked, that the claim limitations equal Hooke's law. One can reach such a conclusion only through factfinding based on expert testimony. But judges are not fact or technical experts. The only appropriate fact finder is the district court and not on summary judgment.

If we are going to embark in a tumultuous area of law on a new test for ascertaining when claims are directed to unmentioned natural laws—we should do so with the benefit of briefing or even better, we should remand for the district court to apply the test in the first instance since it requires resort to extrinsic evidence. Future cases will use this case as a template for how judges can determine as a matter of law when a claim invokes an unmentioned natural law and *nothing more*. All aspects are henceforth a question of law and the record is irrelevant. We are the experts and we will determine when a claim invokes an unmentioned natural law and when nothing but that natural law is necessary to achieve the claimed results.

A disturbing amount of confusion will surely be caused by this opinion, which stands for the proposition that claims can be ineligible as *directed to* a natural law even though no actual natural law is articulated in the claim or even the specification. The majority holds that claims are *directed to* a natural law if performance of the claimed method would use the natural law. The majority has "open[ed] the door to countless challenges to mechanical inventions with underpinnings in one or more, potentially unnamed natural laws." IPO Br. at 9. Holding these claims ineligible under a purported natural law analysis "leaves patentees awash in a sea of uncertainty; how can one determine if a claim is directed to a natural law without a natural law being apparent either on the face of the claim, or under a proper claim construction?" BIO Br. at 5. And the majority's addition of its *Nothing More* test will add nothing more to the clarity. As we see in this case, the *Nothing More* test can be met even when all of the arguments and evidence are to the contrary and will not be finally resolved until we judges bring our scientific acumen to bear on the questions.

B. Claim 1 vs. Claim 22

The majority holds that claim 1 is not directed to a natural law (Hooke's law) because of the additional positioning limitation and the possible inclusion of variables other than mass and stiffness in the tuning limitation of claim 1. Maj. at 24-25. I agree that claim 1 is not directed to a natural law. I would, however, reverse rather than vacate because under the second step of the *Alice/Mayo* test, there are at least factual questions

regarding this claim's inventive concepts which preclude summary judgment. *See infra* Part II. Since we are remanding, the district court will have an opportunity to address these fact questions regarding claim 1 in the first instance.

To hold claim 22 ineligible, the majority holds that claim 22's *inserting* limitation is not equivalent to claim 1's *positioning* limitation "and AAM never argued otherwise." Maj. at 25 n.13. The majority is *sua sponte* interpreting undisputed, unappealed claim terms with reference to nothing. They do not cite the patent, the prosecution history, or any briefs. Neither party ever suggested that the inserting and positioning limitations had different meanings. Claim 22 requires tuning and inserting *wherein* the liner will function as a tuned resistive absorber (damp shell mode) and a tuned reactive absorber (damp bending mode). AAM argued in its Opening Brief that the location of the liner within the shaft was a characteristic which impacted attenuation of vibration. *See, e.g.*, AAM Opening Br. at 64-65 ("The '911 patent specifically teaches how to control the characteristics of a liner to not only match but damp relevant propshaft vibrations, including the thickness of the liner, the interference fit, *the location of the liner*"). "One liner characteristic that can be controlled—'*location* of the liners 204 within the shaft member 200'—is independent of its structure, e.g., its mass and stiffness." *Id.* at 42; *see also* Oral Arg. at 1:36-2:00 ("The specification tells you, here's what you control, you control the diameter of the liner, the thickness of it, where you place the liner, location is important."). Neapco's own expert explained that shell mode vibration is

reduced by the fit achieved when the liner is inserted into the propshaft. The majority's *sua sponte* appellate claim construction is improper, unfounded and unsupported by the record. It is not our job on appeal to create our own claim construction issues to hold claims ineligible especially when they were never briefed or argued by the parties.

II. Unconventional claim elements render a claim eligible even if it fails step one

Even if the majority's analysis of the claims satisfied step one of the *Alice/Mayo* test, which it did not, there is a step two. Step two is a required inquiry precedent to holding that claims are ineligible for patenting. The claims will not be held ineligible (remember § 101 is meant to be a gatekeeper) if the claims contain an "inventive concept." There are many here, articulated in the claims themselves, about which there exist at least questions of fact which should have precluded summary judgment. Argued below and throughout the appeal, AAM maintains that liners had never been used to reduce bending mode vibration. *See* AAM Br. at 12, 25-26, 27, 35, 57-60, 63, and 65 n.5; AAM Reply Br. at 2, 15 ("Prior art liners were used to provide general broadband damping of shell mode vibrations, *but liners were not used to dampen bending mode vibrations prior to the claimed invention*."); *Id.* at 19 ("It was inventive to use a liner to damp bending mode vibrations"); *Id.* at 24-25, and 29. The argument that liners were never before used to attenuate bending mode vibrations was AAM's first and one of its strongest non-conventionality arguments. Only to be bolstered by additional strong, fact-

based, arguments such as the unconventional use of liners to attenuate multiple vibration modes and unconventional control of characteristics (including mass, stiffness and location) to damp vibration. AAM's opening brief set these forth on the very first page of its step-two argument:

> 1. The Claims Contain Inventive Concepts and Are Not Conventional or Routine
>
> * * *
>
> [T]he asserted claims include at least the following inventive concepts:
>
> - ***using a cardboard liner to reduce bending mode vibrations*;**
>
> - using a cardboard liner to reduce bending and shell mode vibrations;
>
> - tuning a cardboard liner by controlling its characteristics;
>
> - controlling the characteristics of a cardboard liner such that it matches and damps bending mode vibrations;
>
> - controlling the characteristics of a cardboard liner such that it damps bending mode vibrations by oscillating in opposition to a specific propshaft bending mode frequency; and

- controlling the characteristics of a cardboard liner such that it matches and damps vibration of multiple different types of propshaft vibration, e.g., both bending and shell mode vibrations.

AAM Br. at 57-58.

The patent discloses prior use of plugs, weights, and dampers to attenuate bending mode vibrations, but stresses that liners were not used. '911 patent at 2:29-38. AAM explained that before the '911 patent, liners were not used to damp bending mode vibrations, instead car manufacturers shoved masses of wadded up cardboard into the propshaft. Oral Arg. 6:46-7:11. More than a dozen times in the briefs and during oral argument AAM argued that the use of liners to attenuate bending mode vibration was one of its inventive concepts. During oral argument, AAM corrected the court when a member of the majority tried to suggest that liners to attenuate bending mode were known in the prior art:

> Judge: "None of that is new, there were liners, there were changes to the liners to make them dampen, right? That was not new."
>
> AAM: "The liners had never been used to damp bending mode."

Oral Arg. 6:37-49. Even Neapco acknowledged that the patent states that liners had not been used to attenuate

bending mode vibrations. *See* Neapco Br. at 8.[8] It matters not at all to the majority that AAM alleges that liners had not been used to reduce bending mode vibration, nor that Neapco presented no contrary evidence. This majority opinion ignores this step two argument entirely—it never addresses it.

In its prior decision, the majority did address AAM's argument that one of its inventive concepts was to use liners to reduce bending mode vibrations: it suggested that AAM did not make this argument, Prior Maj. at 12 n.3, it made its own fact finding based on evidence not of record that liners were used to attenuate bending mode vibrations, *id.*, and then finally, it held (contrary to *Alice/Mayo*), "it makes no difference to the section 101 analysis whether the use of liners to attenuate bending mode vibrations was known in the art," *id.* Each of these positions has been abandoned today, but the result is the same—this time with no explanation at all. It is inconsistent with precedent to hold claims ineligible without analyzing the step two arguments. [9]

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8. Though Neapco admits that *the patent* asserts liners had never been used to attenuate bending mode, it argues that whether it was previously unknown to use a liner to attenuate bending mode is "a point that Neapco disputes and the record evidence contradicts." Neapco Br. at 36. Given *Berkheimer*, this, on its face, at least creates a question of fact regarding step two which should have precluded summary judgment of ineligibility. *Berkheimer v. HP Inc.*, 881 F.3d 1360 (Fed. Cir. 2018).

9. The majority states in generality only that "a claimed invention's use of the ineligible concept to which it is directed cannot supply the inventive concept." Maj. at 21-22. AAM has never claimed that its inventive concept is Hooke's law (the ineligible natural law).

In *Mayo*, the Supreme Court reflected on the process of updating alarm limits held ineligible in *Flook*. The *Flook* claims recited a mathematical formula and did not explain how the variables used in the formula were to be selected. 566 U.S. at 81. The Court did not stop at step one, it considered the inventiveness of every single claim limitation, and only after concluding that they were all "well-known" held that "there was no inventive concept in the claimed application of the formula." *Id.* at 82. In contrast, the majority stops at step one.

According to the majority, "[w]hat is missing is any physical structure or steps for achieving the claimed result." Maj. at 15. The majority never addresses whether a claim to using a physical, hollow liner inserted inside a hollow drive shaft to attenuate bending mode vibrations in the shaft (yes these are all express claim limitations), was conventional. Much less whether a claim to using the same physical liner to attenuate both bending mode *and* shell mode vibrations was conventional. The result is not, as the majority claims, a tuned liner; the result is the reduction of vibration in the propshaft. And these claims expressly require the reduction of bending mode and shell mode vibrations employing a liner positioned inside the hollow shaft, which according to AAM had never been done before. Goodness sakes, the dependent claims held ineligible by the majority specify the material the liner must be made of (cardboard or plastic or fiberglass or metal (claim 31)) and the actual physical form it must take (extending helically (claim 27), with fingers (claim 33), circumferentially wrapped (claim 29) or over-molded (claim 32)) and the place the liners must be positioned

("symmetrically about a bending anti-node" (claims 34, 35)). *See also* Oral Arg. at 29:39-57 ("The claims talk about not only specific locations you put it at anti-nodes for specific modes. The dependent claims also include that they have to be directed to the second bending mode or the second shell mode."). It is remarkable that the majority thinks that claims with all of these very physical, very concrete, very structural limitations are "missing any physical structure or steps." A fiberglass liner with a helically shaped resilient member extending circumferentially around the liner or over-molded to the structural portion of the liner certainly feels like the "physical structure" that the majority says is missing from the claims.

AAM alleges throughout that the concept of tuning a liner, i.e. controlling the characteristics of a liner to dampen vibration of a given system is also an inventive concept. *See id.* at 27-28 and 57-67; AAM Reply Br. at 2, 16, and 18-29. The particular characteristics of the tuned liner will depend on the characteristics of the propshaft it is being used in (for example the natural frequencies, which are inherent properties of each shaft). *See* '911 patent at 7:44-55; AAM Br. at 4, 6, 46, and 53. And the '911 patent's specification explains how to tune liners to attenuate those vibrations. The specification explains that different characteristics of the liners are controlled corresponding to the structure of the propshaft. '911 patent at 7:56-8:43. It even provides a working example of tuned liners for use in a propshaft with specific dimensions and frequencies. *Id.* at 8:2-23. The claims include limitations which get progressively more detailed about the structure and

positioning of the liner inside the drive shaft, none of which are addressed by the majority.

AAM has at least raised factual questions about its asserted inventive concepts which should have precluded summary judgment in this case. Rather than confront AAM's actual claimed and argued unconventional elements (such as a liner for attenuating bending mode vibrations), the majority creates its own strawman to knock down. The majority argues that AAM may have invented patentable refinements to sophisticated FEA software or computer modeling, but that they are not claimed. Maj. at 13-14. Nowhere in the patent or the briefing does AAM claim that the '911 patent's improvement is FEA or computer modeling.

The majority never addresses the inventive concepts alleged by AAM and listed in the above bullets points directly from AAM's opening brief. The second step of *Alice/Mayo* cannot be disregarded in the eligibility analysis.

III. Enablement on Steroids

"A more accurate statement of the majority's view would have been: 'Section 101 can do everything 112 does-and then some.'" BIO Br. at 9. The majority's new blended 101/112 defense concerns the biotech and pharmaceutical industries who "expend great effort during patent prosecution to meet the rigorous written description and enablement requirements." BIO Br. at 7.

Despite the fact that no party has argued that the claims are not enabled or that a skilled artisan would not know how to design a tuned liner and insert it into a given propshaft to reduce vibration, the majority nonetheless concludes the claims are ineligible because they don't teach *how* to tune a liner. The majority's concern is not preemption of a natural law (which should be the focus), but rather that the *claims* do not teach a skilled artisan *how* to tune a liner without trial and error. The majority's new blended 101/112 defense is confusing, converts fact questions into legal ones and eliminates the knowledge of a skilled artisan.

According to the majority, even if the claims are enabled, they are still ineligible because the claims themselves didn't teach *how* (the majority calls this the first *how* requirement). It is certainly correct that "[a]n improved result, without more stated in the claim, is not enough to confer eligibility." *Koninklije KPN N.V. v. Gemalto M2M GmbH*, 942 F.3d 1143, 1150 (Fed. Cir 2019); *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1356 (Fed. Cir. 2016) (claims are directed to an ineligible abstract idea when they "purport to monopolize every potential solution to the problem"). But such is not the case here. The *goal* or the *result* of the claimed invention is not a tuned liner; it is a drive shaft with reduced vibrations. Claims 1 and 22 read:

> 1. 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 at least one liner to attenuate at least two types of vibration transmitted through the shaft member; and

positioning the at least one liner within the shaft member such that the at least one liner is configured to damp shell mode vibrations in the shaft member by an amount that is greater than or equal to about 2%, and the at least one liner is also configured to damp bending mode vibrations in the shaft member, the at least one liner being tuned to within about ±20% of a bending mode natural frequency of the shaft assembly as installed in the driveline system.

* * *

22. 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.

The majority states the claim "must identify 'how' that functional result is achieved by limiting the claim scope to structures specified at some level of concreteness." Maj. at 27-28. It is clear from the claims themselves that the functional result is a drive shaft assembly with reduced vibrations. "The present invention relates to . . . a method for attenuating driveline vibrations transmitted through a shaft assembly." '911 patent at 1:4-7. It is undisputed that there exist many different ways to attenuate vibrations in a drive shaft such as dampers, plugs, weights, liners, even wadded up cardboard. The '911 patent claims one specific way to attenuate vibrations, a concretely identified physical structure—a liner inserted inside the propshaft. It does not just claim a result (reducing vibration)—it claims a specific means of accomplishing the result—a liner positioned in the shaft. Even the amount of required reduction in vibration is an element in some claims (claim 1). Claim 22 even specifies (as do others) that the liner

is tuned to a given frequency by adjusting its mass and stiffness. And AAM alleges and the claims require that the liner's placement inside the shaft aids in reducing vibration. There is no question the claims identify a concrete structure and even specify precise variables (mass and stiffness) to be adjusted to tune the liner to the frequency of any given propshaft. The only remaining question (the majority's true concern with these claims) is would a skilled artisan know *how* to adjust the mass, stiffness, and positioning of the liner in order to damp vibration without undue experimentation. *See* Oral Arg. at 12:04-11 (Judge) ("Basically it is done by trial-and-error. You start with a computer program and then you do trial and error to come to the correct result, right?"); Oral Arg. at 29:20-36 (Judge) ("The claims themselves don't even provide you with a list of variables, there are a lot of different variables, done by trial and error, and all the claims are telling you is here is a desirable result and use trial and error to get there."). This is the question the majority has and this is a question of enablement, not eligibility.

I dissent from the majority's attempt to inject a heightened enablement requirement into the § 101 analysis. These claims contain a specific, concrete solution (inserting a liner into a propshaft) to a problem (vibrations in a propshaft). Some degree of trial and error in modifying the mass and stiffness of the liner to optimize the reduction in vibration of a given shaft, could (if undue) create an enablement concern, but it is not a § 101 problem. And if § 101 did require an analysis of whether too much trial and error would be required to reduce vibration of

a given shaft at a particular frequency, surely this would be a question of fact and not something we decide for the first time on appeal.

IV. Fundamental Fairness

I do not agree with the majority's conclusion that claims 1 and 22 are representative or that AAM waived its arguments as to the dependent claims. First, Neapco never argued that claims 1 and 22 are representative and in fact argued the dependent claims separately. *See* Neapco SJ Br. at 32-33. Second, AAM expressly argued that they are *not* representative. Oral. Arg. 30:50-31:07. AAM's statement that the dependent claims should not come out differently does nothing more than confirm that it believes *all* of the claims are patent-eligible. Third, the majority inaccurately states AAM did not argue limitations of the dependent claims. AAM's briefs provide multiple references to the type of material and other limitations found only in the dependent claims. *See, e.g.*, AAM's Opening Br. at 13-14, 36, 57-58, and 64-65. I do not agree that AAM waived the dependent claims.

As for claim 34 and 35 in particular, there is an even stronger basis for concluding that the majority is wrong. At six locations in the Opening Brief, AAM argues that location of the liners is one of its inventive control characteristics. *Id.* at 63 ("controlling its characteristics (e.g., length, width, interference fit, *location*, etc.)"); *Id.* at 64-65 ("The '911 patent specifically teaches how to control the characteristics of a liner to not only match but damp relevant propshaft vibrations, including the thickness of

the liner, the interference fit, *the location of the liner*"); *Id.* at 13 ("The specification of the '911 patent further explains that liners are tuned for damping by controlling 'various characteristics' including . . . *location* of the liners within the propshaft"); *see also id.* at 35-36 (same). "One liner characteristic that can be controlled—"*location* of the liners 204 within the shaft member 200—is independent of its structure, e.g., its mass and stiffness." *Id.* at 42. And during oral argument, AAM explained that it did argue dependent limitations in the Opening Brief:

> "Q: I didn't see in the Blue Brief separate argument about features of the dependent claims?
>
> A: We certainly talked about the location of the liner, that's in our briefs, and talked about at length."

Oral Arg. at 30:50-31:01.

Given that the majority now *sua sponte* holds that claim 22 does not contain a location limitation, it is unfair to refuse to review the dependent claims which unquestionably have detailed location limitations. Claim 34 states: "The method of claim 22, wherein a first one of the liners is positioned along the shaft member symmetrically about a bending anti-node." Claim 35 further limits the location of a second liner placed in the shaft. Under these circumstances, it is fundamentally unfair for the majority to hold that AAM did not present arguments regarding the dependent claim limitations in its Opening Brief.

Finally, contrary to the majority's assertion (Maj. at 24), the petition for rehearing did not simply state that AAM did not waive arguments related to dependent claims. It pointed to three separate places in the Opening Brief (13-14, 57-59 and 64-65) where it expressly argued location of the liner. Given the Opening Brief's repeated arguments about location and the majority's nascent determination that claim 22 does not have a location limitation, it is wrong to hold AAM waived its arguments regarding dependent claims which contain location limitations.

Conclusion

The majority holds that claims are directed to natural laws and are ineligible under § 101 if practicing the method would require application of a natural law and *nothing more* to achieve the claimed results, even when all of the technical experts disagree. The majority has concluded that the *Nothing More* question will be decided on appeal as a matter of law, without briefing and argument, and without regard to what the experts think. I cannot fathom the confusion that will be caused by declaring that claims are ineligible as directed to a natural law, when it is clear to all involved that this patent does not recite any particular natural law. Every mechanical invention must apply the laws of physics—that does not render them all ineligible, or maybe it does now. Section 101 simply should not be this sweeping and this manipulatable. And the majority's collapse of the two-part *Alice/Mayo* test into a one-part test cannot stand. AAM has argued that there are unconventional elements in these claims, such as using a liner to attenuate bending mode vibrations; this is not the

natural law itself. The majority offers no explanation for why this patentee is not entitled to step two consideration, especially at this, the summary judgment stage.

Our job, our mandate from Congress is to create a clear, uniform body of patent law. Our inability to do so in the § 101 space has not been a mess of our making. But, the unfairness, confusion and uncertainty that will be caused by this opinion is all us. Today, we make a choice. I dissent from this choice to extend the notions of ineligibility and to extend the role of the appellate court. Section 112 adequately protects for exactly the concerns the majority expresses, though honestly, I see no enablement problem and none was raised by the defendant. I dissent from the majority's chimeric approach to § 101 which is inconsistent with precedent, a vast expansion of § 101, and bound to cause confusion in future cases.

I dissent from the conclusion that we judges are the true scientific experts. We should not be deciding technical questions, such as whether two types of vibration are reduced by application of Hooke's law and nothing more, as questions of law de novo on appeal.

APPENDIX B — ORDER ON MOTION OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, DATED OCTOBER 23, 2020

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2018-1763

AMERICAN AXLE & MANUFACTURING, INC.,

Plaintiff-Appellant,

v.

NEAPCO HOLDINGS LLC,
NEAPCO DRIVELINES LLC,

Defendants-Appellees.

Appeal from the United States District Court for the District of Delaware in No. 1:15-cv-01168-LPS, Chief Judge Leonard P. Stark.

ON MOTION

Before DYK, MOORE, and TARANTO, *Circuit Judges.*

Order for the court filed by *Circuit Judge* DYK.

Concurring opinion filed by *Circuit Judge* MOORE.

DYK, *Circuit Judge.*

Appendix B

ORDER

Plaintiff-appellant American Axle & Manufacturing, Inc. ("AAM") filed a motion to stay issuance of the mandate pending the filing of a petition for writ of certiorari in the Supreme Court. Defendants-appellees opposed the motion.

I

Federal Rule of Appellate Procedure 41 provides that a motion for stay of the mandate "must show that the petition would present a substantial question and that there is good cause for a stay." Fed. R. App. P. 41(d)(1). The Advisory Committee Notes state that "[t]he Supreme Court has established conditions that must be met before it will stay a mandate." Fed. R. App. P. 41, advisory committee's note to 1994 amendment (citing Robert L. Stern et al., *Supreme Court Practice* § 17.19 (6th ed. 1986)). In this respect, the Advisory Committee Notes refer to the standard established by the in-chambers opinions of the individual justices. *See* Stern et al., *supra*, § 17.19. The Supreme Court itself has approved this standard in *Hollingsworth v. Perry*, 558 U.S. 183, 190, 130 S. Ct. 705, 175 L. Ed. 2d 657 (2010).

This standard requires that the applicant show "(1) a reasonable probability that four Justices will consider the issue sufficiently meritorious to grant certiorari; (2) a fair prospect that a majority of the Court will vote to reverse the judgment below; and (3) a likelihood that irreparable harm will result from the denial of a stay. In close cases

the Circuit Justice or the Court will balance the equities and weigh the relative harms to the applicant and to the respondent." *Id.*

Chief Justice Roberts, acting as the Circuit Justice for this court, specifically applied that standard in a patent case, denying a stay solely for lack of irreparable injury. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 572 U.S. 1301, 1301-02, 134 S. Ct. 1621, 188 L. Ed. 2d 754 (2014) (Roberts, C.J., in chambers). After we held certain of Teva's patent claims invalid, Teva sought a stay in order to prevent market entry by the generic pharmaceutical company respondents. The Chief Justice noted that the first two requirements for a stay were met, because the Supreme Court had already granted certiorari and Teva had "shown a fair prospect of success on the merits." *Id.* at 1301. But he denied a stay because a likelihood of irreparable injury was not shown, explaining that "[r]espondents acknowledge[d] that, should Teva prevail . . . and its patent be held valid, Teva [would] be able to recover damages from respondents for past patent infringement" and therefore "the extraordinary relief that Teva [sought was] unwarranted." *Id.* at 1301-02.

As a matter of Federal Circuit law, we interpret the Rule as requiring application of the standard articulated by the Supreme Court in *Hollingsworth* and the Justices' in-chambers opinions. *See Biodex Corp. v. Loredan Biomedical, Inc.*, 946 F.2d 850, 858 (Fed. Cir. 1991) (Federal Circuit law, not regional circuit law, governs such matters).

Appendix B

II

In this case, AAM has not made the required showing of a likelihood of irreparable injury absent a stay. With respect to claim 22 and related claims, the decision of this court requires no further action by the district court since the claims have been held to be unpatentable. AAM argues that "[i]f the Supreme Court grants review and decides that the asserted claims of [AAM's patent] are patent eligible under § 101, this Court will have to recall its mandate to conform its disposition with such a decision." Mot. 14, ECF No. 136. This action, common to every case in which the Supreme Court does not affirm, is not irreparable harm.

With respect to claim 1 and related claims, the decision of this court remands to the district court for further proceedings. AAM argues that there is "good cause for a stay" because it "intends to petition for certiorari with regard to the entirety" of our judgment and argues that "[s]ignificant burdens and expenses would accrue" should the mandate issue because "the parties and district court would continue to litigate issues related to claim 1." *Id.* at 12-13. Continued litigation with respect to claim 1 cannot be irreparable injury. "Mere litigation expense, even substantial and unrecoupable cost, does not constitute irreparable injury." *Renegotiation Bd. v. Bannercraft Clothing Co.*, 415 U.S. 1, 24, 94 S. Ct. 1028, 39 L. Ed. 2d 123 (1974); *see also Commonwealth Oil Refin. Co. v. Lummus Co.*, 82 S. Ct. 348, 349, 7 L. Ed. 2d 334 (1961) (Harlan, J., in chambers) (denying motion for stay of the mandate where the only possible harm from denial of the stay was that it

could "set in motion the machinery for arbitration and . . . other matters affecting the possible future conduct of the arbitration"); *Nara v. Frank*, 494 F.3d 1132, 1133 (3d Cir. 2007) (need to "prepar[e] to commence trial within 120 days while simultaneously filing a petition for certiorari" was not irreparable injury under Rule 41); *United States v. Microsoft Corp.*, No. 00-5212, 2001 U.S. App. LEXIS 18715, 2001 WL 931170, at *1 (D.C. Cir. Aug. 17, 2001) (denying motion to stay mandate under Rule 41 because movant "failed to demonstrate any substantial harm that would result from the reactivation of proceedings in the district court during the limited pendency of the certiorari petition.").

AAM has cited no authority suggesting that the prospect of further district court proceedings while the case is on review could constitute irreparable injury. AAM points to the Practice Note to this court's Rule 41, which reminds litigants that their right to seek certiorari is unaffected by the issuance of the mandate and, "[c]onsequently, a motion to stay the mandate should advance reasons for the stay beyond the mere intention to apply for certiorari, e.g., to forestall action in the trial court or agency that would necessitate a remedial order of the Supreme Court if the writ of certiorari were granted." Fed. Cir. R. 41 practice note. But that Practice Note would not displace the governing stay standard if they conflicted. Even by its own terms, moreover, the Practice Note's language does not support a conclusion that the trial court proceedings that might occur regarding claim 1 and related claims would support a stay. Under the standard applied by the Supreme Court, this is not a situation in

which the Court would issue a "remedial order" staying our mandate if certiorari were granted since the only claimed irreparable injury is litigation cost.

We conclude that the irreparable injury requirement is not satisfied here. On this ground alone a stay is not warranted, quite apart from the merit or lack of merit of the petition for certiorari.

Accordingly,

IT IS ORDERED THAT:

The motion to stay the mandate pending the filing of a petition for writ of certiorari in the Supreme Court is denied.

October 23, 2020

FOR THE COURT
/s/ Peter R. Marksteiner

Peter R. Marksteiner
Clerk of Court

Appendix B

MOORE, *Circuit Judge*, concurring.

Today, we adopt the three-prong test for staying a mandate adopted by our sister circuits and several individual Justices. I write separately to elaborate on how those prongs apply here. While American Axle has established a reasonable probability that certiorari will be granted and a fair prospect that the majority of the Court will reverse, it fails to establish irreparable harm and thus a stay is not warranted.

I

The Supreme Court often grants certiorari to resolve circuit splits that render the state of the law inconsistent and chaotic. *See, e.g., Braxton v. United States*, 500 U.S. 344, 347, 111 S. Ct. 1854, 114 L. Ed. 2d 385 (1991) ("A principal purpose for which we use our certiorari jurisdiction . . . is to resolve conflicts among the United States courts of appeals and state courts concerning the meaning of provisions of federal law."); *see also Rogers v. Grewal*, 140 S. Ct. 1865, 1875, 207 L. Ed. 2d 1059 (2020) (Thomas, J., dissenting from the denial of certiorari) ("This case gives us an opportunity to provide lower courts with much-needed guidance, ensure adherence to our precedents, and resolve a Circuit split. Each of these reasons is independently sufficient to grant certiorari."). What we have here is worse than a circuit split—it is a court bitterly divided.

As the nation's lone patent court, we are at a loss as to how to uniformly apply § 101. All twelve active judges

of this court urged the Supreme Court to grant certiorari in *Athena* to provide us with guidance regarding whether diagnostic claims are eligible for patent protection. There is very little about which all twelve of us are unanimous, especially when it comes to § 101. We were unanimous in our unprecedented plea for guidance. But, as we acknowledged in our decisions in *Athena*, that holding was at heart a reticent application of *Mayo* to similar claims.

The current case is the progeny of neither *Alice* nor *Mayo*. It is our own dramatic expansion of a judicial exception to § 101. Section 101 is clear: "[w]hoever invents or discovers any new and useful process," like the claims here, "may obtain a patent." Yet, we have struggled to consistently apply the judicially created exceptions to this broad statutory grant of eligibility, slowly creating a panel-dependent body of law and destroying the ability of American businesses to invest with predictability. *See Smart Sys. Innovations, LLC v. Chicago Transit Auth.*, 873 F.3d 1364, 1377 (Fed. Cir. 2017) (Linn, J., dissenting-in-part and concurring-in-part) (characterizing § 101 doctrine as "indeterminate and often lead[ing] to arbitrary results"). Our confusion has driven commentators, amici, and every judge on this court to request Supreme Court clarification. *See Athena Diagnostics, Inc. v. Mayo Collaborative Servs.*, LLC, 927 F.3d 1333 (Fed. Cir. 2019). If a circuit split warrants certiorari, such an irreconcilable split in the nation's only patent court does likewise.

This case is a model of our divide. To be sure, natural laws are "basic tools of scientific and technological work," "free to all men and reserved exclusively to none." *Mayo*

Collaborative Servs. v. Prometheus Labs., Inc., 566 U.S. 66, 70-71, 132 S. Ct. 1289, 182 L. Ed. 2d 321 (2012). Before this case, we applied this exception narrowly, because "all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas," so "too broad an interpretation of this exclusionary principle could eviscerate patent law." *Id.* at 71. In a divided panel here, we struggled to marry these concepts into an administrable distinction between eligible and ineligible claims. The majority concluded *as a matter of law* that claims to a manufacturing process are not eligible for patent protection because they are directed to a law of nature even though no law of nature appears in the claims, the patent, or the prosecution history. Under the majority's new "Nothing More" test, claims are ineligible when they merely make use of a natural law. We have strayed too far from the text of the statute. I dissented, proposing that we follow the narrow test announced in *Alice* and that we refrain from usurping the district court's factfinding role. Equally divided in a 6-6 vote, the full court denied rehearing en banc and, in doing so, detailed its further divided views. *Am. Axle & Mfg., Inc. v. Neapco Holdings LLC*, 966 F.3d 1347, 1348 (Fed. Cir. 2020) (prompting two opinions concurring in the denial and three opinions dissenting from the denial). I believe American Axle has established that there is a reasonable probability certiorari will be granted.

II

The claims here are not directed to a business method, internet or financial method, the likes of which

the Court dealt with in *Alice* or *Bilski*. Nor does this case map onto the Court's holding in *Mayo* regarding the patent eligibility of diagnostic inventions, as did our decisions in *Ariosa* and *Athena*. Instead, our decision in *American Axle* is a patent killing judicial exception of our own creation. The claims here are directed to a process for manufacturing car parts—the type of process which has been eligible since the invention of the car itself. They do not preempt the use of a natural law, a building block of science, which should be freely available to all. To nonetheless hold these claims ineligible, the majority broadens the judicial exceptions in a way that threatens to swallow the whole of the statute. *See Am. Axle & Mfg., Inc. v. Neapco Holdings LLC*, 967 F.3d 1285 (Fed. Cir. 2020), *reh'g denied*, 966 F.3d 1347, 1365 (Stoll, J., dissenting) ("I grow more concerned with each passing decision that we are, piece by piece, allowing the judicial exception to patent eligibility to 'swallow all of patent law.'") (quoting *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 217, 134 S. Ct. 2347, 189 L. Ed. 2d 296 (2014) and citing *Mayo*, 566 U.S. at 70-73). Such a rejection of the plain language of the patent statute in favor of a vast and amorphous judicial exception in which we Federal Circuit judges get to decide *de novo* not just the legal principles, but the application of the science itself, cannot stand. American Axle has established a fair probability that the Supreme Court will reverse.

The Supreme Court has often corrected this court when we have defied precedent or strayed from our mandate by claiming *de novo* dominion over factual issues. *See, e.g., Halo Elecs., Inc. v. Pulse Elecs., Inc.*,

136 S. Ct. 1923, 1931-34, 195 L. Ed. 2d 278 (2016); *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 324-27, 135 S. Ct. 831, 190 L. Ed. 2d 719 (2015); *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 407, 127 S. Ct. 1727, 167 L. Ed. 2d 705 (2007). We repeat this mistake again. We hold *as a matter of law* that the claimed result (a reduction in two types of vibration in a drive shaft) was achieved by nothing more than a natural law that appeared nowhere in the claims, patent or prosecution history. We approach as a question of law whether the vibrations in the drive shaft were reduced by application of Hooke's Law and nothing more. And in doing so, we reject the undisputed testimony of both experts. This is simply not our role as appellate judges. American Axle has established a fair prospect that the Supreme Court will reverse our usurpation of the district court's fact-finding role and our decision to expand the natural law exception to cover an automotive manufacturing process in direct contravention of the plain statutory language.

III

Our remand to the district court of claim 1 and its dependent claims will surely cause redundant, expensive process. We unanimously held that claim 1 and its dependent claims are not directed to a natural law. But as the majority explained: "On appeal, Neapco relied on both the natural law and abstract idea categories of ineligibility in defending the district court's decision. But the abstract idea basis was not adequately presented and litigated in the district court." *Am. Axle*, 967 F.3d at 1300-01. Still, the majority ordered the district court to

consider the abstract idea arguments on remand. Whether a claim is directed to Hooke's Law is a different question than whether a claim is directed to an abstract idea. I dissented from our remand which requires the district court to consider a defense which we concluded was not adequately presented and litigated. Whether to allow such a new defense ought to be within the sound discretion of the district court, but the majority's remand dictates otherwise. The court and parties will now be forced to undertake significant, expensive and burdensome process addressing this new defense.

Due process demands that American Axle be given the "opportunity to be heard at a meaningful time and in a meaningful manner" regarding Neapco's new arguments. *Mathews v. Eldridge*, 424 U.S. 319, 333, 96 S. Ct. 893, 47 L. Ed. 2d 18 (1976) (internal quotation marks omitted). Therefore, discovery must be reopened, new expert reports permitted, and new summary judgment briefing allowed. And since the defendant gets to challenge these patent claims on an entirely different ground (abstract idea versus natural law), American Axle as the patentee is free to make whatever arguments it chooses in defense—such as arguments regarding the factual underpinnings of the second part of the *Alice-Mayo* test and the level of detailed structure present in the dependent claims. The majority's forced do-over works both ways. And depending on the actions of the Supreme Court, there could be significant wasteful, duplicative or parallel process, including on American Axle's dependent claims, which we refused to separately address. Or American Axle may choose to seek certiorari on the propriety of our remand as to claim 1,

and the Supreme Court may determine that our remand instructions were improper.

Although American Axle faces significant expense and potentially duplicative process, this is not irreparable harm. Thus, I join the majority's adoption of the three-prong test and its decision that we cannot stay the mandate in this case under these circumstances. It bears noting, however, that although we have not stayed our mandate, the district court retains "the power to stay proceedings" as to claim 1 and the dependent claims, which "is incidental to the power inherent in every court to control the disposition of the causes on its docket with economy of time and effort for itself, for counsel, and for litigants." *Landis v. N. Am. Co.*, 299 U.S. 248, 254, 57 S. Ct. 163, 81 L. Ed. 153 (1936) (reviewing decision to stay for an abuse of discretion).

APPENDIX C — OPINION AND DISSENT OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, DATED OCTOBER 3, 2019

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2018-1763

AMERICAN AXLE & MANUFACTURING, INC.,

Plaintiff-Appellant,

v.

NEAPCO HOLDINGS LLC,
NEAPCO DRIVELINES LLC,

Defendants-Appellees.

October 3, 2019, Decided

Appeal from the United States District Court for the District of Delaware in No. 1:15-cv-01168-LPS, Chief Judge Leonard P. Stark.

Before DYK, MOORE, and TARANTO, *Circuit Judges*.

Opinion for the court filed by *Circuit Judge* DYK.

Dissenting opinion filed by *Circuit Judge* MOORE.

DYK, *Circuit Judge*.

Appendix C

American Axle & Manufacturing, Inc. ("AAM") sued Neapco Holdings LLC and Neapco Drivelines LLC (collectively, "Neapco") alleging infringement of claims of U.S. Patent No. 7,774,911 ("the '911 patent").[1] The parties filed cross-motions for summary judgment as to the eligibility of the asserted claims of the '911 patent under 35 U.S.C. § 101. The district court granted Neapco's motion and held that the asserted claims are ineligible under § 101. We agree and therefore affirm.

Background

I

The '911 patent generally relates to a method for manufacturing driveline propeller shafts ("propshafts") with liners that are designed to "attenuat[e] . . . vibrations transmitted through a shaft assembly." '911 patent, col. 1, ll. 6-7. Propshafts are "employed [in automotive vehicles] to transmit rotary power in a driveline." *Id.* col. 1, ll. 38-39. Because these propshafts are typically made of a "relatively thin-walled steel or aluminum tubing [they] can be receptive to various driveline excitation sources." *Id.* col. 1, ll. 40-42. These excitation sources, in turn, can

1. AAM's complaint alleged infringement of two other patents—U.S. Patent Nos. 8,176,613 ("the '613 patent") and 8,528,180 ("the '180 patent"). During claim construction, the district court held the asserted claims of the '613 patent indefinite. Neapco Mot. for Summary Judgment at 3, *American Axle & Manuf., Inc. v. Neapco Hldgs. LLC*, No. 15-01168 (D. Del. Aug. 11, 2017), ECF No. 150. AAM also dropped the asserted claims of the '180 patent. *Id.* Neither the '613 nor the '180 patent is at issue on appeal.

cause the propshaft to vibrate in three modes: bending mode, torsion mode, and shell mode. *Id.* col. 1, ll. 42-44. The '911 patent describes these vibration modes as follows:

> Bending mode vibration is a phenomenon wherein energy is transmitted longitudinally along the shaft and causes the shaft to bend at one or more locations. Torsion mode vibration is a phenomenon wherein energy is transmitted tangentially through the shaft and causes the shaft to twist. Shell mode vibration is a phenomenon wherein a standing wave is transmitted circumferentially about the shaft and causes the cross-section of the shaft to deflect or bend along one or more axes.

Id. col. 1, ll. 44-52. These vibration modes correspond to different frequencies. Because such vibrations cause undesirable noise, "techniques [had, prior to the '911 patent,] been employed to attenuate vibrations in propshafts including the use of weights and liners." *Id.* col. 1, ll. 53-54.

One prior art method of attenuation involved the use of liners. Liners are hollow tubes made of a fibrous material (like cardboard) with outer resilient members that "frictionally engage the inner diameter of the [propshaft]." *Id.* col. 6, ll. 56-65. Liners, like propshafts, vibrate at different frequencies, and depending on the frequencies at which they vibrate, may damp the vibration of the propshaft into which they are inserted. When certain variables related to the liner are changed (i.e.,

when the liner is "tuned"), the frequencies at which that liner vibrates, and therefore the liner's ability to damp the vibration of that propshaft, changes. *See, e.g., id.* col. 7-8. It was known in the prior art to alter the mass and stiffness of liners to alter their frequencies to produce dampening. Indeed, this was sufficiently well known that prior art patents disclosed the use of particular materials to achieve dampening. *See, e.g., id.* col. 2, lines 5-37.

Other prior art methods of dampening also existed, including the use of weights. For example, the '911 patent describes plugs or weights that are inserted to frictionally engage a propshaft and act as resistive attenuation means to damp bending mode vibrations. *Id.* col. 1, line 53-col. 2, l. 4. The patent also discloses a prior art damper that is inserted into a hollow shaft and frictionally engages the inside of the shaft by using a pair of resilient members. *Id.* col. 2, ll. 5-10.

Two types of attenuation are relevant here: resistive attenuation and reactive attenuation. "[R]esistive attenuation of vibration refers to a vibration attenuation means that deforms as vibration energy is transmitted through it . . . so that the vibration attenuation means absorbs . . . the vibration energy." *Id.* col. 1, ll. 61-65. A liner that is properly tuned to attenuate shell mode vibration through resistive attenuation "matches" the shell mode vibration (i.e., a particular natural frequency) of the propshaft such that it absorbs the shell mode vibration of the propshaft. J.A. 2000-02. "[R]eactive attenuation of vibration refers to a mechanism that can oscillate in opposition to the vibration energy [of the propshaft] to

thereby 'cancel out' a portion of the vibration energy." '911 patent, col. 2, ll. 15-18. Thus, to design a liner to perform reactive attenuation of a bending mode vibration "the liner frequency must match the propshaft frequency and involve translation of the liner to effectively couple with the propshaft bending mode." AAM Op. Br. 6 (citing J.A. 2076-77, 4036-37, 5218).

The district court treated independent claims 1 and 22 of the '911 patent as representative of the asserted claims (claims 1-6, 12, 13, 19-24, 26, 27, 31, 34-36). Those two claims recite:

> 1. 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 at least one liner to attenuate at least two types of vibration transmitted through the shaft member; and
>
> positioning the at least one liner within the shaft member such that the at least one liner is configured to damp shell mode vibrations in the shaft member by an amount that is greater

than or equal to about 2%, and the at least one liner is also configured to damp bending mode vibrations in the shaft member, the at least one liner being tuned to within about ±20% of a bending mode natural frequency of the shaft assembly as installed in the driveline system.

* * *

22. 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.

'911 patent, col. 10, ll. 10-27; *id.* col. 11, ll. 24-36 (emphases added). The district court construed the term tuning to mean "controlling the mass and stiffness of at least one liner to configure the liner to match the relevant frequency or frequencies." J.A. 15. No party contests the district court's construction on appeal.

According to the '911 patent's specification, prior art liners, weights, and dampers that were designed to individually attenuate each of the three propshaft vibration modes—bending, shell, and torsion—already existed. '911 patent, col. 1, l. 53-col. 2, l. 38. But these prior art damping methods were assertedly not suitable for attenuating two vibration modes simultaneously. *See id.* Thus, the patent identified "a need in the art for an improved method for damping various types of vibrations in a hollow shaft" that "facilitates the damping of shell mode vibration as well as the damping of bending mode vibration" simultaneously. *Id.* col. 2, ll. 39-43. AAM argues that the inventive concept to which these claims are directed is the tuning of a liner in order to produce frequencies that dampen both the shell mode and bending mode vibrations simultaneously.

AAM urges both that it "conceiv[ed] of the novel and unconventional concept of 'tuning' a liner," and that it conceived of a tuned liner that "unlike previous dampers and absorbers . . . [can] dampen multiple types of vibration" simultaneously. AAM Op. Br. 13. AAM explains that "particular liners that are specifically tuned to match and damp multiple vibration modes and are utilized to manufacture improved propshafts . . . w[ere] entirely

new and far from well-understood" at the time of the '911 patent. AAM Op. Br. 27. Neither the claims nor the specification describes how to achieve such tuning. The specification also discloses a solitary example describing the structure of a tuned liner, but does not discuss the process by which that liner was tuned. '911 patent, col. 8, ll. 4-23.

II

AAM sued Neapco on December 18, 2015, alleging infringement of the '911 patent. The parties filed cross-motions for summary judgment as to patent eligibility under § 101. On February 27, 2018, the district court granted Neapco's motion for summary judgment, and denied AAM's cross-motion, holding that the asserted claims of the '911 patent were invalid because they claim ineligible subject matter under § 101.

The district court concluded that "the Asserted Claims as a whole are directed to laws of nature: Hooke's law and friction damping." J.A. 10. The district court held that the claims' direction to tune a liner to attenuate to different vibration modes amounted to merely "instruct[ing] one to apply Hooke's law to achieve the desired result of attenuating certain vibration modes and frequencies" without "provid[ing] [a] particular means of how to craft the liner and propshaft in order to do so." J.A. 17. Hooke's law is an equation that describes the relationship between an object's mass, its stiffness, and the frequency at which the object vibrates. Friction damping is damping that "occur[s] due to the resistive friction and interaction of

two surfaces that press against each other as a source of energy dissipation." J.A. 1604. Because the district court determined that the claimed "additional steps consist of well-understood, routine, conventional activity already engaged in by the scientific community . . . and those steps, when viewed as a whole, add nothing significant beyond the sum of their parts taken separately," it concluded that the claims were not patent eligible. J.A. 16 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 79-80, 132 S. Ct. 1289, 182 L. Ed. 2d 321 (2012)).

AAM appeals. We have jurisdiction under 28 U.S.C. § 1291. We review a district court's grant of summary judgement de novo, applying the same test on review that the district court applied. Summary judgment is appropriate where "there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). The issue of patent eligibility under § 101 is a question of law, reviewed de novo. *In re BRCA1- and BRCA2- Based Hereditary Cancer Test Patent Litig.*, 774 F.3d 755, 759 (Fed. Cir. 2014). "While patent eligibility is ultimately a question of law," the underlying issue of "[w]hether something is well-understood, routine, and conventional to a skilled artisan at the time of the patent is a factual determination." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1369 (Fed. Cir. 2018).

Discussion

Section 101 provides that "any new and useful process, machine, manufacture, or composition of matter, or any

new and useful improvement thereof" may be eligible to obtain a patent. 35 U.S.C. § 101. But the Supreme Court has long recognized that § 101 "contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable." *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589, 133 S. Ct. 2107, 186 L. Ed. 2d 124 (2013) (brackets omitted) (quoting *Mayo*, 566 U.S. at 70). The Supreme Court has stated that "without this exception, there would be considerable danger that the grant of patents would 'tie up' the use of such tools and thereby 'inhibit future innovation premised upon them.'" *Id.* (quoting *Mayo*, 566 U.S. at 73).

Our analysis of § 101 follows the Supreme Court's two-step test established in *Mayo* and *Alice Corp. Pty. Ltd. v. CLS Bank International*, 573 U.S. 208, 134 S. Ct. 2347, 82 L. Ed. 2d 296, 189 L. Ed. 2d 296 (2014). At step one of the *Mayo/Alice* test, we ask whether the claims are directed to a law of nature, natural phenomenon, or abstract idea. *Alice*, 573 U.S. at 217 (citing *Mayo*, 566 U.S. at 77). If the claims are so directed, we then ask whether the claims embody some "inventive concept"—i.e., whether the claims contain "an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.'" *Id.* at 217-18 (brackets omitted) (quoting *Mayo*, 566 U.S. at 72-73).

I

To determine what the claims are "directed to" at step one, we look to the "focus of the claimed advance."

See, e.g., Trading Techs Int'l, Inc. v. IBG LLC, 921 F.3d 1378, 1384 (Fed. Cir. 2019).[2] There is no legal principle that a claim to a method of manufacturing cannot be directed to a natural law, nor are there any cases saying so. The '911 patent discloses a method of manufacturing a driveline propshaft containing a liner designed such that its frequencies attenuate two modes of vibration simultaneously.

The claims are directed to tuning liners—i.e., "controlling a mass and stiffness of at least one liner to configure the liner to match the relevant frequency or frequencies." J.A. 15. As is clear from the specification itself, most aspects of the '911 patent were well known in the art. It was known that driveline propshafts were prone to bending, shell, and torsion mode vibrations. '911 patent, col. 1, ll. 38-52. It was known that shell mode vibrations could be damped by resistive attenuation and that bending mode vibrations could be damped by reactive attenuation. *Id.* col. 1, l. 53-col. 2, l. 38. It was also known that a liner or weight could be designed specifically to have a frequency that would allow it to function as either a resistive attenuation means or as a reactive attenuation means. *Id.* AAM does not dispute that these features were known in the art. AAM agrees that the selection

2. *Accord Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1338 (Fed. Cir. 2017); *Intellectual Ventures I LLC v. Erie Indemnity Co.*, 850 F.3d 1315, 1325 (Fed. Cir. 2017); *Affinity Labs of Tex., LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257-58 (Fed. Cir. 2016); *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016); *Genetic Techs. Ltd. v. Merial LLC*, 818 F.3d 1369, 1375-76 (Fed. Cir. 2016).

of frequencies for the liners to damp the vibrations of the propshaft at least in part involves an application of Hooke's law.

Hooke's law is a natural law that mathematically relates the mass and/or stiffness of an object to the frequency with which that object oscillates (vibrates). Here, both parties' witnesses agree that Hooke's law undergirds the design of a liner so that it exhibits a desired damping frequency pursuant to the claimed invention. For example, Neapco's expert, Dr. Becker, stated that the tuning limitations claim "nothing more than Hooke's law . . . [and/or] the law of nature / natural phenomenon for friction damping." J.A. 1603-05. Dr. Sun, one of the named inventors of the '911 patent, stated in his deposition:

> Q. But to change the frequency of any damper, it comes down to basic physics, doesn't it; changing the mass or the stiffness of that damper that will adjust the frequency?
>
> A. You change a tuned liner, yeah, by adjusting the controlling variables and to get to the tuning that is needed.
>
> Q. And one of those variables is stiffness, correct?
>
> A. Correct.
>
> Q. And one of them is the mass, correct?
>
> A. Yes.

J.A. 1757 (92:15-25). AAM's engineering manager likewise admitted that "if [one] do[es] something to control the stiffness [or mass]" of a liner—the variables directly implicated by Hooke's law—that person is "directly controlling tuning." J.A. 2547 (20:23-21:1). At the same time, the patent claims do not describe a specific method for applying Hooke's law in this context. They simply state that the liner should be tuned to dampen certain vibrations. Thus, the problem is that the claims' instruction to tune a liner essentially amounts to the sort of directive prohibited by the Supreme Court in *Mayo*—i.e. "simply stat[ing] a law of nature while adding the words 'apply it.'" 566 U.S. at 72.

But AAM argues that the claims are not merely directed to Hooke's law. AAM points to testimony suggesting that tuning a liner such that it attenuates two different vibration modes is a process that involves more than simple application of Hooke's law. For example, AAM's expert, Dr. Rahn, testified that a "liner is not a spring with a single stiffness, it is a complex, distributed object with different stiffnesses in different directions (e.g., shell and bending) that depend on the location of the applied force and the measured displacement." J.A. 1928. Dr. Rahn in numerous instances explained that liners are different from a single spring-mass system as they "can bounce, they can rock, they can deform, [and] they can bend." J.A. 2505 (137:2-4). In essence, AAM's argument is that the system of the invention (a driveline propshaft and its liner) is too complex to be described by mere application of Hooke's law, which itself is a simple approximation of a single-degree-of-freedom spring-

mass system. AAM also appears to argue that liners had not previously been used to dampen bending mode—as opposed to shell mode—vibrations.[3]

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3. Contrary to the dissent at 6-7, the majority does not assert that this point was not disputed on appeal. Although raised on appeal, this argument by AAM was not properly raised below. In the district court, AAM did not make this claim in arguing for § 101 eligibility in any of its relevant summary judgment filings—its motion for summary judgment in its favor, its reply in support of that motion, or its opposition to Neapco's motion for summary judgment. *See* J.A. 4330-36, 5236-37, 6094-96; *see also* J.A. 6194, 7049 (supplemental summary judgment briefings). Instead, in those filings, AAM identified as an inventive concept only the idea of dual-mode dampening we have identified. *See* J.A. 4330-36, 5236-37, 6094-96, 6194. Only at the oral hearing on summary judgment, after the papers that defined the issue were complete, did AAM make this claim—in passing in one sentence, before immediately invoking the dual-mode dampening notion as the inventive concept. J.A. 7193-94.

And the argument is not supported by the patent specification. While noting that certain prior art liners ("[t]hese liners" referenced at col. 2, lines 23-38 of the '911 patent) did not dampen bending mode vibrations, no suggestion that prior art liners generally did not attenuate bending mode vibrations appears in the patent specification; and the specification notes that "the damper of the [1963] '406 patent appears to be a reactive damper for attenuating bending mode vibration." '911 patent, col. 2, lines 13-15 (citing U.S. Patent No. 3,075,406). The '911 specification makes clear that this damper is a "liner" by incorporating the '361 patent "as if fully set forth in its entirety." '911 patent, col. 6, lines 49-53. The incorporated '361 patent states: "Various kinds of vibration dampers have been proposed heretofore. *Typical of such dampers are the liners disclosed in U.S. Patent No[]. . . 3,075,406* . . . ." U.S. Patent No. 4,909,361, col. 1, lines 16-18. Moreover, AAM's own testing data shows that prior art liners did in fact dampen bending mode vibrations, as admitted by Dr. Sun, one of the named inventors of the '911 patent.

The problem with AAM's argument is that the solution to these desired results is not claimed in the patent. We have repeatedly held that features that are not claimed are irrelevant as to step 1 or step 2 of the *Mayo/Alice* analysis. *Alice*, 573 U.S. at 221 ("[W]e must examine the *elements of the claim* to determine whether it contains an 'inventive concept.'" (emphasis added)); *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1149 (Fed. Cir. 2016) ("The § 101 inquiry must focus on the language of the Asserted Claims themselves."); *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) (rejecting alleged inventive concept because it was "not the invention *claimed* by the . . . patent" (emphasis added)); *see also Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 809 F.3d 1282, 1286 (Fed. Cir. 2015) (Lourie, J., concurring) (noting that the appropriate focus is "on the *claims we have* rather than those we might have had" (emphasis added)).

The elements of the method here that AAM argues take the patent outside the realm of ineligible subject matter—i.e., the mechanisms for achieving the desired result—are not actually claimed in claim 1 or claim 22 of the patent. To be sure, as AAM indicates in its brief, the process of tuning a liner may involve extensive computer modelling and experimental modal analysis, a process

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Patentee's technical expert suggested that certain types of liners have not previously been used to significantly dampen specific modes of vibration. Yet the representative claims are not limited to any type of liner or the dampening of specific bending modes. In any case, it makes no difference to the section 101 analysis whether the use of liners to attenuate bending mode vibrations was known in the prior art.

utilized in the prior art. But even the patent specification recites only a nonexclusive list of variables that can be altered to change the frequencies exhibited by a liner and a solitary example of a tuned liner (though not the process by which that liner was tuned).[4] Most significantly, the claims do not instruct how the variables would need to be changed to produce the multiple frequencies required to achieve a dual-damping result, or to tune a liner to dampen bending mode vibrations.

The trial-and-error process for determining the desired frequencies was well-known. AAM makes clear in its opening brief that "methods for determining natural frequencies and damping are well known in the art," including "testing for natural frequencies and damping of propshafts by performing experimental modal analysis." AAM Op. Br. 8-11. While AAM may have discovered patentable refinements of this process, such as "us[ing]

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4. The patent discloses a nonexclusive list of variables related to a liner that can be altered to change the frequencies exhibited by the liner so that the liner attenuates certain vibration modes of the propshaft. These variables include:

> mass, length and outer diameter of the liner 204, diameter and wall thickness of the structural portion 300, material of which the structural portion 300 was fabricated, the quantity of resilient members 302, the material of which the resilient members 302 was fabricated, the helix angle 330 and pitch 332 with which the resilient member 302 are fixed to the structural portion 300, the configuration of the lip member(s) 322 of the resilient member 302, and the location of the liners 204 within the shaft member 200.

'911 patent, col. 7, l. 60-col. 8, l. 2.

sophisticated FEA [finite element analysis] models during its design process," *id.* at 45, neither the specifics of any novel computer modelling nor experimental modal analysis are disclosed in the patent, much less included in the claims themselves, and these unclaimed features cannot function to remove claims 1 and 22 from the realm of ineligible subject matter. *See ChargePoint*, 920 F.3d at 766. This case might well be significantly different, if, for example, specific FEA models were included in the claims. But, the claims' general instruction to tune a liner amounts to no more than a directive to use one's knowledge of Hooke's law, and possibly other natural laws, to engage in an ad hoc trial-and-error process of changing the characteristics of a liner until a desired result is achieved.

The claiming of a natural law runs headlong into the very problem repeatedly identified by the Supreme Court in its cases shaping our eligibility analysis. *See Mayo*, 566 U.S. at 71-73; *Parker v. Flook*, 437 U.S. 584, 590-95, 98 S. Ct. 2522, 57 L. Ed. 2d 451 (1978); *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94-101, 59 S. Ct. 427, 83 L. Ed. 506, 1939 Dec. Comm'r Pat. 857 (1939); *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 112-17, 14 L. Ed. 601 (1854). As the Supreme Court stated in *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 174-75, 14 L. Ed. 367 (1853), "[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." The same approach is embodied by this court's case law.[5]

5. *See e.g., ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 769-70 (Fed. Cir. 2019) (finding claims directed to abstract idea where broad claim language "would cover any mechanism for

This distinction between results and means is fundamental to the step 1 eligibility analysis, including in law-of-nature cases, not just abstract-idea cases. *See Diamond v. Diehr*, 450 U.S. 175, 191, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981) ("We recognize, of course, that when a claim recites a mathematical formula (*or scientific principle or phenomenon of nature*), an inquiry must be made into whether the claim is seeking patent protection for that formula in the abstract." (emphasis added)). In *Interval Licensing*, we reiterated the importance of this distinction in describing prior Supreme Court cases in which inventors "lost . . . claim[s] that encompassed all solutions for achieving a desired result" because "the

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implementing network communication on a charging station" rather than a specific way of doing so); *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1345-46 (Fed. Cir. 2018) (claims ineligible "because they consist of generic and conventional information acquisition and organization steps that are connected to, but do not convert, the abstract idea . . . into a particular conception of *how to carry out* that concept" (emphasis added)); *Electric Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1355-56 (Fed. Cir. 2016); *see also Innovation Sci., LLC v. Amazon.com, Inc.*, F. App'x , 2019 U.S. App. LEXIS 19753, 2019 WL 2762976, at *4 (Fed. Cir. 2019) (claim directed to patent ineligible matter where it "s[ought] to capture the broad concept of switching to a more secure server, rather than a specific way to do so"); *Univ. of Fla. Research Found., Inc. v. Gen. Elec. Co.*, 916 F.3d 1363, 1368 (Fed. Cir. 2019) (finding claims to be "directed to an abstract idea" where "[n]either the '251 patent, nor its claims, explains *how* the drivers do the conversion that UFRF points to."); *Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1337 (Fed. Cir. 2017) ("The claim requires the functional results of 'converting,' 'routing,' 'controlling,' 'monitoring,' and 'accumulating records,' but does not sufficiently describe how to achieve these results in a non-abstract way.").

claims failed to recite a practical way of applying an underlying idea . . . [and] instead were drafted in such a result-oriented way that they amounted to encompassing 'the principle in the abstract' no matter how implemented." 896 F.3d at 1343; *see also Electric Power*, 830 F.3d at 1355-56 (noting that "the essentially result-focused, functional character of claim language has been a frequent feature of claims held ineligible under § 101"). The same reasoning is applicable here, notwithstanding the fact that the patent here is directed to a natural law rather than an abstract idea.

The Supreme Court's analysis in *Parker v. Flook* reinforces our conclusion that a claim to a natural law concept without specifying the means of how to implement the concept is ineligible under section 101. In *Flook*, the Supreme Court considered the patent eligibility of a method for updating alarm limits during catalytic conversion processes. 437 U.S. at 585. The method involved an initial step of measuring temperature, a second step of using a formula to calculate an updated alarm-limit value, and a final step in which the alarm limit is adjusted to the updated value. *Id.* But the patent "d[id] not purport to explain how to select . . . any of the . . . variables" involved, nor did it "purport to contain any disclosure relating to the chemical process at work, the monitoring of process variables, or the means of setting off an alarm or adjusting an alarm system." *Id.* at 586, 588. The patentee argued that the inventive part of the patent was the mathematical formula used in the second step of the claimed method. *Id.* at 588. The patentee further contended that his claimed invention should be patent eligible because it was limited

to a particular process and involved post-solution activity that ensured that the patent did not "wholly preempt [use of] the mathematical formula." *Id.* at 589-90.

Nevertheless, the Court held that the patent contained no patent-eligible invention. *Id.* at 594. The Court explained that "if a claim is directed essentially to a method of calculating, using a mathematical formula, even if the solution is for a specific purpose, the claimed method is nonstatutory." *Id.* at 595 (quoting *In re Richman*, 563 F.2d 1026, 1030 (C.C.P.A. 1977)). It first noted that limiting the law of nature described in the patentee's mathematical formula to application in a specific process did not transform the subject matter to which the patent was directed into eligible matter. *Id.* at 593. Though the Court went on to state that the use of a mathematical formula or law of nature did not alone make a claim patent ineligible, it explained that what was required was "an inventive application of the principle." *Id.* at 593-94. Such an inventive application, the Court concluded, was not present in the patented method. The process to which the claims were directed (catalytic conversion of hydrocarbons) was well known, as were the use of alarm limits to trigger alarms, repeated recalculation and readjustment of alarm-limit values, and the use of computers for automatic monitoring-alarming. *Id.* at 594. Because the Court found that the purportedly new formula itself was only a mathematical one, which it deemed a "principle" akin for eligibility analysis to an existing natural relationship, *id.* at 589, and given that nothing else in the patent claims exhibited more than conventional pre- and post-solution activity, it concluded

that the patent was directed to nonstatutory matter. *Id.* at 594-95.

Diehr, on the other hand, involved a situation in which a patent claimed a new and specific process of molding rubber products "which incorporate[d] in it a more efficient solution of the [Arrhenius] equation" (a natural law). 450 U.S. at 188. Though the Supreme Court in *Diehr* explained that a mathematical formula itself was not patent eligible subject matter, it concluded that the alleged invention claimed in that case was patent eligible. The invention involved a new rubber-curing process with a specific and detailed series of steps (one of which included the use of a natural law) that limited the possibility of preempting the natural law itself. *Id.* at 187-88, 191-92. In *Diehr*, unlike this case, "[t]hese other steps apparently added to the formula something that in terms of patent law's objectives had significance—they transformed the process into an inventive application of the formula." *Mayo*, 566 U.S. at 81 (discussing *Diehr*, 450 U.S. at 187). Nevertheless, the Court reaffirmed *Flook*'s teaching that "[a] mathematical formula does not suddenly become patentable subject matter simply by having the applicant acquiesce to limiting the reach of the patent for the formula to a particular technological use" nor through the addition of "token postsolution activity." *Diehr*, 450 U.S. at 191-92 & n.14.

Like the claims in *Flook*, the claims of the '911 patent are directed to the utilization of a natural law (here, Hooke's law and possibly other natural laws) in a particular context. As in *Flook*, where the patent did not

disclose how variables were measured nor the means by which the alarm system functioned, the claims here do not disclose how target frequencies are determined or how, using that information, liners are tuned to attenuate two different vibration modes simultaneously. The claims here simply instruct the reader to tune the liner—a process that, as explained above, merely amounts to an application of a natural law (Hooke's law) to a complex system without the benefit of instructions on how to do so.[6] The breadth of these claims is illustrated by AAM's admission during the claim construction hearing that one could infringe the claims of the '911 patent "[e]ven if you didn't try to [tune] and didn't know you did it." J.A. 699.

Finally, though we recognize that AAM may be correct in its assertion that the system involved in the '911 patent is more complex than just a bare application of Hooke's law, and that other laws of nature may be relevant, that does not render the subject matter patent eligible. What is missing is any physical structure or steps for achieving the claimed result of damping two different types of vibrations. The focus of the claimed advance here

6. The specification makes this much clear, as it describes tuning in terms of the result achieved, rather than the particular process by which the result is accomplished. For instance, the specification states that "a liner 204 will be considered to be tuned to a relevant frequency if it is effective in attenuating vibration at the relevant frequency." '911 patent, col. 8, ll. 28-31. Later in the same column, the patent gives an example of a "liner [that is] considered to be tuned to a relevant shell mode frequency if it damps shell mode vibrations by an amount that is greater than or equal to about 2%." *Id.* at col. 8, ll. 44-47. This makes clear that the concept of tuning embodied by the patent is merely results-oriented.

is simply the concept of achieving that result, by whatever structures or steps happen to work.

The dissent suggests that the failure of the claims to designate how to achieve the desired result is exclusively an issue of enablement. Dissent Op. at 2, 11-14. Both the Supreme Court cases and our cases addressing section 101 have held otherwise, as the earlier discussion demonstrates. Enablement is concerned with whether the "the specification of a patent... teach[es] those skilled in the art how to make and use the full scope of the claimed invention." *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993). Section 101 is concerned with whether the claims at issue recite a natural law, not whether the specification has adequately described how to make and use the concretely claimed structures and steps. The Supreme Court in *Mayo* made clear that section 101 serves a different function than enablement. *Mayo*, 566 U.S. at 90 ("[T]o shift the patent-eligibility inquiry entirely to these later [statutory] sections risks creating significantly greater legal uncertainty, while assuming that those sections can do work that they are not equipped to do."). Moreover, even if, as the dissent says, the specification gives one adequately concrete embodiment, which we need not decide, that is not enough: *O'Reilly* established long ago that an inadequately concrete claim is not saved from ineligibility by the presence of adequate concrete recitations in the specification or in other claims. 56 U.S. at 112-20 (holding eighth claim ineligible while upholding first seven claims).

Appendix C

II

As to *Mayo/Alice* step 2, nothing in the claims qualifies as an "inventive concept" to transform the claims into patent eligible matter. AAM contends that the claims include numerous inventive concepts that were neither previously known, nor conventional or routine. AAM's arguments in this respect essentially amount to an assertion that prior to the '911 patent, liners had never been tuned to damp propshaft vibrations and, more specifically, liners had not been used to damp two different vibration modes simultaneously. This amounts to no more than an elaborated articulation of its reasons as to why the claims are not directed to a natural law (reasons we have already rejected).

The claimed advance is simply controlling various known characteristics of the liner so as to achieve attenuation of two vibration modes simultaneously, whether that is by changing the mass or thickness of the liner, altering the location of the liner in the propshaft, or modifying any other physical attributes that will produce the claimed dual-attenuation. AAM admits that it was well known "in the automotive industry [to] test for natural frequencies and damping of propshafts by performing experimental modal analysis." AAM Op. Br. 8. As explained above, this direction to engage in a conventional, unbounded trial-and-error process does not make a patent eligible invention, even if the desired result to which that process is directed would be new and unconventional.

Nor does the direction in claim 1 to "position" the liner within the propshaft add an inventive concept. Under the claim language itself, and as reaffirmed by the district court's now-undisputed construction, positioning is not part of tuning. And even if it were, the specification makes clear that it was well known to position dampers in the propshaft so as to maximize vibration damping. *See, e.g.*, '911 patent, col. 1, ll. 57-60. Notably, AAM does not appear to argue that positioning was more than conventional. In listing alleged inventive concepts in its opening brief, AAM does not include positioning.

The remaining steps of claims 1 and 22, like the steps involved in the *Flook* patent, amount to no more than conventional pre- and post-solution activity. As the Supreme Court made clear in *Flook*, neither such conventional additions, nor the limiting of the use of a natural law or mathematical formula to a particular process suffices to create patent eligibility.[7]

Claims 1 and 22 are not patent eligible.[8]

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7. AAM does not appear to argue on appeal that the numerical limitations in claim 1 represent an inventive concept. In any event, as explained above, these limitations describe a desired result but do not instruct how the liner is tuned to accomplish that result.

8. To the extent that AAM's opening summary judgment brief as to § 101 patent eligibility can be understood to argue that there are disputed issues of material fact as to whether the patent discloses an inventive concept, it relies only on Dr. Rahn's testimony that dual-damping of bending mode and shell mode vibrations was new and unconventional. AAM Mot. for Summary Judgment at 8-9, *American Axle & Manuf., Inc. v. Neapco Hldgs. LLC*, No. 15-01168

Appendix C

III

Having determined that independent claims 1 and 22 are not patent eligible under § 101, we need not separately determine eligibility of the dependent claims. The district court found independent claims 1 and 22 collectively representative of all the asserted claims. AAM did not argue before the district court that the dependent claims change the outcome of the eligibility analysis. Nor did AAM make such an argument in its opening brief on appeal. Although at oral argument AAM disagreed that claims 1 and 22 are representative of the others and stated that it never acceded to such a finding, Oral Arg. 30:07-40, it was unable to identify any part of its opening brief that presented such an argument and admitted that it was "not suggesting that the other claims should come out differently," *id.* at 30:40-31:16. We therefore find any such argument waived. *See Affinity Labs*, 838 F.3d at 1256 n.1 (treating certain claims as representative where no meaningful argument made that other claims are materially different); *Electric Power*, 830 F.3d at 1352.

(D. Del. Aug. 11, 2017), ECF No. 160. But as addressed in detail above, dual-damping is merely a desired result and, without more, is insufficient to make the '911 patent eligible pursuant to § 101.

Appendix C

CONCLUSION

Because we conclude that the asserted claims of the '911 patent are directed to ineligible subject matter under § 101, we affirm.

AFFIRMED

COSTS

No costs.

Appendix C

MOORE, *Circuit Judge*, dissenting.

The majority's decision expands § 101 well beyond its statutory gate-keeping function and the role of this appellate court well beyond its authority. The majority opinion parrots the *Alice/Mayo* two-part test, but reduces it to a single inquiry: If the claims are directed to a law of nature (even if the court cannot articulate the precise law of nature) then the claims are ineligible and all evidence of non-conventionality will be disregarded or just plain ignored. The majority rejects the notion that claims which contain an "inventive concept" survive the gatekeeper. In the words of the majority, "it makes no difference to the section 101 analysis whether the use of liners to attenuate bending mode vibration was known in the prior art." Maj. at 13. I am deeply troubled by the majority's disregard for the second part of the *Alice/Mayo* test, its fact finding on appeal and its repeated misrepresentation of the record, in each instance to the patentee's detriment; all when we are to be applying the summary judgment standard no less.

The majority's concern with the claims at issue has nothing to do with a natural law and its preemption and everything to do with concern that the claims are not enabled. Respectfully, there is a clear and explicit statutory section for enablement, § 112. We cannot convert § 101 into a panacea for every concern we have over an invention's patentability, especially where the patent statute expressly addresses the other conditions of patentability and where the defendant has not challenged them.

Appendix C

The district court held that the claims at issue are ineligible under § 101 because they are directed to a natural law, specifically, "applications of Hooke's law with the result of friction damping." J.A. 11. Even the majority does not agree with the district court that the claims are directed to Hooke's Law. Instead the majority concludes that the claims are ineligible because they are "directed to the utilization of a natural law (here, Hooke's law *and possibly other natural laws*) in a particular context." Maj. at 19; *see also* Maj. at 20 ("though we recognize that AAM may be correct in its assertion that the system involved in the '911 patent is more complex than just a bare application of Hooke's law, *and that other laws of nature may be relevant*, that does not render the subject matter patent eligible"). Section 101 is monstrous enough, it cannot be that now you need not even identify the precise natural law which the claims are purportedly directed to. The "focus of the claimed advance," as repeatedly alleged by the patentee, is to use liners (a physical liner) positioned inside a drive shaft to reduce shell mode vibration and bending mode vibration. The claims at issue are directed to methods of manufacturing shaft assemblies for driveline systems for automotive vehicles using liners to reduce specific types of vibration. *See* '911 Patent Claims. Claim 1, for instance, recites:

> 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 at least one liner to attenuate at least two types of vibration transmitted through the shaft member; and
>
> positioning the at least one liner within the shaft member such that the at least one liner is configured to damp shell mode vibrations in the shaft member by an amount that is greater than or equal to about 2%, and the at least one liner is also configured to damp bending mode vibrations in the shaft member, the at least one liner being tuned to within about ±20% of a bending mode natural frequency of the shaft assembly as installed in the driveline system.

As the patentee argues, the dependent claims further narrow the physical characteristics of the liners to be used and their positioning within the drive shaft: "Several dependent claims, for example, recite particular liner materials (e.g., cardboard or paperboard) and structures (helically-wrapped resilient member). . . . claims 12, 13, 19, 26, 27, 31." Appellant's Reply Br. at 27.[1] I do not see how

1. I do not agree with the majority's conclusion that claims 1 and 22 are representative. First, Neapco never argued that claims 1 and 22 should be representative and in fact argued the dependent claims separately. *See* Dkt. 150 (Neapco's Mot. for Summ. J.) at 32-33. Second, AAM expressly argued that they are not representative.

these claims are directed to a natural law. And even if part one of the *Alice/Mayo* test was satisfied here, there is a part two. The claims will not be held ineligible (remember § 101 is meant to be a gatekeeper) if the claims contain an "inventive concept." There are *many* here, articulated in the claims themselves, about which there exist at least questions of fact which should have precluded summary judgment. Argued below, and throughout the briefing on appeal and during oral argument to this panel, the patentee maintains that liners had never before been used to reduce bending mode vibration. *See* Appellant's Br. at 12, 25-26, 27, 35, 57-60, 63, and 65 n.5; Appellant's Reply Br. at 2, 15 ("Prior art liners were used to provide general broadband damping of shell mode vibrations, *but liners were not used to dampen bending mode vibrations prior to the claimed invention*."), 19 ("It was inventive to use a liner to damp bending mode vibrations"), 24-25, and 29. The argument that liners were never before used

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AAM's statement that the dependent claims should not come out differently does nothing more than confirm that it believes *all* of the claims are patent-eligible. Third, the majority inaccurately states the patentee did not argue limitations of the dependent claims. AAM's briefs provide multiple references to the type of material and other limitations found only in the dependent claims as providing the inventive concepts which are not routine or conventional. *See, e.g.*, Appellant's Br. at 13-14, 36, 57-58, and 64-65. Merely by way of example, dependent claim 31 limits the material for the liner to cardboard among others. AAM claimed using a "cardboard liner to reduce bending mode vibrations" was an "inventive concept" and not "conventional or routine." *Id.* at 57-58. It is inappropriate in light of these facts for the majority to sua sponte declare the claims representative and ignore the expressly argued dependent claims and limitations.

to attenuate bending mode vibrations was AAM's first and one of its strongest non-conventionality arguments. AAM's opening brief set this forth on the very first page of its step-two argument:

> 1. The Claims Contain Inventive Concepts and Are Not Conventional or Routine
>
> * * *
>
> [T]he asserted claims include at least the following inventive concepts:
>
> - ***using a cardboard liner to reduce bending mode vibrations*;**
> - using a cardboard liner to reduce bending and shell mode vibrations;
> - tuning a cardboard liner by controlling its characteristics;
> - controlling the characteristics of a cardboard liner such that it matches and damps bending mode vibrations;
> - controlling the characteristics of a cardboard liner such that it damps bending mode vibrations by oscillating in opposition to a specific propshaft bending mode frequency; and

> controlling the characteristics of a cardboard liner such that it matches and damps vibration of multiple different types of propshaft vibration, e.g., both bending and shell mode vibrations.

Appellant's Br. at 57-58.

The majority rejects this "inventive concept" in its § 101 analysis, first as inaccurate (a fact finding made by the majority on appeal and contrary to all the evidence of record) and second as irrelevant. Let's begin with the majority's claim that the patent itself discloses the use of liners to reduce bending mode vibration: "According to the '911 patent's specification, prior art liners, weights, and dampers that were designed to individually attenuate each of the three propshaft vibration modes—bending, shell and torsion—already existed." Maj. at 6. And again, citing the patent, the majority claims, "It was also known that a liner or weight could be designed specifically to have a frequency that would allow it to function as either a resistive attenuation means [shell mode vibration] or as a reactive attenuation means [bending mode vibration]. AAM does not dispute that these features were known in the art." Maj. at 10. These statements are false.

The patent admits that liners had been used to reduce shell mode vibration. '911 patent at 2:23-36. It then states: "These liners, however, do ***not*** appear to be suitable for bending mode vibration or torsion mode vibration." *Id.* at 2:36-38. The patent discloses prior use of plugs, weights, and dampers to attenuate bending mode vibrations,

but stresses that liners were not suitable. The patentee explained that before the '911 patent, liners were not used, car manufacturers shoved masses of wadded up cardboard into the propshaft to reduce bending vibrations. Oral Arg. 6:46-7:11. More than a dozen times in the briefs and during oral argument the patentee argued that the use of liners to attenuate bending mode vibration was one of its inventive concepts. Without regard for the arguments made, the majority declares "AAM does not dispute that these features were known in the art." Maj. at 10. Yes, it certainly did dispute this more than a dozen times.[2] In fact, AAM's counsel corrected the court when a member

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2. In a footnote, the majority suggests that while the patentee made the argument throughout its briefing and argument on appeal, it was not properly raised below. Maj. at 12 n.3. There is no doubt the district court understood the argument as having been made and Neapco did not argue otherwise:

> THE COURT: "So what is it that is not conventional in the claims other than the application of Hooke's law?
>
> MR. NUTTALL: Tuning a liner to target a specific bending mode was new and different and nobody thought you could do that or should do that before, much less coupling that with also being tuned to a shell mode vibration."

The majority stops short of saying that it deems the argument waived, and in fact then decides the fact question which was disputed in the briefs before us by the parties. The majority likely does not find the argument waived because Neapco never alleges it was waived and it is axiomatic that one can waive waiver. *See, e.g., Norwood v. Vance*, 591 F.3d 1062, 1068 (9th Cir. 2010) (It is "well-established" that a party can "'waive waiver' implicitly by failing to assert it.").

of the majority tried to suggest that liners to attenuate bending mode were known in the prior art:

> Judge: "None of that is new, there were liners, there were changes to the liners to make them dampen, right? That was not new."
>
> AAM: "The liners had never been used to damp bending mode."

Oral Arg. 6:46-49. Even Neapco acknowledged that the patent states that liners had not been used to attenuate bending mode vibrations. *See* Appellee's Br. at 8. Neapco never disputed the patentee's claim that liners had never been used to dampen bending mode vibration. It matters not at all to the majority that the patentee alleges that liners had not been used to reduce bending mode vibration, and that Neapco presented no argument or evidence to contradict that. The majority has decided to make its own fact finding that prior art liners had been used. The majority finds that U.S. Patent No. 3,075,406, never introduced as evidence in this case or cited by either party, which discloses a rigid cylindrical metal bar with two circular ends resembling a metal dumbbell—is a liner. Thus, according to the majority, there is at least one liner in a single prior art patent which was used to reduce bending mode. This is a fact question, nobody argued it, and reasonable minds could disagree over whether a dumbbell is a liner. Moreover, a disclosure in a single patent does not establish that the use of liners to attenuate bending mode vibration was "well-understood, routine, conventional activity" as required by the Supreme Court.

Doubling down, the majority then claims that the patentee's own testing proved that prior art liners "did in fact dampen bending mode vibrations." Maj. at 13. I fail to see how the patentee's invention that liners could be used, the very invention for which they have obtained patent protection, supports the majority's finding that liners were known in the prior art to be used to reduce bending mode vibration. To be clear, there is no record evidence that liners had been used to dampen bending mode vibration much less that the use of liners to dampen bending mode vibration was routine and conventional. The patentee argued throughout that one of the inventive concepts present in every single claim of the patent was the novel use of liners to reduce bending mode vibration. Ultimately, the majority says the inventive concept "makes no difference to the section 101 analysis." Maj. at 13. I understand this to be an outright rejection of the second step of the *Alice/Mayo* test. The majority explains: "Section 101 is concerned with whether the claims at issue recite a natural law, not whether the specification has adequately described how to make and use the concretely claimed structures and steps." Maj. at 21. This statement of law is just plain wrong. Missing is any recognition that the *Alice/Mayo* test is a two-part test and that the second step has meaning. The concretely claimed structures and steps, as in these claims, are exactly what can move the claim from ineligible to eligible by virtue of step 1 or step 2.

There are additional alleged "inventive concepts" which I will briefly mention. The claims include limitations which get progressively more detailed about the structure and positioning of the liner inside the drive shaft. The

patentee argues throughout that the position of the liner inside the shaft (an express claim element) is one of the characteristics to be controlled in attenuating bending mode vibration. *See* Appellant's Br. at 14, 36, 42, and 65. The patentee alleges throughout that the concept of tuning a liner, i.e. controlling the characteristics of a liner to dampen vibration of any given system is an inventive concept. *See id.* at 27-28, and 57-67; Appellant's Reply Br. at 2, 16, and 18-29. The particular characteristics of the tuned liner will depend on the characteristics of the drive shaft it is being used in (for example the natural frequencies, which are inherent properties of each shaft).[3] *See* '911 patent at 7:44-55; Appellant's Br. at 4, 6, 46, and 53.

The majority claims: "What is missing is any physical structure or steps for achieving the claimed result of damping two different types of vibration. The focus of the claimed advance here is simply the concept of achieving that result, by whatever structures or steps happen to work." Maj. at 20. The "focus of the claimed advance," as repeatedly alleged by the patentee and as expressly claimed, is to insert a liner (a concretely identified physical liner) inside a drive shaft to reduce shell mode vibration and bending mode vibration. *See, e.g.*, claims 1 & 22. The dependent claim limitations further narrow this "identified

3. And the '911 patent's specification explains how to tune liners to attenuate those vibrations. For example, the specification explains that different characteristics of the liners are controlled corresponding to the structure of the propshaft. '911 patent at 7:56-8:43. It even provides a particular example of tuned liners for use in a propshaft with specific dimensions. *Id.* at 8:2-23.

physical structure." Claims limit the material from which the liner can be made, for example, cardboard. *See* claims 19 & 31. Other claims limit the physical structure of the liner itself. It can extend helically (claims 13 & 27) or longitudinally (claims 14 & 28) or circumferentially (claims 15 & 29). The liner includes a "plurality of fingers" (claims 18 & 33). And the claims limit where the liner can be placed within the shaft. Claim 20 for example requires the liner to be positioned within the shaft symmetrically about a bending anti-node. It is remarkable that the majority thinks that claims with all of these very physical, very concrete, very structural limitations are nonetheless "missing any physical structure or steps." It is not, as the majority claims, "whatever structures or steps happen to work." Maj. at 20. It is a physical liner positioned inside the shaft.

The tuned liner element is the crux of what bothers the majority in this case. The majority's true concern with these claims is not that they are directed to Hooke's Law (because this is clearly a much more complex system not limited to varying mass and stiffness), but rather the patentee has not claimed precisely *how* to tune a liner to dampen both bending and shell mode vibrations. As the following quotes from the majority demonstrate, their problem with these claims is not one of eligibility, but rather one of enablement:

- "Most significantly, the claims do not instruct *how* the variables would need to be changed to produce the multiple frequencies required to achieve a dual-damping result." Maj. at 14-15.

- "[T]he claims' general instruction to tune a liner amounts to no more than a directive to use one's knowledge of Hooke's law, and possibly other natural laws, to engage in an ad hoc trial-and-error process of changing the characteristics of a liner until a desired result is achieved." Maj. at 15.

- "The claims here simply instruct the reader to tune the liner . . . without the benefit of instructions on *how* to do so." Maj. at 19-20.

- "The problem is it really doesn't tell you how to do it, right? It says 'do tuning,' but it doesn't tell you *how* to do the tuning." Oral Arg. at 1:35-42 (Judge).

- "Looking at this patent, you couldn't tell how to do it. Someone skilled in the art wouldn't know *how* to do it. You would need additional information, right?" Oral Arg. at 2:09-2:16 (Judge).

- "That is just a statement of the result, it doesn't tell you *how* to do it . . . it doesn't tell you *how* to change the variables, right?" Oral Arg. at 5:50-6:15 (Judge).

- "Basically it is done by trial-and-error. You start with a computer program and then you do trial and error to come to the correct result, right?" Oral Arg. at 12:04-11 (Judge).

- "The real question here is do we have anything more than a result? Even if you use all of these different variables, it doesn't really tell you *how* to use the variables. And that's the problem." Oral Arg. at 21:40-22:20 (Judge).

- "The more variables there are, the more difficult it is to know how to do it, and the more guidance that's needed, and there is none as to the use of all these variables other than just use a lot of variables and figure it out." Oral Arg. at 27:10-23 (Judge).

- "The claims themselves don't even provide you with a list of variables, there are a lot of different variables, done by trial and error, and all the claims are telling you is here is a desirable result and use trial and error to get there." Oral Arg. at 29:20-36 (Judge).

- "At least what I am listening for, and I have been focused on throughout this is . . . is it only make and place a liner so that two damping effects occur, you figure out how? That seems to me kind of the question that we are struggling with." Oral Arg. at 35:17-38 (Judge).

"[T]o be enabling, the *specification* of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue

experimentation.'" *See Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997). There is undue experimentation when "the trial and error required to practice the claimed invention could be unduly laborious." *Old Town Canoe Co. v. Confluence Holdings Corp.*, 448 F.3d 1309, 1320 (Fed. Cir. 2006). And whether undue experimentation is required is a question of fact. *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1305 (Fed. Cir. 2010). The majority faults the '911 patent because the claims themselves fail to describe "how to achieve such tuning." Maj. at 7. The majority concludes, apparently de novo, that too much "trial and error" would be required to determine how to tune a particular liner to the frequencies associated with a given propshaft. The majority advises that if the claims had themselves mentioned using computer modeling to determine how to tune the liner, it may have made all the difference. Yet, earlier the majority explains that such computer modeling and experimental modal analysis was already used in the prior art. How does adding a limitation to the claims to "use a computer program to figure out how to tune the liners" alleviate the majority's concern that these claims are directed to a natural law? Surely, this is the first time adding software to a claim would make it eligible. The majority acknowledges that there is a very specific example given in the patent with precise dimensions, weights, lengths, materials, positioning, etc. *See* '911 patent at 8:2-23. Whether this disclosure combined with the knowledge of a skilled artisan would permit that skilled artisan to tune a liner to a given propshaft in order to reduce bending mode vibrations without undue experimentation is exactly

and precisely the enablement test pursuant to § 112. A patentee's failure to enable his invention renders the claims invalid under § 112, it does not, however, render the claims ineligible under § 101. The '911 patent claims include a concretely identified physical structure—a liner inserted inside the propshaft—to reduce vibrations. According to the majority, it is not enough that a skilled artisan reading the specification would know how to tune a liner to the frequency of any given propshaft—the claims themselves must recite these steps. To be clear, according to the majority, even if these claims are enabled, they are still ineligible because the claims themselves didn't teach *how*. This is now the law of § 101. The hydra has grown another head.

Today, the majority concludes that the '911 patent claims are not eligible because they do not teach a skilled artisan *how* to tune a liner. The majority holds that they are directed to some unarticulated number of possible natural laws apparently smushed together and thus ineligible under § 101. The majority concludes that the inventive concepts "make no difference." Section 101 simply should not be this sweeping and this manipulatable. It should not be used to invalidate claims under standards identical to those clearly articulated in other statutory sections, but not argued by the parties. It should not subsume § 112. It should not convert traditional questions of fact (like undue experimentation) into legal ones. The majority's validity goulash is troubling and inconsistent with the patent statute and precedent. The majority worries about result-oriented claiming; I am worried about result-oriented judicial action. I dissent.

APPENDIX D — OPINION OF THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE, DATED FEBRUARY 27, 2018

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

C.A. No. 15-1168-LPS

AMERICAN AXLE & MANUFACTURING, INC.,

Plaintiff,

v.

NEAPCO HOLDINGS LLC
and NEAPCO DRIVELINES LLC,

Defendants.

MEMORANDUM OPINION

STARK, U.S. District Judge:

Pending before the Court in this patent infringement action are the following motions:

(i) Plaintiff American Axle & Manufacturing, Inc.'s ("AAM" or "Plaintiff") Motion for Summary Judgment of Infringement (D.I. 155; *see also* D.I. 206);

(ii) AAM's Motion for Summary Judgment of No Invalidity Pursuant to 35 U.S.C. §§ 101 and 102 (as to the Laskey Reference) (D.I. 159; *see also* D.I. 206);

(iii) AAM's Motion to Exclude Portions of the Testimony of Neapco's Technical Expert, Steven Becker, and Neapco's Damages Expert, Michael Chase (D.1. 157; *see also* D.I. 206);

(iv) Defendants Neapco Holdings LLC and Neapco Drivelines LLC's (collectively,' "Neapco" or "Defendants") Motion for Summary Judgment of Invalidity and/or Non-Infringement (D.I. 149);

(v) Neapco's Supplemental Motion for Summary Judgment of Invalidity and/or Non-Infringement as to the New Claims (D.I. 207); and

(vi) Neapco's Motion to Preclude Certain Expert Testimony and Evidence (D.I. 208).

I. BACKGROUND

AAM filed suit against Neapco on December 18, 2015, alleging infringement of U.S. Patent Nos. 7,774,911 (the "'911 patent"), 8,176,613 (the "'613 patent"), and 8,528,180 (the "'180 patent"). (*See* D.I. 1) The pending motions are principally (if not entirely) addressed to the '911 patent.

The '911 patent "generally relates to shaft assemblies for transmitting rotary power in a driveline and more particularly to a method for attenuating driveline vibrations transmitted through a shaft assembly." ('911 patent col. 1:4-7) The reason for attenuating such vibrations is to reduce the tonal noise that can be heard by occupants in the vehicle as a result of the vibrations.

(*See id.* col. 1:8-23) "Modern automotive propshafts are commonly formed of relatively thin-walled steel or aluminum tubing and as such, can be receptive to various driveline excitation sources," which "can typically cause the propshaft to vibrate in a bending (lateral) mode, a torsion mode and a shell mode." (*Id.* col. 1:39-44) Several techniques existed in the prior art "to attenuate vibrations in propshafts including the use of weights and liners." (*Id.* col. 1:53-54) However, many of the prior art liners only attenuate shell mode vibrations and not also bending or torsion mode vibrations. (*See id.* col. 2:34-38) The '911 patent purports to provide "an improved method for damping various types of vibrations in a hollow shaft," which facilitates the damping of shell mode vibration as well as bending mode vibration and/or torsion mode vibration. (*Id.* col. 2:40-43)

On April 7, 2017, the Court issued its Claim Construction Opinion (D.I. 113), which found certain claims of the '911 patent indefinite.

On August 11, 2017, the parties filed motions with respect to the claims that remained asserted after the Court's Claim Construction Opinion. In particular, the motions were directed to '911 patent claims 22-24, 26, 27, 31, and 34-36 (the "Original Claims"). (D.I. 149, 155, 157, 159) The parties completed briefing on their initial motions on September 15, 2017.

In the meantime, on September 6, 2017, the Court granted AAM's motion for reconsideration of the Claim Construction Opinion, finding that new evidence

demonstrated that Defendants had failed to prove that any of the claims of the '911 patent were indefinite. (D.I. 180) The Court then ordered the parties to submit supplemental briefing to address how the pending motions might apply to the claims that had been initially invalidated as indefinite, but were now newly-revived in the case. In particular, the supplemental briefing relates to claims 1-6, 12, 13, and 19-21 of the '911 patent (the "New Claims," and collectively with the Original Claims, the "Asserted Claims"). (D.I. 188) The parties submitted supplemental briefs and motions on December 1, 2017 and responsive briefs on December 18, 2017.

Collectively, the parties filed a total of 287 pages of briefing in relation to their many motions. The Court heard oral argument on January 18, 2018. (D.I. 217 "("Tr.")")

Independent claim 22 is representative of the Original Claims and reads:

> 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.

Independent claim 1 is representative of the New Claims and reads:

> 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 at least one liner to attenuate at least two types of vibration transmitted through the shaft member; and
>
> positioning the at least one liner within the shaft member such that the at least one liner is configured to damp shell mode vibrations in the shaft member by an amount that is greater than or equal to about 2%, and the at least one liner is also configured to damp bending mode

vibrations in the shaft member, the at least one liner being tuned to within about ±20% of a bending mode natural frequency of the shaft assembly as installed in the driveline system.

II. LEGAL STANDARDS

Under Rule 56(a) of the Federal Rules of Civil Procedure, "[t]he court shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." The moving party bears the burden of demonstrating the absence of a genuine issue of material fact *See Matsushita Elec. Indus. Co., Ltd. v. Zenith Radio Corp.*, 475 U.S. 574, 585-86, 106 S. Ct. 1348, 89 L. Ed. 2d 538 (1986). An assertion that a fact cannot be — or, alternatively, is — genuinely disputed must be supported either by "citing to particular parts of materials in the record, including depositions, documents, electronically stored information, affidavits or declarations, stipulations (including those made for purposes of the motion only), admissions, interrogatory answers, or other materials," or by "showing that the materials cited do not establish the absence or presence of a genuine dispute, or that an adverse party cannot produce admissible evidence to support the fact." Fed. R. Civ. P. 56(c)(1)(A) & (B). If the moving party has carried its burden, the nonrnovant must then "come forward with specific facts showing that there is a genuine issue for trial." *Matsushita*, 475 U.S. at 587 (internal quotation marks omitted). The Court will "draw all reasonable inferences in favor of the nonmoving party, and it may not make credibility determinations or weigh

the evidence." *Reeves v. Sanderson Plumbing Prods., Inc.*, 530 U.S. 133, 150, 120 S. Ct. 2097, 147 L. Ed. 2d 105 (2000).

To defeat a motion for summary judgment, the nonmoving party must "do more than simply show that there is some metaphysical doubt as to the material facts." *Matsushita*, 475 U.S. at 586; *see also Podobnik v. US. Postal Serv.*, 409 F.3d 584, 594 (3d Cir. 2005) (stating party opposing summary judgment "must present more than just bare assertions, conclusory allegations or suspicions to show the existence of a genuine issue") (internal quotation marks omitted). The "mere existence of some alleged factual dispute between the parties will not defeat an otherwise properly supported motion for summary judgment;" a factual dispute is genuine only where "the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247-48, 106 S. Ct. 2505, 91 L. Ed. 2d 202 (1986). "If the evidence is merely colorable, or is not significantly probative, summary judgment may be granted." *Id.* at 249-50 (internal citations omitted); *see also Celotex Corp. v. Catrett*, 477 U.S. 317, 322, 106 S. Ct. 2548, 91 L. Ed. 2d 265 (1986) (stating entry of summary judgment is mandated "against a party who fails to make a showing sufficient to establish the existence of an element essential to that party's case, and on which that party will bear the burden of proof at trial"). Thus, the "mere existence of a scintilla of evidence" in support of the nonmoving party's position is insufficient to defeat a motion for summary judgment; there must be "evidence on which the jury could reasonably find" for the nonmoving party. *Anderson*, 477 U.S. at 252.

III. DISCUSSION

As explained below, the Court has determined that the Asserted Claims are not directed to patentable subject matter. Therefore, the Court will rule only on the motions implicating 35 U.S.C. § 101. The Court will deny as moot all other motions that address only the '911 patent—the motions relating to infringement and invalidity of the Asserted Claims of the '911 patent — and will defer ruling on the remaining motions until after conferring with the parties on how the case should now proceed.[1]

A. Section 101: Applicable Law

The parties have filed cross-motions for summary judgment on the issue of patent eligibility under 35 U.S.C. § 101. (*See* D.I. 149, 159) The Court will address both motions together.

Under 35 U.S.C. § 101, "[w]hoever 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 therefor, subject to the conditions and requirements of this title." There are three

1. At the hearing, Neapco advised the Court they did not think the Court would need to resolve infringement issues if it determined the patent is not eligible for patentability. (*See* Tr. at 54) While AAM stated it preferred the Court to rule on all the issues before it, AAM recognized that the Court could exercise its discretion on this matter. (*See id.* at 74) It appears that the only motion that may arguably remain ripe is AAM's motion to preclude Neapco's damages expert, Mr. Chase. (D.I. 157)

exceptions to § 101's broad patent-eligibility principles: "laws of nature, physical phenomena, and abstract ideas." *Diamond v. Chakrabarty*, 447 U.S. 303, 309, 100 S. Ct. 2204, 65 L. Ed. 2d 144 (1980). "Whether a claim recites patent eligible subject matter is a question of law which may contain disputes over underlying facts." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 2018 WL 774096, at *6 (Fed. Cir. Feb. 8, 2018).

In *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 132 S. Ct. 1289, 182 L. Ed. 2d 321 (2012), the Supreme Court set out a two-step "framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355, 82 L. Ed. 2d 296, 189 L. Ed. 2d 296 (2014). First, courts must determine if the claims at issue are directed to a patent-ineligible concept ("step one"). *See id.* If so, the next step is to look for an "inventive concept' — *i.e.*, an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself" ("step two"). *Id.* The two steps are "plainly related" and "involve overlapping scrutiny of the content of the claims." *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016).

At step one, "the claims are considered in their entirety to ascertain whether their character ***as a whole*** is directed to excluded subject matter." *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed.

Cir. 2015) (emphasis added); *see also Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016) (stating first step "calls upon us to look at 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").

Courts should not "oversimplif[y]" key inventive concepts or "downplay" an invention's benefits in conducting a step one analysis. *See Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1337-38 (Fed. Cir. 2016); *see also McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1313 (Fed. Cir. Sept. 13, 2016) ("[C]ourts 'must be careful to avoid oversimplifying the claims' by looking at them generally and failing to account for the specific requirements of the claims.") (quoting *In re TLI Commc'ns LLC Patent Litig.*, 823 F.3d 607, 611 (Fed. Cir. 2016)). "Whether at step one or step two of the *Alice* test, in determining the patentability of a method, a court must look to the claims as an ordered combination, without ignoring the requirements of the individual steps." *McRO*, 837 F.3d at 1313.

At step two, courts must "look to both the claim as a whole and the individual claim elements to determine whether the claims contain an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself." *Id.* at 1312 (internal brackets and quotation marks omitted). The "standard" step two inquiry includes consideration of whether claim elements "simply recite 'well-understood, routine, conventional

activit[ies].'" *Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016) (quoting *Alice*, 134 S. Ct. at 2359). "Simply appending conventional steps, specified at a high level of generality, [is] not ***enough*** to supply an inventive concept." *Alice*, 134 S. Ct. at 2357 (internal quotation marks omitted) (emphasis in original).

However, "[t]he inventive concept inquiry requires more than recognizing that each claim element, by itself, was known in the art." *Bascom*, 827 F.3d at 1350. In *Bascom*, the Federal Circuit held that "the limitations of the claims, taken individually, recite generic computer, network and Internet components, none of which is inventive by itself," but nonetheless determined that an ***ordered combination*** of these limitations was patent-eligible under step two. *Id.* at 1349. The Federal Circuit has looked to the claims as well as the specification in performing the "inventive concept" inquiry. *See Affinity Labs of Texas, LLC* v. Amazon.com *Inc.*, 838 F.3d 1266, 1271 (Fed. Cir. 2016) ("[N]either the claim nor the specification reveals any concrete way of employing a customized user interface.").

The Federal Circuit recently elaborated on the step two standard, stating that "[t]he question of whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact. Any fact, such as this one, that is pertinent to the invalidity conclusion must be proven by clear and convincing evidence." *Berkheimer*, 881 F.3d 1360, 2018 WL 774096, at *5; *see also Aatrix Software, Inc. v. Green Shades Software,*

Inc., 882 F.3d 1121, 2018 U.S. App. LEXIS 3463, 2018 WL 843288, at *5 (Fed. Cir. Feb. 14, 2018) ("While the ultimate determination of eligibility under § 101 is a question of law, like many legal questions, there can be subsidiary fact questions which must be resolved en route to the ultimate legal determination."); *Automated Tracking Sols., LLC v. Coca-Cola Co.*, 723 Fed. Appx. 989, 2018 U.S. App. LEXIS 3779, 2018 WL 935455, at *5 (Fed. Cir. Feb. 16, 2018) ("We have held that 'whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact.'") (quoting *Berkheimer*, 881 F.3d 1360, 2018 WL 774096, at *5). "Whether a particular technology is well-understood, routine, and conventional goes beyond what was simply known in the prior art. The mere fact that something is disclosed in a piece of prior art, for example, does not mean it was well-understood, routine, and conventional." *Berkheimer*, 881 F.3d 1360, 2018 WL 774096, at *6. "When there is no genuine issue of material fact regarding whether the claim element or claimed combination is well-understood, routine, [and] conventional to a skilled artisan in the relevant field, this issue can be decided on summary judgment as a matter of law." *Id.*

B. Step One

With respect to step one, the issue presented is whether the Asserted Claims as a whole are directed to laws of nature: Hooke's law and friction damping. AAM does not dispute that Hooke's law is the linear relationship between force F and displacement x of a spring with

stiffness k, specifically $F=kx$. (*See* D.I. 160 at 6; D.I. 160-4 at ¶ 389) AAM also does not dispute that the frequency is affected by a change in mass m or stiffness k. (*See* D.I. 150 at 29-30; D.I. 151 at 496 (inventor Sun testifying frequency is changed by adjusting mass and stiffness); D.I. 153 at 142 (AAM executive director testifying, "the natural frequency is strictly a function of stiffness and mass"); D.I. 160 at 6) Furthermore, AAM's expert stated that friction damping, or the reduction in friction, "is a property of physics experienced by any two surfaces in contact." (D.I. 172 at 6 (quoting D.I. 160-4 at ¶ 396); *see also* D.I. 150 at 30-31)

Neapco argues, "[t]he Asserted Claims do nothing more than use a prior art liner design (*e.g.*, cardboard having, for certain embodiments, elastomer winding) and apply (or just characterize) the physics behind 'tuning' and vibration attenuation or damping." (D.I. 150 at 28) Therefore, Neapco asserts, in order to "tune" the liner, one merely applies Hooke's law and then measures the amount of damping. (*See* D.I. 150 at 29; Tr. at 53)

The Court agrees with Neapco. There is no dispute that adjusting the mass and stiffness of the liner will change the amount of damping of a certain frequency. The claimed methods are applications of Hooke's law with the result of friction damping. (*See, e.g.*, D.I. 151 at 496 (inventor Sun testifying that "tuning" is "basic physics"))

AAM's arguments to the contrary are unavailing. AAM contends that the Asserted Claims are patent-eligible because they are directed to industrial processes

for manufacturing very large automotive components, rather than any law of nature or natural phenomenon. (*See* D.I. 160 at 5; Tr. at 21 (arguing "[m]ethod of manufacturing a prop shaft is not some law of nature")) But the Asserted Claims do not disclose a method of manufacturing a propshaft; instead, considered as a whole, they are directed to the mere application of Hooke's law, and they fail to instruct ***how*** to design the tuned liners or manufacture the driveline system to attenuate vibrations. *See Elec. Power*, 830 F.3d at 1355-56 (discussed further in step two). AAM's other argument - that the tuned liners in the propshaft make up a complex system with multiple degrees of freedom, so Hooke's law, which relates to "a very simple spring and mass," does not apply (*see* D.I. 160 at 6; Tr. at 22) - also fails. There is no genuine dispute of material fact that a liner with multiple degrees of freedom may be broken down mathematically into multiple, single degrees of freedom, and Hooke's law can then be applied to each individually. (*See, e.g.*, D.I. 151 at 512 (inventor Sun testifying, "a tunable liner theoretically or mathematically can be simplified as just single degree[s] of freedom[] of mass spring systems," and if one breaks down each of the modes, "they're all a combination of [] single degree[s] of freedom[]"); D.I. 173-1 at 45 (Neapco's expert explaining if one has a multi-degree of freedom system, then "you're going to be applying Hooke's Law in a couple of axes"))

Looking at the "focus" of the claims and their "character as a whole," *Elec. Power*, 830 F.3d at 1353, Neapco has met its burden at step one.

C. Step Two

A claimed method "is not unpatentable simply because it contains a law of nature or a mathematical algorithm." *Diamond v. Diehr*, 450 U.S. 175, 187, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981) (internal quotation marks omitted). In fact, it is "commonplace that an ***application*** of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection." *Id.* In the present case, then, it is necessary to proceed to step two, and consider "what the claim elements add," and specifically whether they identify an "inventive concept." *Elec. Power*, 830 F.3d at 1353.

In *Mayo*, 566 U.S. at 72, the claims covered "processes that help doctors who use thiopurine drugs to treat patients with autoimmune diseases determine whether a given dosage level is too low or too high" by "describing the relationships between the concentration in the blood of certain thiopurine metabolites and the likelihood that the drug dosage will be ineffective or induce harmful side-effects." The Supreme Court held that the claims there were not patent-eligible because they "inform a relevant audience about certain laws of nature; any additional steps consist of well-understood, routine, conventional activity already engaged in by the scientific community; and those steps, when viewed as a whole, add nothing significant beyond the sum of their parts taken separately." *Id.* at 79-80.

As in *Mayo*, the question before the Court is whether the process claimed in the '911 patent "has additional

features that provide practical assurance that the process is more than a drafting effort designed to monopolize the law of nature itself." *Id.* at 77. Patentees should not obtain claims that "simply recite a law of nature and then add the instruction 'apply the law.'" *Id.* at 77-78.

Since claims must be considered as a whole, it is important to consider the "ordered combination" of the method's steps, *id.* at 79, because "a new combination of steps in a process may be patentable even though all the constituents of the combination were well known and in common use before the combination was made," *Diehr*, 450 U.S. at 188. For example, in *Diehr*, even though the "process used a known mathematical equation," the Supreme Court "found the overall process patent eligible because of the way the additional steps of the process integrated the equation into the process as a whole." *Mayo*, 566 U.S. at 80. The combination of steps was not "obvious, already in use, or purely conventional." *Id.* at 81; *see also Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042, 1050-51 (Fed. Cir. 2016) (finding that new and improved claimed method of freezing and thawing hepatocytes twice, as result of discovered phenomenon that hepatocytes can survive multiple freeze-thaw cycles, was patent-eligible because, even though the individual steps were known in the art, repetition of the process was previously taught away from).

However, adding instructions to the claimed method that "add nothing specific to the laws of nature other than what is well-understood, routine, conventional activity, previously engaged in by those in the field," is

insufficient to constitute an inventive concept. *Mayo*, 566 U.S. at 82. For example, in *Parker v. Flook*, 437 U.S. 584, 585-86, 98 S. Ct. 2522, 57 L. Ed. 2d 451 (1978), the claim was not patent-eligible because it simply applied a novel mathematical algorithm to the otherwise well-known steps of a method in a particular technological environment. *See also Mayo*, 566 U.S. at 81-82 (discussing *Flook).* Thus, "[t]he process itself, not merely the mathematical algorithm, must be new and useful." *Flook*, 437 U.S. at 591; *see also Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1377 (Fed. Cir. 2015) ("For process claims that encompass natural phenomenon, the process steps are the additional features that must be new and useful."). "[A]ppending routine, conventional steps to a natural phenomenon, specified at a high level of generality, is not enough to supply an inventive concept." *Ariosa*, 788 F.3d at 1378.

Here, as the '911 patent itself explains, the method of manufacturing a shaft assembly of a driveline system by inserting a liner into the propshaft was well-known in the prior art.[2] (*See, e.g.*, '911 patent col. 2:23-34) What AAM claims is new – for example, in independent claim 22 – are

2. Since the hearing on these motions, the Federal Circuit has expressly observed that the patent eligibility inquiry, which is a question of law, may involve issues of fact. *See Berkheimer*, 881 F.3d 1360, 2018 WL 774096, at *6. But here the record reveals no genuine disputes of material fact. The parties here do not dispute that the non-tuning claim limitations are well-understood, routine, and conventional. Nor is there any genuine dispute of material fact that the tuning limitations are non-inventive applications of Hooke's law. Thus, "this issue can be decided on summary judgment as a matter of law." *Id.*

two claim elements. First is the claim limitation "tuning a mass and a stiffness of at least one liner," which the Court has construed as "controlling a mass and stiffness of at least one liner to configure the liner to match a relevant frequency or frequencies." (D.I. 113 at 6) But this claim limitation is just the application of Hooke's law.[3] AAM argues that this element makes the claim inventive because "[p]rior to this invention, people used untuned liners and just put them in the prop shaft in hopes of getting some general damping," whereas the claimed method requires one "to actually target certain frequencies and modes." (Tr. at 23) One's intentional act of controlling the characteristics of a liner is not inventive, because, as Neapco explained at oral argument, controlling the characteristics of a liner "is just an inherent part of any design process." (Tr. at 33) Since Hooke's law governs the relationship between mass, stiffness, and frequency, the "tuning" claim limitation does nothing more than suggest that a noise, vibration, and harshness ("NVH") engineer (D.I. 156 at 5) consider that law of nature when designing propshaft liners to attenuate driveline vibrations.

AAM argues that a second inventive concept is that the Asserted Claims cover a dual-tuned liner to absorb vibrations in both bending and shell modes (*see* Tr. at 22-

3. The same result applies to claim 1, which has as a claim limitation "tuning at least one liner to attenuate at least two types of vibration transmitted through the shaft member," which the Court construed as "controlling characteristics of at least one liner to configure the liner to match a relevant frequency or frequencies to reduce at least two types of vibration transmitted through the shaft member." (D.I. 113 at 5)

24), as reflected in the claim limitation "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." In the Court's view, this claim limitation is, instead, the result that is achieved from performing the method rather than an active step in the method.

In sum, as in *Mayo*, 566 U.S. at 79-80, the Asserted Claims "inform a relevant audience [NVH engineers] about certain laws of nature [Hooke's law and friction damping]; any additional steps consist of well-understood, routine, conventional activity already engaged in by the scientific community [inserting liners with certain characteristics into propshafts to attenuate driveline vibrations]; and those steps, when viewed as a whole, add nothing significant beyond the sum of their parts taken separately [having the same, but potentially slightly improved, effect of attenuating certain frequencies and modes of driveline vibrations]." Hence, as in *Mayo*, the Asserted Claims here are not patent-eligible.

The Court further agrees with Neapco that another obstacle to the Asserted Claims being patent-eligible is that they "are not directed to any specific, discrete liner design but rather a solution to the problem of attenuating shell and bending mode vibrations generally by applying physics." (D.I. 172 at 9) *Electric Power Group*, 830 F.3d at 1350, provides support for this conclusion. That case involved patents that "describe and claim systems and methods for performing real-time performance monitoring of an electric power grid by collecting data from multiple

data sources, analyzing the data, and displaying the results." *Id.* at 1351. The Court searched for an inventive concept in "***how*** the desired result is achieved," and found that the claims did not include any requirement for performing the claimed functions with anything other than "off-the-shelf, conventional . . . technology." *Id.* at 1355. Then, pointing to "an important common-sense distinction . . . between desired results (functions) and particular ways of achieving (performing) them," the Court explained, "there is a critical difference between patenting a particular concrete solution to a problem and attempting to patent the abstract idea of a solution to the problem in general." *Id.* at 1356 (internal quotation marks omitted). "[C]laims, defining a desirable [] result and not limited to inventive means of achieving the result, fail under § 101." *Id.* at 1351; *see also McRO*, 837 F.3d at 1314 ("A patent may issue for the means or method of producing a certain result, or effect, and not for the result or effect produced.") (internal quotation marks omitted).

Here, the Asserted Claims simply instruct one to apply Hooke's law to achieve the desired result of attenuating certain vibration modes and frequencies. They provide no particular means of how to craft the liner and propshaft in order to do so. Thus, like the claims in *Electric Power Group*, the claims here are invalid under § 101.

D. Preemption

AAM further argues that "the Asserted Claims provide no risk of preempting Hooke's law in its entirety." (D.I. 160 at 7) However, "[w]here a patent's claims are

deemed only to disclose patent ineligible subject matter under the *Mayo* framework, as they are in this case, preemption concerns are fully addressed and made moot." *Ariosa*, 788 F.3d at 1379.

E. Machine or Transformation Test

AAM also argues that the Asserted Claims are patent-eligible under the machine-or-transformation test. (*See* D.I. 160 at 9-10) This test provides that a process claim is patent-eligible if "(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing." *Bilski v. Kappos*, 561 U.S. 593, 600, 130 S. Ct. 3218, 177 L. Ed. 2d 792 (2010). To satisfy the test, the use of a machine "must impose meaningful limits on the claim's scope." *In re Bilski*, 545 F.3d 943, 961 (Fed. Cir. 2008). "In other words, the machine must play a significant part in permitting the claimed method to be performed." *CyberSource Corp. v. Retail Decision, Inc.*, 654 F.3d 1366, 1375 (Fed. Cir. 2011) (internal quotation marks omitted).

Here, because the Asserted Claims are nothing more than applying a law of nature to a conventional method to achieve an abstract solution to a problem, the Asserted Claims fail to provide any meaningful limits on the scope of the claim. The machine or transformation test does not help AAM.

IV. CONCLUSION

The Asserted Claims of the '911 patent are invalid

under § 101, as they are directed to nonpatentable subject matter. Thus, the Court will grant Neapco's motion for summary judgment with respect to § 101 and will deny AAM's cross-motion on the same issue. The other motions – with the exception of AAM's motion directed to striking testimony from Neapco's damages expert – will be denied as moot. An appropriate Order follows.

APPENDIX E — ORDER ON PETITION FOR PANEL REHEARING OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, DATED JULY 31, 2020

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2018-1763

AMERICAN AXLE & MANUFACTURING, INC.,

Plaintiff-Appellant,

v.

NEAPCO HOLDINGS LLC,
NEAPCO DRIVELINES LLC,

Defendants-Appellees.

Appeal from the United States District Court for the District of Delaware in No. 1:15-cv-01168-LPS, Chief Judge Leonard P. Stark.

ON PETITION FOR PANEL REHEARING

Before DYK, MOORE, and TARANTO, *Circuit Judges.*

PER CURIAM.

ORDER

IT IS ORDERED THAT:

The Petition for Panel Rehearing is granted to the extent that the previous precedential opinion and judgment issued October 3, 2019, are withdrawn and replaced

with the modified precedential opinion and judgment accompanying this order.

FOR THE COURT

July 31, 2020
Date

/s/ Peter R. Marksteiner
Peter R. Marksteiner
Clerk of Court

APPENDIX F — ORDER ON PETITION FOR REHEARING EN BANC OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, DATED JULY 31, 2020

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2018-1763

AMERICAN AXLE & MANUFACTURING, INC.,

Plaintiff-Appellant,

v.

NEAPCO HOLDINGS LLC,
NEAPCO DRIVELINES LLC,

Defendants-Appellees.

Appeal from the United States District Court for the District of Delaware in No. 1:15-cv-01168-LPS, Chief Judge Leonard P. Stark.

ON PETITION FOR REHEARING EN BANC

Before Prost, *Chief Judge*, Newman, Lourie, Dyk, Moore, O'Malley, Reyna, Wallach, Taranto, Chen, Hughes, and Stoll, *Circuit Judges*.

Dyk, *Circuit Judge*, with whom Wallach and Taranto, *Circuit Judges*, join, concurs in the denial of the petition for rehearing en banc.

CHEN, *Circuit Judge*, with whom WALLACH, *Circuit Judge*, joins, concurs in the denial of the petition for rehearing en banc.

NEWMAN, *Circuit Judge*, with whom MOORE, O'MALLEY, REYNA, and STOLL, *Circuit Judges*, join, dissents from the denial of the petition for rehearing en banc.

STOLL, *Circuit Judge*, with whom NEWMAN, MOORE, O'MALLEY, and REYNA, Circuit Judges, join, dissents from the denial of the petition for rehearing en banc.

O'MALLEY, *Circuit Judge*, with whom NEWMAN, MOORE, and STOLL, *Circuit Judges*, join, dissents from the denial of the petition for rehearing en banc.

LOURIE, *Circuit Judge*, dissents without opinion from the denial of the petition for rehearing en banc.

PER CURIAM.

ORDER

Appellant American Axle & Manufacturing, Inc. filed a combined petition for panel rehearing and rehearing en banc. A response to the petition was invited by the court and filed by appellees Neapco Holdings LLC and Neapco Drivelines LLC. Several motions for leave to file amici curiae briefs were filed and granted by the court. The petition for rehearing, response, and amici curiae briefs were first referred to the panel that heard the appeal, which granted the petition in part as indicated in the

accompanying order. Thereafter, the petition was referred to the circuit judges who are in regular active service. A poll was requested, taken, and failed.

Upon consideration thereof,

IT IS ORDERED THAT:

1) The petition for rehearing en banc is denied.

2) The mandate of the court will issue on September 8, 2020.

FOR THE COURT

July 31, 2020
Date

/s/ Peter R. Marksteiner
Peter R. Marksteiner
Clerk of Court

DYK, *Circuit Judge*, with whom WALLACH and TARANTO, *Circuit Judges*, join, concurring in the denial of the petition for rehearing en banc.

We agree that en banc review was not warranted. The panel opinion is both consistent with precedent and narrow in its scope. Claim 22 and related claims instruct only the use of mass and stiffness to match relevant frequencies to tune a propshaft liner so that the liner, when used, will produce certain results (reducing two modes of vibration from the propshaft). Contrary to Judge Stoll's dissent, these claims in no way "recite the process and machinery necessary to produce the desired effect of reducing vibrations in a shaft assembly." Stoll Dissent Op. at 2-3. Because claim 22 contains no further identification of specific means for achieving those results, but merely invokes the natural law that defines the relation between stiffness, mass, and vibration frequency, it is ineligible under a long line of cases beginning at about the time of *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 14 L. Ed. 601 (1853), which held ineligible a claim to "printing intelligible characters . . . at any distances" by the use of "electro-magnetism," precisely because, unlike the other upheld claims in *O'Reilly*, it lacked any identification of specific means to use electromagnetism.[1] *Id.* at 113-20.

1. Judge Stoll's dissent suggests that "several of Samuel Morse's other claims [in *O'Reilly*] were held eligible in that very same case, and [that] they more closely resemble the claims at issue here." Stoll Dissent Op. at 2. Unlike claim 8, however, the other claims in *O'Reilly* all incorporated by express reference descriptions and illustrations from the specification of the patent addressed by the Court. The specification contained a number of detailed technical drawings and

"Morse's eighth claim would have covered, among other things, telephone, radio, television, microwave, wireless, and Internet communication, although they were all invented by others much later." Jay Dratler, Jr., *Alice in Wonderland Meets the U.S. Patent System*, 38 Akron L. Rev. 299, 321 (2015). Allowing the patentability of such broad claims impairs rather than promotes innovation and denies patent protection to real inventors—those who discover particular ways to achieve the desired result. "[T]here is a danger that the grant of patents that tie up the[] use [of laws of nature] will inhibit future innovation premised upon them, a danger that becomes acute when a patented process amounts to no more than an instruction to 'apply the natural law,' or otherwise forecloses more future invention than the underlying discovery could reasonably justify." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 86, 132 S. Ct. 1289, 182 L. Ed. 2d 321 (2012).

The inventors here may well have invented a specific means of achieving the claimed result, but they chose not to include such means in the claims we hold ineligible. Those claims, which invoke only a natural law, are ineligible under *O'Reilly* and other cases invalidating claims that merely state a result without providing specific detail as to the

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corresponding descriptions. *See* Reissue Patent No. 117 (issued June 13, 1848) (Figure 1-5 and pages 2-3). In contrast, claim 8 of *O'Reilly* specifically did not limit itself to the specification and for that reason was found ineligible. *O'Reilly*, 56 U.S. at 62 ("Eighth. I do not propose to limit myself to the specific machinery, or parts of machinery, described in the foregoing specification . . . ."). In the Telephone Cases, the Supreme Court explained that *O'Reilly*'s singling out of claim 8 rested on this exact distinction. *Dolbear v. Am. Bell Tel. Co.*, 126 U.S. 1, 534, 8 S. Ct. 778, 31 L. Ed. 863, 1888 Dec. Comm'r Pat. 321 (1888).

"how"—the means for achieving the result. *See Mayo*, 566 U.S. at 71-73 ("[T]o transform an unpatentable law of nature into a patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words 'apply it.'"); *Parker v. Flook*, 437 U.S. 584, 586, 98 S. Ct. 2522, 57 L. Ed. 2d 451 (1978) (invalidating a claimed method that did not "purport to explain how to select . . . any of the . . . variables" involved, or "purport to contain any disclosure relating to the chemical process at work, the monitoring of process variables, or the means of setting off an alarm or adjusting an alarm system"); *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94-101, 59 S. Ct. 427, 83 L. Ed. 506, 1939 Dec. Comm'r Pat. 857 (1939); *O'Reilly*, 56 U.S. at 112-17 (holding a claim for "use of the motive power of the electric or galvanic current . . . for marking or printing intelligible characters . . . at any distances" ineligible because "it matter[ed] not by what process or machinery the result [wa]s [to be] accomplished"); *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175, 14 L. Ed. 367 (1852) (holding that claiming a concept without the particular steps of carrying it out "would prohibit all other persons from making the same thing by any means whatsoever," and that such claims are ineligible for patentability); *Corning v. Burden*, 56 U.S. (15 How.) 252, 268, 14 L. Ed. 683 (1853) ("It is for the discovery or invention of some practicable method or means of producing a beneficial result or effect, that a patent is granted, and not for the result or effect itself."), quoted by *Diamond v. Diehr*, 450 U.S. 175, 182 n.7, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981).[2]

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2. *See also SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1167 (Fed. Cir. 2018) (holding that as "reflected repeatedly in our cases," to avoid ineligibility, a claim must "ha[ve] the specificity

required to transform [the] claim from one claiming only a result to one claiming a way of achieving it"); *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1258 (Fed. Cir. 2016) (claim was directed to an ineligible abstract idea because "[t]here [wa]s nothing in the claim that [wa]s directed to *how* to implement out-of-region broadcasting on a cellular telephone"); *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1241 (Fed. Cir. 2016) (claims found ineligible and "directed to an abstract idea" because they "d[id] not claim a particular way of programming or designing the software to create menus . . . , but instead merely claim[ed] the resulting systems"); *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1348 (Fed. Cir. 2015) (finding claim abstract because it "contain[ed] no restriction on how the result [wa]s accomplished"); *Secured Mail Sols. LLC v. Universal Wilde, Inc.*, 873 F.3d 905, 911 (Fed. Cir. 2017) (finding claims abstract because they were "not limited by rules or steps that establish[ed] how the focus of the methods [wa]s achieved"); *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 770 (Fed. Cir. 2019), *cert. denied*, 140 S. Ct. 983, 206 L. Ed. 2d 135 (2020) (finding claims directed to abstract idea where broad claim language "would cover any mechanism for implementing network communication on a charging station" rather than a specific way of doing so); *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1345-46 (Fed. Cir. 2018) (claims ineligible "because they consist[ed] of generic and conventional information acquisition and organization steps that [we]re connected to, but d[id] not convert, the abstract idea . . . into a particular conception of *how to carry out* that concept" (emphasis added)); *Innovation Sci., LLC v. Amazon.com, Inc.*, 778 F. App'x 859, 863 (Fed. Cir. 2019) (finding ineligible a claim reciting coverage "in merely functional, result-oriented terms"); *Univ. of Fla. Research Found., Inc. v. Gen. Elec. Co.*, 916 F.3d 1363, 1364, 1368 (Fed. Cir. 2019) (claims "directed to an abstract idea" where "[n]either the . . . patent, nor its claims, ex-plain[ed] *how* the drivers d[id] the conversion that [Appellant] points to."); *Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1337 (Fed. Cir. 2017) (claim directed to ineligible abstract idea where "[t]he claim require[d] the functional results of 'converting,' 'routing,'

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The assertions that the panel decision holds that "any reliance on a scientific principle in the claimed subject matter affects eligibility" or calls into question the patentability of basic inventions such as "the telegraph, telephone, light bulb, and airplane" are quite incorrect. Newman Dissent Op. at 5; Stoll Dissent Op. at 7. What the decision calls into question is claims, such as claim 8 in *O'Reilly*, that claim only a result (the telegraph, electric light bulb, the combustion engine) and disclose nothing more than a natural law (electromagnetic force, incandescence, chemical combustion) to achieve that result. Nothing in the panel opinion suggests that claims that describe how the objective (light bulb, etc.) is to be achieved are patent ineligible. Such claims have long been held patentable. Such claims continue to be patentable. A contrary result would deny a true inventor (an individual who determined a specific means to achieve the claimed result) the fruits of his or her invention.

'controlling,' 'monitoring,' and 'accumulating records,' but d[id] not sufficiently describe how to achieve these results in a non-abstract way"); *Finjan, Inc. v. Blue Coat Sys., Inc.*, 879 F.3d 1299, 1305 (Fed. Cir. 2018) ("*Apple, Affinity Labs*, and other similar cases hearken back to a foundational patent law principle: that a result, even an innovative result, is not itself patentable."); *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016) ("[In section 101 analysis w]e . . . 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.").

As the foregoing cases illustrate, the same concern is significant under the abstract idea branch of ineligibility analysis, which we leave for consideration as to the claims that are the subject of our remand.

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Contrary to Judge Stoll's dissent from denial of rehearing en banc, *see* Stoll Dissent Op. at 6-7, there is also no fact issue here. If the suggestion is that it is a factual question whether more than Hooke's Law might be needed to make a device that actually produces the claimed result, that is not the proper eligibility question. In *O'Reilly*, it was plain from the specification and the other claims that more than electromagnetism was needed to produce the claimed result, but the Supreme Court held claim 8 ineligible precisely because it omitted any such implementation means. The omission of needed specifics in the claim was the problem, not a reason to find eligibility.

The step-one "directed to" inquiry in this case, as in *O'Reilly*, is what the claim says. As to that question, the panel does not suggest that there can never be a factual issue, but there is no such factual issue here. Both parties' witnesses agreed that Hooke's law relates an object's frequency of vibration to its mass and stiffness, *see* Maj. Op., slip op. at 12-13, and neither party disputes the claim construction given to the claim language "tuning a mass and a stiffness of at least one liner," namely, "controlling a mass and stiffness of at least one liner to configure the liner to match a relevant frequency or frequencies," J.A. 15, 1047. Nor is there a conflict in evidence about what "mass" or "stiffness" means to the relevant skilled artisan. The claim language thus invokes the very relation between frequency and mass and stiffness stated by Hooke's law, as the district court determined. J.A. 11 ("The claimed methods are *applications of Hooke's law* with the result of friction damping." (emphasis added)).

Claim 22 does not name Hooke's law, but the name is immaterial. The Supreme Court has not required reciting the natural law by name and has rejected a "draftsman's art" approach to § 101 analysis. *See, e.g.*, *Mayo*, 566 U.S. at 72, 77 (explaining that the "laws of nature" set forth in the claims are unnamed "relationships between concentrations of certain metabolites in the blood and the likelihood that a dosage of a thiopurine drug will prove ineffective or cause harm").

Judge O'Malley's dissent suggests that the panel majority "decide[s] questions on grounds that were neither argued before the district court nor briefed on appeal" and that it "announces a new test for patentable subject matter at the eleventh hour and without adequate briefing." O'Malley Dissent at 2. But there is no new ground here. Both in district court and on appeal, Neapco Holdings LLC and Neapco Drivelines LLC (collectively, "Neapco") argued that the claims invoked a natural law, and nothing more, to accomplish a desired result. Neapco argued in summary judgment briefings that "the claims are ineligible because they are directed to laws of nature and/or natural phenomena related to controlling the natural frequency of an object and the physics behind vibration attenuation." J.A. 4596. Neapco's expert stated that "the asserted claims of the '911 patent do nothing more than attempt to claim well-known laws of nature or natural phenomen[a]." J.A. 2704. American Axle & Manufacturing, Inc. ("AAM") opposed this characterization of the claims in its briefing to the district court: "Neapco oversimplifie[d] the Asserted Claims to allege that they 'do nothing more than attempt to claim well-known laws of nature or natural

phenomenon . . . . [Its] arguments are without merit." J.A. 4331 (quoting Neapco's expert's testimony). Ultimately, the district court found that the claims "are directed to the mere application of Hooke's law, and they fail to instruct *how* to design the tuned liners or manufacture the driveline system to attenuate vibrations." J.A. 11-12. On appeal, Neapco reiterated that "[o]ther than providing the relationship set by the natural law itself, the claims tell those of skill nothing else about how to purportedly 'tune' a liner." Neapco Br. 25; *see also id.* at 38 ("[T]he claims here specifically lack[] any instruction or disclosure for how to design or manufacture the tuned liners to attenuate vibration (other than telling an engineer to 'apply' Hooke's law)."); Oral Arg. 13:38-56 (explaining that the invention "is a claim to a goal, the result . . . of tuning a liner to dampen two different modes of vibration").[3] The panel opinion appropriately addresses the case as argued.

There is also no "new test" in stating that claim 22 is "nothing more" than a natural law, *i.e.*, that it contains no information as to how to achieve the claimed result. This linguistic formulation has previously been used by this court in describing the test for § 101.[4] This "nothing

3. AAM argued that "[t]he district court [in its § 101 analysis] . . . applied an erroneous legal standard finding that the asserted claims did not 'disclose' or 'instruct how' to design tuned liners. There is no such standard, even under § 112, requiring the *claims* of the '911 patent to 'instruct *how* to design the tuned liners or manufacture the driveline system to attenuate vibrations.'" AAM Op. Br. 54 (quoting J.A. 11).

4. *See, e.g., Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042, 1048 (Fed. Cir. 2016) ("In recent cases, we found claims

more" formulation was also repeatedly used by Neapco,[5] by Neapco's expert,[6] and by AAM to describe Neapco's position.[7] The same linguistic formulation was used by the district court. J.A. 15 ("Since Hooke's law governs the relationship between mass, stiffness, and frequency, the 'tuning' claim limitation does *nothing more* than suggest that a noise, vibration, and harshness . . . engineer . . .

'directed to' a patent-ineligible concept when they amounted to *nothing more* than observing or identifying the ineligible concept itself." (emphasis added)); *ChargePoint*, 920 F.3d at 769 (finding ineligible at step 1 "claims that claim *nothing more* than the broad law . . . underlying the claims" (emphasis added)); *Genetic Veterinary Scis., Inc. v. LABOKLIN GmbH & Co. KG*, 933 F.3d 1302, 1318 (Fed. Cir. 2019) (finding ineligible claims "directed to *nothing more* than 'observing or identifying' the natural phenomenon of a mutation in the SUV39H2 gene" (emphasis added)).

5. Neapco Br. 12 ("The claimed 'tuning' is *nothing more* than a recitation of Hooke's law . . . ." (emphasis added) (capitalization removed)); *id.* at 21 ("[T]he asserted claims do *nothing more* than recite the abstract concept of 'tuning' a liner according to a natural law." (emphasis added)); *id.* at 32 ("The asserted claims 'fail to provide any meaningful limits on the scope of the claim,' and are thus '*nothing more* than applying a law of nature to a conventional method to achieve an abstract solution to a problem.'" (emphasis added) (quoting J.A. 18)).

6. J.A. 2704 (Neapco's expert stating that "the asserted claims of the '911 patent do *nothing more* than attempt to claim well-known laws of nature or natural phenomen[a]" (emphasis added)).

7. J.A. 4331 (AAM arguing that "Neapco oversimplifie[d] the Asserted Claims to allege that they 'do *nothing more* than attempt to claim well-known laws of nature or natural phenomenon . . . . [Its] arguments are without merit." (emphasis added) (quoting Neapco's expert)).

[would] consider that law of nature when designing propshaft liners to attenuate driveline vibrations." (emphasis added)); J.A. 18 ("Here, because the Asserted Claims are *nothing more* than applying a law of nature to a conventional method to achieve an abstract solution to a problem, the Asserted Claims fail to provide any meaningful limits on the scope of the claim.").

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CHEN, *Circuit Judge*, with whom WALLACH, *Circuit Judge*, joins, concurring in the denial of the petition for rehearing en banc.

I concur in the court's decision not to rehear this case en banc because the principles applied by the district court and panel majority in holding claim 22 invalid are consistent with long-standing precedent. Contrary to the dissent's view, the panel majority did not announce a new patent-eligibility test. Rather, its rationale is a straightforward application of the Supreme Court's decision in *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 14 L. Ed. 601 (1853). Moreover, the district court applied the same test as the panel majority and for that reason no remand is required as to claim 22.

What the dissent dubs the new "nothing more" test is actually a principle that has been part of patent law since at least 1853: a claim may be held ineligible if it invokes a natural law to achieve some desired result without reciting any further limitations as to the means for accomplishing that result. In *O'Reilly*, the Supreme Court ruled that Samuel Morse's eighth claim, reciting nothing more than the use of electromagnetism to generate and send messages at a distance, was ineligible. *Id.* at 112-13. Today's panel decision tracks that precise reasoning. As construed, claim 22 calls for nothing more than the use of Hooke's law to produce a particular result: the reduction of two types of vibration in a liner. The claim is devoid of any other element for producing that result. Because claim 22, as drafted and construed, is substantively the same as Mr. Morse's claim 8, I do not see a way to logically distinguish *O'Reilly* in this case.

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Some amici suggest that the panel's understanding of *O'Reilly* is undercut because other claims of Mr. Morse's patent were found eligible and are analogous to AAM's claims. *See* Law Prof. Br. 6-8. They suggest that Mr. Morse's upheld claims merely begin with a natural law and end with a desired result without reciting any further requirements. To the contrary, each of Mr. Morse's claims, with the exception of ineligible claim 8, limits itself to the specific implementation details disclosed in Mr. Morse's specification. Take claim 1 for example:

> Having thus fully described my invention, I wish it to be understood that I do not claim the use of the galvanic current or current of electricity for the purpose of telegraphic communications generally; but [w]hat I specially claim as my invention and improvement is—
>
> 1. Making use of the motive power of magnetism when developed by the action of such current or currents, *substantially as set forth in the foregoing description of the first principal part of my invention*, as means of operating or giving motion to machinery which may be used to imprint signals upon paper or other suitable material, or to produce sounds in any desired manner for the purpose of telegraphic communication at any distances.

U.S. Reissue Patent No. 117 (issued June 13, 1848) (emphasis added). Claim 1 does not simply invoke "the motive power of magnetism" to produce the desired

result of "telegraphic communication at any distances," but instead further confines the claim's scope to the application of current "substantially as set forth in the foregoing description of the first principal part of [Mr. Morse's] invention" to achieve the desired result. *Id.* The remaining claims likewise incorporate implementation details from Mr. Morse's specification. *Id.* (claiming what was "substantially as set forth in the foregoing description," the "combination of machinery herein described," "substantially by the means herein described," "substantially as herein set forth and illustrated," and "as herein described").

In contrast, Mr. Morse's claim 8 disavows any implementation details from his specification:

> 8. *I do not propose to limit myself to the specific machinery or parts of machinery described in the foregoing specifications and claims*, the essence of my invention being the use of the motive power of the electric or galvanic current, which I call "*electro-magnetism*," *however developed, for marking or printing intelligible characters, signs, or letters at any distances*, being a new application of that power of which I claim to be the first inventor or discoverer.

Id. (emphasis added). As the Supreme Court later explained in *Dolbear v. Am. Bell Tel. Co.*, the distinguishing feature of Mr. Morse's invalidated claim 8 was that it claimed "the use of magnetism as a motive power, without regard to the particular process with which it was connected

in the patent." 126 U.S. 1, 534, 8 S. Ct. 778, 31 L. Ed. 863, 1888 Dec. Comm'r Pat. 321 (1888). In contrast, the Court explained that Mr. Morse's claim 1, although also "making use of the motive power of magnetism," was patent eligible because that claim specified the use of magnetism in connection with the particular process disclosed in the patent. *Id.* Following these principles, the Court in *Dolbear* held eligible a claim to "transmitting vocal or other sounds telegraphically, *as herein described*, by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or other sound, *substantially as set forth*." *Id.* at 532 (emphasis added).

The amici's understanding of Mr. Morse's upheld claims as merely reciting the motive power of magnetism to produce telegraphic communication thus suffers from multiple grave problems. First, it ignores the claim language incorporating implementation details from the specification. Second, if the amici's reading were correct, it would render the *O'Reilly* decision hopelessly in conflict with itself, given that the Court invalidated claim 8. Third, the Court in *Dolbear*, in reiterating the principle that invoking a law of nature to achieve a result, without more, is not a patent-eligible claim, characterized Mr. Morse's upheld claims in a way that is clearly incompatible with the amici's views. Thus, nothing in *O'Reilly* helps AAM's cause in this case.

Contrary to the dissent's position that a remand is needed to allow the district court to apply the *O'Reilly* test in the first instance, the district court here already applied

the principles of *O'Reilly* in the same way and based on the same claim interpretation as the panel majority when it held claim 22 invalid as merely invoking Hooke's law to accomplish a desired result. The district court's decision noted that "Neapco asserts, in order to 'tune' the liner, one merely applies Hooke's law and then measures the amount of damping." J.A. 11. "[A]gree[ing] with Neapco," the district court explained that "[t]he claimed methods are *applications of Hooke's law* with the result of friction damping." *Id.* (emphasis added); *see also* J.A. 11-12 (finding the asserted claims "are directed to the *mere application of Hooke's law*, and they fail to instruct *how* to design the tuned liners or manufacture the driveline system to attenuate vibrations.") (first emphasis added); J.A. 15 (finding, under the court's claim construction "controlling a mass and stiffness of at least one liner to configure the liner to match a frequency or frequencies," that "this claim limitation is just the *application of Hooke's law*") (emphasis added); J.A. 17 ("Here, the Asserted Claims *simply instruct one to apply Hooke's law* to achieve the desired result of attenuating certain vibration modes and frequencies. They provide no particular means of how to craft the liner and propshaft in order to do so.") (emphasis added). Thus, while the district court initially identified the issue in the case as whether the asserted claims are directed to both "Hooke's law and friction damping," J.A. 10, the court ultimately concluded that claim 22 invokes Hooke's law, with nothing more, to achieve a desired result. J.A. 11, 11-12, 15, 17. Notably, this understanding of the claims directly follows from the undisputed claim construction that the claim calls for controlling mass and stiffness to control frequency. *See* J.A. 10-12 (analyzing

why controlling mass and stiffness to control frequency is a reference to applying Hooke's law). And given that the district court analyzed the content of the claim and found nothing other than this reference to Hooke's law for accomplishing the claimed results of attenuating shell mode and bending mode vibrations, its reasoning and conclusion as to claim 22's invalidity follows the principle established by the Supreme Court in *O'Reilly*. The district court's understanding of the claim and its rationale for holding claim 22 patent ineligible thus are identical to the panel majority's analysis and a remand is not necessary.

While some question the correctness of the panel majority and district court's application of the *O'Reilly* test to AAM's claim 22, the application of law to fact in the section 101 context has always been a case by case judgment. Such context-driven analysis is made in many areas of patent law, for example in determining whether a claim is invalid for obviousness or construing a claim limitation in light of the specification. The same is true for the judicial exceptions to section 101 and the legal assessment as to whether a claim is directed to a patent-ineligible concept or a patent-eligible application of that concept. As Judge Learned Hand famously remarked about the similarly difficult problem in copyright law of distinguishing between idea and expression: "Nobody has ever been able to fix that boundary, and nobody ever can." *Nichols v. Universal Pictures Corp.*, 45 F.2d 119, 121 (2d Cir. 1930). In the present case, given (1) the claim language of tuning the liner's mass and stiffness, (2) the undisputed construction of the relevant claim language as referring to tuning said mass and stiffness to match frequencies,

(3) the undisputed mathematical relationship, per Hooke's law, between mass, stiffness, and frequency, and (4) the district court's analysis rejecting AAM's arguments that claim 22, as construed, is not referring to Hooke's law (J.A. 11-12), it seems reasonable to me for the panel majority to view claim 22 as on par with Mr. Morse's claim 8 and thus likewise fall on the side of ineligibility.

Importantly, the majority's opinion in this case does not, and should not be read to, announce a new test for patent eligibility. It holds that the *O'Reilly* test remains good law and applies when a claim recites a limitation that, as construed, expressly invokes a particular law of nature. Maj. at 26. The majority opinion emphasizes that its holding "should not be read as an invitation to raise a validity challenge against any patent claim that requires the application of an unstated natural law." *Id.* That a claim implicitly or inherently requires compliance with a natural law for any embodiment to be operational is not a basis for concluding that the claim expressly invokes that natural law. In this case, the undisputed construction of claim 22 tunes mass and stiffness to match frequency, which is the very formula for Hooke's law.

The narrow scope of the majority's holding is illustrated by the differences in the outcomes between claims 1 and 22. If claim 22 had omitted any reference to mass and stiffness, such that the claim simply recited "tuning to match the relevant frequency or frequencies," there would be no basis to say that the claim invokes Hooke's law. This is the scenario of claim 1, which recites "tuning at least one liner to attenuate at least two types

of vibration transmitted through the shaft member" and "positioning the at least one liner within the shaft member such that the at least one liner is configured to damp shell mode vibrations in the shaft member by an amount that is greater than or equal to about 2%, and the at least one liner is also configured to damp bending mode vibrations in the shaft member, the at least one liner being tuned to within about ±20% of a bending mode natural frequency of the shaft assembly as installed in the driveline system." U.S. Patent No. 7,774,911 at claim 1. Because claim 1 nowhere mentions "mass" and "stiffness," it cannot properly be read to expressly invoke the Hooke's law relationship between mass, stiffness, and frequency. As the specification confirms, tuning for a desired frequency can be accomplished through variables other than mass and stiffness. *Id.* at col. 7 l. 60-col. 8 l. 2. Thus, unlike claim 22, claim 1 cannot be said to expressly call for Hooke's law.[1] Because of the differences between the two claims, I cannot say it was wrong for the panel majority to hold that the district court erred by treating the two claims in the same way. As evidenced by the majority opinion's conclusion that claim 1 is not directed to a natural law, the narrow holding of this case should not be read to open the door to eligibility challenges based on the argument that a claim is directed to one or more unspecified natural laws.

1. This distinction between claim 22, which expressly invokes Hooke's law, and claim 1, which is entirely silent as to mass and stiffness, exists regardless of whether "positioning" in claim 1 is construed to have the same, or different meaning to "inserting" in claim 22. While claim 1 is not directed to Hooke's law, the district court will address on remand whether it is directed to an abstract idea.

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To the extent AAM and amici contend that mechanical or industrial inventions can be categorically excluded from the ambit of section 101 concerns, I cannot agree. The origins of the judicial exceptions to patent eligibility arise from such cases during the Industrial Revolution. Mr. Morse's patent claimed the invention of the electromagnetic telegraph. *O'Reilly*, 56 U.S. at 77. In *Wyeth v. Stone*, Justice Story, riding circuit, considered the eligibility of a patent that described a particular apparatus for cutting ice, and a method for using the inventor's apparatus to cut ice. 30 F. Cas. 723, F. Cas. No. 18107 (C.C.D. Mass. 1840) (finding ineligible a claim to "the art of cutting ice by means of any power, other than human power"). Likewise, in *Tilghman v. Proctor*, the Court evaluated the eligibility of a claim to "the manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure." 102 U.S. 707, 729, 26 L. Ed. 279, 1881 Dec. Comm'r Pat. 163 (1880). To exclude manufacturing methods such as AAM's from the section 101 inquiry would be inconsistent with longstanding Supreme Court precedent dating back to the origins of the eligibility inquiry.

I also do not agree with the dissent's assertion that the panel majority's decision creates a heightened enablement provision. As the majority opinion explains, section 101 imposes a threshold constraint on the claims, whereas enablement applies a second, different requirement to the specification's support of those claims. Maj. at 27-29. Moreover, the panel opinion goes no farther than what is required by *O'Reilly*, which the Supreme Court has repeatedly identified as a case about the judicial exceptions to

section 101. *See Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1343 (Fed. Cir. 2018) (citing Supreme Court section 101 opinions discussing *O'Reilly*). And as made clear by the lengthy list of both Supreme Court and Federal Circuit cases cited in Judge Dyk's concurrence, result-oriented claim drafting raises concerns under section 101 independent from section 112. Dyk Concurrence Op. at 3-4 and n.2. The lesson to patent drafters should now be clear: while not all functional claiming is the same, simply reciting a functional result at the point of novelty poses serious risks under section 101. *See, e.g., SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1167 (Fed. Cir. 2018) (stressing that, as "reflected repeatedly in our 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"); *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175, 14 L. Ed. 367 (1853) ("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."); *Athena Diagnostics, Inc. v. Mayo Collaborative Servs., LLC*, 927 F.3d 1333, 1344-49 (Fed. Cir. 2019) (Chen, J., concurring in denial of rehearing en banc) (explaining how the Supreme Court in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 132 S. Ct. 1289, 182 L. Ed. 2d 321 (2012) and *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 134 S. Ct. 2347, 189 L. Ed. 2d 296 (2014) resurrected the point of novelty inquiry from *Parker v. Flook*, 437 U.S. 584, 98 S. Ct. 2522, 57 L. Ed. 2d 451 (1978), which many, including this court, thought had been rejected in *Diamond v. Diehr*, 450 U.S. 175, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981)).

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Consider the example of an automaker CEO who announces a stretch goal to her engineers to produce a car, powered by electricity, that can be driven 1,000 miles without a recharge. That declaration from the CEO does not make her an "inventor" and the section 101's judicial exceptions bar the grant of a patent for such a claim, for it fails to recite any arguable act of invention to reach the claimed result. Like Mr. Morse's claim 8, this claim recites a law of nature, and also like Mr. Morse's claim 8, the claim's fundamental problem is there is no there there. Without any content in the claim that can even be arguably regarded as some form of a means or method beyond the use of electricity, the claim is invalid under *O'Reilly* without having to consider other validity grounds, such as enablement, for example.

Assessing claim validity under section 101 is difficult work and our court over a series of many decisions in recent years has attempted to extract principles articulated in Supreme Court opinions, both old and new. Differences of opinion within our court on how to apply those principles to a particular case inevitably arise from time to time, given the inherently imprecise nature of the legal framework. But today's panel majority decision is consistent with both Supreme Court and our court's precedent and its decision as to claims 1 and 22 does not strike me as warranting en banc intervention.

NEWMAN, *Circuit Judge*, with whom MOORE, O'MALLEY, REYNA, and STOLL, *Circuit Judges*, join, dissenting from denial of the petition for rehearing en banc.

The court's rulings on patent eligibility have become so diverse and unpredictable as to have a serious effect on the innovation incentive in all fields of technology. The victim is not only this inventor of this now-copied improvement in driveshafts for automotive vehicles; the victims are the national interest in an innovative industrial economy, and the public interest in the fruits of technological advance. I share the concerns of my colleagues in dissent, and I write to emphasize the far-reaching consequences of the court's flawed Section 101 jurisprudence.

The court's new spin on Section 101 holds that when technological advance is claimed too broadly, and the claims draw on scientific principles, the subject matter is barred "at the threshold" from access to patenting. As here, where the invention is found to embody a principle of physics called "Hooke's law," the court rules that the invention is ineligible for patenting as a matter of law.

All technology is based on scientific principles—whether or not the principles are understood. The Supreme Court long ago recognized that what is required for patentability is that the inventor describes the useful application of discovery. The Court then and now understood the distinction between the basic principles of science and their practical application. See, for example, *Le Roy v. Tatham*, 55 U.S. 156, 14 L. Ed. 367 (1852):

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> The word *principle* is used by elementary writers on patent subjects, and sometimes in adjudications of courts, with such a want of precision in its application, as to mislead. It is admitted, that a principle is not patentable. A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.

Id. at 174-75 (emphasis in original). This understanding is fundamental to the system of patents, implementing the constitutional purpose of promoting the progress of science and useful arts. The Court further stated:

> [T]he processes used to extract, modify, and concentrate natural agencies, constitute the invention. The elements of the power exist; the invention is not in discovering them, but in applying them to useful objects.

Id. at 175. The Supreme Court has reiterated this balance between abstract principle and practical application:

> [W]e tread carefully in construing this exclusionary principle lest it swallow all of patent law. At some level, "all inventions . . . embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas." Thus, an invention is not rendered ineligible for patent simply because it involves an abstract concept. "Applications" of such concepts "to

> a new and useful end," we have said, remain eligible for patent protection.

Alice Corp. v. CLS Bank Int'l, 573 U.S. 208, 217, 134 S. Ct. 2347, 189 L. Ed. 2d 296 (2014) (internal citations and alterations omitted).

Precedent illustrates application of these principles to evolving technologies; for example, radio: "While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be." *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94, 59 S. Ct. 427, 83 L. Ed. 506, 1939 Dec. Comm'r Pat. 857 (1939). *See also, e.g., Diamond v. Diehr*, 450 U.S. 175, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981):

> Our earlier opinions lend support to our present conclusion that a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer. . . . It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.

Id. at 187 (emphasis in original). Until recently, Federal Circuit precedent appropriately implemented the law; for example, *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) ("The 'directed to' inquiry,

therefore, cannot simply ask whether the claims involve a patent-ineligible concept, because essentially every routinely patent-eligible claim involving physical products and actions involves a law of nature and/or natural phenomenon—after all, they take place in the physical world."); *see also In re TLI Comm'cns LLC Patent Litig.*, 823 F.3d 607, 611 (Fed. Cir. 2016) ("But in determining whether the claims are directed to an abstract idea, we must be careful to avoid oversimplifying the claims because '[a]t some level, 'all inventions . . . embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.'" (quoting *Alice Corp.*, 573 U.S. at 217)).

However, the case now before us departs from these rulings, adding to the concerns of *amici curiae* that "[t]he panel majority's decision reflects a five-year trend of courts severely narrowing the range of inventions and discoveries eligible for patent protection under the two-step *Mayo-Alice* inquiry, contrary to historical practice and precedent." 12 Law Profs. Br. 2.

Section 101 of the patent statute is designed as an all-encompassing introduction to the subject matter of invention and discovery:

> 35 U.S.C. § 101. Whoever 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 therefor, subject to the conditions and requirements of this title.

Appendix F

A valid patent must meet the "conditions and requirements" of the patent statute; eligibility under Section 101 is not the same as patentability under the substantive statutory provisions of novelty (§ 102), non-obviousness (§ 103), and description and enablement (§ 112). Yet the court accepts the argument made by defendant Neapco, the admitted copier of the American Axle invention, that "it always has been, the breadth of a claim is critically material to the § 101 inquiry. The fact that breadth is also material to enablement (and written description, novelty, and obviousness as well) does not mean that it cannot be relevant to § 101." Neapco Br. 4. That is incorrect.

Breadth of claiming is a matter of the scope and con tent of the description and enablement in the specification, considered in light of the prior art, as investigated during PTO examination. The notion that any reliance on a scientific principle in the claimed subject matter affects eligibility under Section 101 itself warrants *en banc* rehearing.

The panel majority holds that some claims hereof are, "without more," a claim to a scientific principle, and that it is irrelevant whether the application is new, non-obvious, and enabled. This theory has found support in half of the court, now declining *en banc* review. Our missteps are conspicuous in the panel majority's treatment of "Hooke's law," which is stated to be the basis for the majority's ruling of ineligibility, although we are not told Hooke's law or how it invalidates American Axle's new automotive driveshaft.

Appendix F

Hooke's law is not defined in the parties' briefs. However, it is reported in the Encyclopædia Britannica, at https://www.britannica.com/science/Hookes-law:

> Mathematically, Hooke's law states that the applied force F equals a constant k times the displacement or change in length x, or $F = kx$. The value of k depends not only on the kind of elastic material under consideration but also on its dimensions and shape.

The panel majority does not explain how Hooke's formula $F = kx$ for the compression of springs renders the '911 patent's automotive driveshaft ineligible for access to the patent system. One need only look at claim 1, the broadest claim, to observe that this is a straightforward form of claim, for which eligibility is routine:

> 1. 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 at least one liner to attenuate at least two types of vibration transmitted through the shaft member; and positioning the at least one liner within the shaft member such that the at least one liner is configured to damp shell mode vibrations

> in the shaft member by an amount that is greater than or equal to about 2%, and the at least one liner is also configured to damp bending mode vibrations in the shaft member, the at least one liner being tuned to within about ±20% of a bending mode natural frequency of the shaft assembly as installed in the driveline system.

'911 patent, col. 10, ll. 10-27.

Our colleagues apparently find differences in eligibility between claim 1 and claim 22:

> 22. 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.

'911 patent, col. 11, ll. 24-36. Our colleagues, writing to support denial of rehearing en banc, propose that there

is a Section 101 distinction between claim 1 and claim 22, and draw analogy to claim 8 of Samuel Morse's telegraph patent, Judge Dyk explaining that "claim 8 of *O'Reilly* specifically did not limit itself to the specification and for that reason was found ineligible." J. Dyk concurrence at 2 n.1. However, claim 8 was not rejected because it was not limited to the specification, it was rejected because it proposed to claim electromagnetism as a scientific principle. If the panel majority is holding that eligibility to claim an invention employing a scientific principle depends on whether the principle is mentioned in the specification, clear instructions must be given.

For the American Axle claims, neither the district court nor this court considered the prior art or other patentability factors including written description and enablement. Yet it is apparent that these claims are for an automotive driveshaft, not for an abstract idea or law of nature or mathematical formula. We are not told how $F = kx$ renders these claims ineligible for patenting.

The distinction between basic scientific principle and practical embodiment is the story of technology and industry. The *amici curiae* 12 Law Professors remind us that: "All inventions of practically applied processes and machines are reducible to mathematical abstractions and algorithms; for example, a patentable method for operating a combustion engine is really just an application of the law of PV=nRT, the principles of thermodynamics, and other laws of nature comprising the principles of engineering." 12 Law Profs. Br. 9 (quoting Adam Mossoff, *A Brief History of Software Patents (and Why They're Valid)*, 56 Ariz. L. Rev. Syllabus 65, 71 (2014)).

Nonetheless, the majority deems irrelevant whether the claimed subject matter meets the requirements of Sections 102, 103, and 112. We don't know whether there are substantive issues of claim scope related to invalidity or infringement. I take note of the protestations that this opinion is limited, but if the court indeed intends to limit its holding to driveshafts for automotive vehicles, *en banc* instruction is a necessity. Instead, the court furthers the debilitation of Section 101. As stated by *amicus curiae* Biotechnology Innovation Organization:

> [T]here continues to be unabated uncertainty about the patent eligibility of inventions across an expanding range of technologies, including biotechnology. The unstable state of patent-eligibility jurisprudence affects modern biotechnologies ranging from biomarker-assisted methods of drug treatment to companion diagnostic tests, fermentation products, industrial enzyme technology, and marker-assisted methods of plant breeding.

BIO Br. 1. Other *amici curiae* reinforce these concerns. As summarized by *amicus curiae* Judge Paul R. Michel (Ret.), "the § 101 rulings-at-issue threaten to undercut patent law and its innovation-promoting goals. . . . The panel's decision is legally incorrect and ill-advised." Michel Br. 1. And *amicus curiae* practitioner Jeremy C. Doerre states that "the implicit judicial exception to 35 U.S.C. § 101 for natural laws is ill-suited to police overbroad [claims]." Doerre Br. 4-5.

Appendix F

The need for judicial provision of stable and comprehensible patent law is of increasing urgency. "Legal protection of inventions and discoveries that once was a defining characteristic of U.S. industrial policy has become increasingly irrelevant, no longer providing adequate comfort to investors willing to make high risk commitments of time and capital or to inventors who would leave secure jobs to pursue visions of breakthrough technologies and challenge entrenched incumbents." Alliance of U.S. Startups & Inventors for Jobs Br. 2-3 (showing survey results conducted by Professor Taylor at SMU, documenting "[t]he growing unwillingness of inventors and investors to rely on patents in tackling promising but risky new technologies harbingers badly for the United States"). *Amicus curiae* Alliance states that "If left standing, the decision has the potential for expanding ineligibility under Section 101 to threaten most every invention for which a patent has ever been granted," *id.* at 5,—as exemplified in the case here before us.

The court's notion that the presence of a scientific explanation of an invention removes novel and non-obvious technological advance from access to the patent system, has moved the system of patents from its once-reliable incentive to innovation and commerce, to a litigation gamble. It is essential to restore the incentive role of the system of patents, for technology is the foundation of the nation's economy, trade, and strength.

There is no room for second best in our dependence on correct, just, and wise application of the law. I respectfully dissent from the court's denial of the request for rehearing *en banc*.

STOLL, *Circuit Judge*, with whom NEWMAN, MOORE, O'MALLEY, and REYNA, *Circuit Judges*, join, dissenting from the denial of the petition for rehearing en banc.

I write to dissent from the denial of the petition for rehearing en banc because the majority's decision extends § 101 to place in doubt the patent eligibility of historically eligible mechanical inventions, and thus presents "a question of exceptional importance" that warrants consideration by the full court. Fed. R. App. P. 35(a)(2). I share Judge Moore's concerns about the majority's "nothing more" test and its application in this case, particularly on this procedural posture. The majority has, to a limited extent, cabined the scope of its prior decision on panel rehearing, but I am concerned that its new decision only serves to introduce additional questions—including how to apply the "nothing more" test—that would benefit from further development and contemplation through en banc review.

The majority asserts that its "nothing more" test is not new, and is instead firmly grounded in precedent such as *O'Reilly v. Morse*, 56 U.S. 62, 14 L. Ed. 601 (1853). I disagree. The claim held ineligible in *O'Reilly* is distinguishable on its face. It was not limited to any particular machinery and was instead broadly directed to the use of electromagnetism, "however developed," for transmitting information. *Id.* at 112. And as amici point out, several of Samuel Morse's other claims were held eligible in that very same case, and they more closely resemble the claims at issue here. *See* Law Prof. Br. 6-8; *see also O'Reilly*, 56 U.S. at 85-86 (listing claims). For example, one

of the patent-eligible claims expressly recites applying a natural law, "the motive power of magnetism," to produce a result, "telegraphic communication at any distances." *O'Reilly*, 56 U.S. at 85 (quoting U.S. Reissue Patent No. 117). It is difficult to square that outcome in *O'Reilly* with the majority's application of the "nothing more" test here.

The majority, along with Judge Dyk and Judge Chen in their concurrences, contend that the *O'Reilly* Court held these claims eligible because they include phrases such as "substantially as set forth in the foregoing description," which, in their view, incorporated subject matter from the specification into the claims. But *O'Reilly* does not expressly rely on any such incorporation by reference. Instead, it characterizes the ineligible claim as being directed to "an effect produced by the use of electro-magnetism," as opposed to "the process or machinery necessary to produce" that effect. 56 U.S. at 120. That distinction is entirely consistent with the eligibility of the claims at issue here, for they recite the process and machinery necessary to produce the desired effect of reducing vibrations in a shaft assembly. And, although *O'Reilly* does describe the ineligible claim as "outside" and "beyond" the specification, *id.* at 119-20, it does not necessarily follow that the other claims were eligible because of any particular incorporation by reference. *See Dolbear v. Am. Bell Tel. Co.*, 126 U.S. 1, 534, 8 S. Ct. 778, 31 L. Ed. 863, 1888 Dec. Comm'r Pat. 321 (1888) ("The effect of [*O'Reilly*] was . . . that the use of magnetism as a motive power, without regard to the particular process with which it was connected in the patent, could not be claimed, but that *its use in that connection could*."

(emphasis added)). Thus, the majority's "nothing more" test appears to be a new development with potentially far-reaching implications in an already uncertain area of patent law. On that basis alone, this case deserves en banc review, including an opportunity for the parties and other stakeholders, such as the U.S. Patent and Trademark Office, to address the merits of the new "nothing more" test.

Judge Chen also claims in his concurrence that the majority did not create a new test, characterizing the majority's decision as a "straightforward application" of the "*O'Reilly* test" that is "consistent with long-standing prec-edent." *E.g.*, Chen Concurring Op. 1, 4, 6. While I appreciate the importance of *O'Reilly* as Supreme Court precedent addressing eligibility, I note that Judge Chen does not identify any prior court opinions or articles that specifically refer to an "*O'Reilly* test," nor am I aware of any. To the extent that the Supreme Court has cited *O'Reilly*, it has been for the general propositions that there is an implicit exception to § 101 and that preemption is an important concern in patent law. *See, e.g., Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 216, 134 S. Ct. 2347, 189 L. Ed. 2d 296 (2014) (citing *O'Reilly* in support of the implicit exception to § 101); *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 85, 132 S. Ct. 1289, 182 L. Ed. 2d 321 (2012) (discussing *O'Reilly* to illustrate preemption con-cerns); *Diamond v. Diehr*, 450 U.S. 175, 187-88, 101 S. Ct. 1048, 67 L. Ed. 2d 155 (1981) (cit-ing *O'Reilly* to underscore that an application of a law of nature or mathematical formula may be patent eligible). Perhaps most notably, the district court opinion

in this case never even mentions *O'Reilly*. Finally, if this case presented such a straightforward application of the longstanding "*O'Reilly* test," why did the majority's initial opinion not even mention this test?

In his concurrence, Judge Dyk also suggests that the "nothing more" test is not new because the same "linguistic formulation" has been used by this court, the district court, and by the parties. Dyk Concurring Op. 8-10 & n.4-7. In doing so, the concurrence provides nothing to further elucidate what the "nothing more" test entails, and in my view, makes the test even more confusing and uncertain. The fact that the phrase "nothing more" has been employed a few times in our recent § 101 jurisprudence provides little insight into its scope and application as a legal test. These scattered references, furthermore, provide little assurance that any legal test is being applied consistently and in accordance with the principles set forth by the Supreme Court in cases like *O'Reilly*. Indeed, the fact that "nothing more" has begun to appear in our § 101 precedent only further confirms that it would be prudent to review its application now. I am left even more convinced that we should hear this case en banc.

The majority's reasoning also introduces further uncertainty by blurring the line between patent eligibility and enablement. While the eligibility inquiry may take into account whether a claim has "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, 1167-68 (Fed. Cir. 2018) (emphasis added) (collecting cases), the majority's "how

to" analysis seems to go further, potentially incorporating a heightened enablement requirement into § 101. In my view, a claim can be specific enough to be directed to an application of a law of nature—which is patent eligible—without reciting how to perform all the claim steps. The majority's conclusion that claim 22 is ineligible demonstrates the flaws in its "how to" test. Even assuming that claim 22 applies Hooke's law (or any other unnamed law of nature), the claim seems sufficiently specific to qualify as an eligible application of that natural law. The claim identifies specific variables to tune, including "a mass and a stiffness of at least one liner." U.S. Patent No. 7,774,911 col. 11 l. 31. It requires that the tuned liner attenuate specific types of vibration, including "shell mode vibrations" and "bending mode vibrations," and further requires that the tuned liner is inserted in a "hollow shaft member." *Id.* at col. 11 ll. 30-36. With this level of specificity, claim 22 appears to be properly directed to "the application of the law of nature to a new and useful end," not to the law of nature itself. *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130, 68 S. Ct. 440, 92 L. Ed. 588, 1948 Dec. Comm'r Pat. 671 (1948) (collecting cases). Yet this level of detail is insufficient in the majority's view, and it remains unclear how much more "how to" would have been sufficient to render the claim eligible under the majority's approach. Here too, en banc review would provide an opportunity for the parties and other stakeholders to address, and the full court to consider, where eligibility analysis stops and enablement analysis begins.

Beyond the uncertainty introduced by the majority's application of the "nothing more" and "how to" tests, the

result reached by the majority should also give us pause. The majority invokes § 101 to hold ineligible a method for manufacturing a drive shaft assembly for a car—a class of invention that has historically been patent eligible. *See, e.g., Diehr*, 450 U.S. at 184 ("Industrial processes . . . have historically been eligible to receive the protection of our patent laws."). In my view, the result in this case suggests that this court has strayed too far from the preemption concerns that motivate the judicial exception to patent eligibility. The claims at issue here are far removed from the canonical ineligible claim that "simply state[s] the law of nature while adding the words 'apply it.'" *Mayo*, 566 U.S. at 72 (citing *Gottschalk v. Benson*, 409 U.S. 63, 71-72, 93 S. Ct. 253, 34 L. Ed. 2d 273 (1972)). Indeed, the claims at issue do not recite *any* particular law of nature, much less preempt the use of Hooke's law in any particular context. Instead, they are directed to a specific "method for manufacturing a shaft assembly" with a liner that attenuates certain types of vibrations. '911 patent col. 11 ll. 24-36. Even assuming that Hooke's law is required to tune the claimed liner (despite not being mentioned anywhere in the specification or claims), so are innumerable other laws of nature. And there remain innumerable ways to apply Hooke's law to achieve the goal of mitigating problematic vibrations in a shaft assembly—perhaps, for instance, by using something other than a liner tuned to attenuate at least two different kinds of vibrations.

I also believe that it is inappropriate for us to announce this new "nothing more" test, and then resolve it on our own when the resolution is subject to factual disputes. This is particularly so here, on review of the district court's

summary judgment of ineligibility. As Judge Moore's dissent points out, significant evidence, including expert testimony, contradicts the notion that the two types of vibrations identified in the claims can be reduced by Hooke's law and "nothing more." In my view, whether the claimed process involves application of Hooke's law, and whether it involves "nothing more" than Hooke's law, are both questions of fact. Whether the claims in this case invoke Hooke's law is not purely a question of claim construction involving intrinsic evidence because nothing in the intrinsic evidence even refers to Hooke's law. As the Supreme Court has explained, we can evaluate certain evidence de novo (the intrinsic record, composed largely of legal documents), but we must evaluate other evidence with deference due to fact findings (everything extrinsic to the record, including expert testimony). *See Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 324-28, 135 S. Ct. 831, 190 L. Ed. 2d 719 (2015). The scientific question of whether Hooke's law and "nothing more" reduces the two types of vibration identified in the claims presents a question analogous to the conventionality of a particular technology in eligibility analysis, inherency or anticipation in prior art analysis, or the second (comparing) step in an infringement analysis—all of which are factual inquiries. *See, e.g., Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018) (the conventionality of a claim element is a question of fact); *Monsanto Tech. LLC v. E.I. DuPont de Nemours & Co.*, 878 F.3d 1336, 1342 (Fed. Cir. 2018) (anticipation and inherent disclosure are questions of fact); *Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1369 (Fed. Cir. 2001) (the comparing step of infringement analysis is a question of fact). If the "nothing more" test were treated

as involving questions of fact, as it should be, there would be no question that this case would have to be vacated and remanded for fact development at the district court.

Finally, I remain concerned about the practical effect of the majority's decision, notwithstanding its newly introduced warning that its "holding should not be read as an invitation to raise a validity challenge against any patent claim that requires the application of an unstated natural law." Maj. 26. In one colorful example, amici suggest that the majority's original approach would have placed the combustion engine at risk of ineligibility—a proposition that would have seemed absurd just a few years ago, but now seems eerily plausible. Law Prof. Br. 9. Although the majority has dialed back its original decision to some degree on panel rehearing, one can still reasonably ponder whether foundational inventions like the telegraph, telephone, light bulb, and airplane—all of which employ laws of nature—would have been ineligible for patenting under the majority's revised approach. *See, e.g.*, *id.* at 5-9; IPO Ass'n Br. 9. Despite the majority's cautionary language, the uncertainty introduced by its analysis will likely invite eligibility challenges to many other patents directed to mechanical inventions or otherwise. *See* Michel Br. 7 ("[I]f 'industrial-process,' physically-based patents like these are ineligible under *Mayo/Alice*, then seemingly every patent is in ineligibility jeopardy."). Without clear direction from this court, the Patent Office and district courts will likely reach inconsistent results when assessing the patent eligibility of mechanical inventions. Inventors, the patent system, and our innovation-focused economy will bear the cost of the resulting unpredictability. *See* BIO Br. 7-9; USIJ Br. 8-11.

Appendix F

En banc review would provide this court with an opportunity to hear from the parties and various stakeholders, including the Patent Office, which deals with § 101 issues on a daily basis, about how the judicial exception to patent eligibility should apply in the context of mechanical and other inventions that employ unnamed laws of nature. By declining to rehear this case en banc, we have abdicated our responsibility to address patent eligibility head on. In the face of our unwillingness to consider patent eligibility as a full court, I grow more concerned with each passing decision that we are, piece by piece, allowing the judicial exception to patent eligibility to "swallow all of patent law." *Alice*, 573 U.S. at 217 (citing *Mayo*, 566 U.S. at 70-73). I respectfully dissent.

O'MALLEY, *Circuit Judge*, with whom NEWMAN, MOORE, and STOLL, *Circuit Judges*, join, dissenting from the denial of the petition for rehearing en banc.

The revised majority opinion issued today attempts to address the many concerns raised by American Axle & Manufacturing, Inc. ("American Axle") and the half-dozen amici curiae who objected to the substance of the majority's original opinion. It does this, however, with little concern for proper process—instead achieving its chosen result by whatever means it could conjure. The Advisory Committee on Appellate Rules recently forwarded to all Courts of Appeals a letter from the American Academy of Appellate Lawyers ("the Academy"). The Academy's letter proposed a rule that would require us, as an appellate court, to "give notice [when] considering a previously unaddressed ground and provide [the parties] an opportunity to brief it." Letter from the Academy to Hon. Michael Chagares, Chair Federal Advisory Committee on Appellate Rules (April 26, 2019), *available at* https://www.appellateacademy.org/pub-lications/Chagares_proposal.pdf. The Advisory Committee's cover letter noted a growing belief among appellate lawyers that Courts of Appeals have shown an increasing tendency to decide questions on grounds that were neither argued before the district court nor briefed on appeal. The Advisory Committee explained that it felt the Academy's concerns were legitimate, but decided that, rather than implement a mandate, it would ask Courts of Appeals, including this one, to voluntarily correct course. It is my hope that we, as an institution, will rise to the

Advisory Committee's challenge.[1] Thus, while I share all the substantive and policy concerns raised by Judge Newman, Judge Moore and Judge Stoll in their dissents, I write separately to emphasize the procedural norms that the majority ignores.

The problems I perceive with the majority opinion are threefold: (1) it announces a new test for patentable subject matter at the eleventh hour and without adequate briefing; (2) rather than remand to the district court to decide the issue in the first instance, it applies the new test itself; and (3) it sua sponte construes previously undisputed terms in a goal-oriented effort to distinguish claims and render them patent ineligible, or effectively so. These obstacle-avoiding maneuvers fly in the face of our role as an appel late court.

First, the majority announces that a claim is patent ineligible if it "clearly invokes a natural law, and nothing more, to accomplish a desired result." Maj. 19. The majority contends that this statement of law stems directly from a 19th century Supreme Court case, *O'Reilly v. Morse*, 56 U.S. 62, 14 L. Ed. 601 (1853). As Judge Stoll explains in her dissent, however, this case does not present a clear-cut application of *O'Reilly*. It is, instead, an expansion that would likely render ineligible claims found patent eligible

1. I confess that I have not always stayed on the correct side of the line the Academy would have us draw. That does not free me from the obligation to work harder in the future to avoid deciding cases on unbriefed grounds. And it should not free us as an institution from attempting to rein in egregious instances where our colleagues cross that line.

by the *O'Reilly* court itself. Despite this, the majority forges on, adopting a test that was proposed by no one. One might ask why, if appellate judges will reach their desired result regardless of outside input and untethered from the arguments of others, we should bother with the dog and pony show of the full development of a trial record or our admonition to raise all issues in one's appellate briefs or suffer waiver? Just as the majority was persuaded by the outcry of the public in response to the original opinion, it may have benefited from, or even changed course in view of, comments on this new test. The parties and the public should have been given a chance to weigh in.

Second, the majority's choice to apply its new test to this case, again without briefing, is troubling. As Judge Moore and Judge Stoll each explain, the "nothing more" test presents *factual* questions. Does the claim clearly invoke a natural law? Which one? How do we know there is nothing more? Where, as here, the claims say nothing about any *natural law*, these are scientific questions that must be answered by reference to expert testimony—testimony which, as developed to date in this case, does not answer these questions as the majority now does. While the district court made some general statements about Hooke's Law and friction damping, it was not applying the test articulated by the majority today. The district court opinion makes no mention of *O'Reilly* and certainly did not find "nothing more." *See Am. Axle & Mfg., Inc. v. Neapco Holdings LLC*, 309 F. Supp. 3d 218, 225 (D. Del. 2018). Given this, at minimum the majority should have remanded with an instruction for the district court to consider the factual record and decide the issue in the

first instance. Or, assuming arguendo that the majority is correct to treat this as question of law, it should have remanded for the district court to consider the issue afresh using that lens. It seems that the majority was just too deep in the § 101 hole it originally dug to give up control. Thus, rather than follow the prudent path, the majority took it upon itself to invalidate these claims *today*. The decision ignores that we are a court of review and steps far outside the bounds of our role as appellate judges.

Finally, the majority's treatment of claim 1 is perhaps most emblematic of the concerns raised by the Academy. Sua sponte, and without the aid of supplemental briefing, the majority construes claims 1 and 22 to have a patentably distinct difference—"inserting" versus "positioning" of the claimed liner. Maj. 25 n.13. No one argued that these terms are meaningfully, much less patentably, different and no one asked the trial court to compare or assess them. While the majority points out that no one argued the terms share the *same* meaning, that is irrelevant and unsurprising. That the parties failed to raise this argument only underlies that this was not an important issue, either before the district court or on appeal. The majority uses the minor wording difference as a hook and notes that claim 1 is "more general" than claim 22, so that it can set up the framework for an abstract idea-based § 101 decision. It then remands to the district court to effectuate that goal, even though this issue was not argued to the district court in the first instance. Maj. 24-26. This unrequested second chance for Neapco Holdings LLC is unwarranted and leaves American Axle trapped in § 101 purgatory. It is not our role as an appellate court to direct

the litigation strategy of the parties or to pressure the district court into invaliding claims on grounds never argued to it before.

The active judges of this Court were evenly divided, 6-6, in our vote on whether to take this case en banc based on the serious substantive concerns the new majority opinion raises. In such circumstances, important institutional concerns such as the ones discussed above should push the vote over the line. I respectfully dissent from the full Court's unwillingness to put us back on course and force adherence to the limitations imposed on us as a court of review.

APPENDIX G — RELEVANT STATUTORY PROVISIONS

35 U.S.C.A. § 101

§ 101. Inventions patentable

Whoever 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 therefor, subject to the conditions and requirements of this title [35 U.S.C.A. §§ 1 *et seq.*].

Appendix G

35 U.S.C.A. § 112

§ 112. Specification

(a) In General.--The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

(b) Conclusion.--The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

(c) Form.--A claim may be written in independent or, if the nature of the case admits, in dependent or multiple dependent form.

(d) Reference in Dependent Forms.--Subject to subsection (e), a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

(e) Reference in Multiple Dependent Forms.--A claim in multiple dependent form shall contain a reference, in the alternative only, to more than one claim previously set

forth and then specify a further limitation of the subject matter claimed. A multiple dependent claim shall not serve as a basis for any other multiple dependent claim. A multiple dependent claim shall be construed to incorporate by reference all the limitations of the particular claim in relation to which it is being considered.

(f) Element in Claim for a Combination.--An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

APPENDIX H — COMBINED PETITION FOR PANEL REHEARING AND REHEARING EN BANC OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, DATED NOVEMBER 18, 2019

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

No. 18-1763

AMERICAN AXLE & MANUFACTURING, INC.,

Plaintiff-Appellant,

v.

NEAPCO HOLDINGS LLC
AND NEAPCO DRIVELINES LLC,

Defendants-Appellees.

Appeal from the United States District Court for the District of Delaware in C.A. No. 15-cv-1168, United States District Court Judge Leonard P. Stark

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COMBINED PETITION FOR PANEL REHEARING AND REHEARING EN BANC OF PLAINTIFF-APPELLANT

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November 18, 2019

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[TABLES INTENTIONALLY OMITTED]

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STATEMENT OF COUNSEL

Based on my professional judgment, I believe this appeal requires an answer to one or more precedent-setting questions of exceptional importance:

1) Whether courts can find patent claims ineligible without identifying any precise ineligible concept the claims are allegedly directed to.

2) Whether, on summary judgment, the Federal Circuit can disregard facts establishing several inventive concepts, and find, for the first time on appeal and based on prior art and arguments never raised, that the inventive concepts taught by the patent were instead well understood, routine, and conventional.

3) Whether Section 101 can be interpreted to swallow the enablement requirement of Section 112, and whether it is appropriate to require the claims of a patent to meet enablement requirements under Section 101.

Based on my professional judgment, I believe the panel decision is contrary to at least the following decisions of the Supreme Court of the United States and precedents of this Court: *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208 (2014); *Mayo Collaborative Servs. v. Prometheus*

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Labs., 566 U.S. 66 (2012); *Diamond v. Diehr*, 450 U.S. 175 (1981); *Berkheimer v. HP Inc.*, 881 F.3d 1369 (Fed. Cir. 2018); *Berkheimer v. HP Inc.*, 890 F.3d 1369 (Fed. Cir. 2018); *Vanda Pharm. Inc. v. West-Ward Pharm. Int'l Ltd.*, 887 F.3d 1117 (Fed. Cir. 2018); *Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042 (Fed. Cir. 2016).

/s/ James R. Nuttall

Counsel for Plaintiff-Appellant,
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PRELIMINARY STATEMENT

There is much debate about the bounds of patent-eligible subject matter under 35 U.S.C. § 101. But there should be no debate here. The majority's opinion would vastly expand the test for ineligibility and push the law past its already fragile position. U.S. Patent No. 7,774,911 ("'911 patent") relates to automotive driveshafts used in pickup trucks. Appx2021, Appx2375; Appx59-60. With the '911 patent, AAM invented novel and unconventional methods of manufacturing improved driveshafts that include "liners"—low cost, hollow tubes made of a fibrous material (such as cardboard).

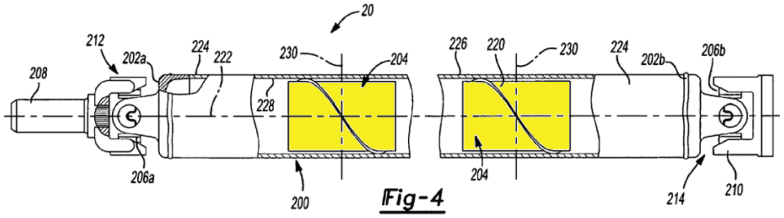

Fig-4

Appx2021; Appx26.

Before the '911 patent, it had only been well understood to use liners in driveshafts to attenuate a single type of vibration called "shell mode" vibration. Appx30; Appx1911. Neapco admitted that prior art liners had only attenuated

shell mode vibration, and "presented no argument or evidence to contradict that" fact on appeal. Dissent at 8; Appx1327; Appx1309; Appx23; Appx3281; Appx828. As explained in the '911 patent, prior art liners were not suitable (let alone well understood) to attenuate another type of vibration called "bending mode" vibration. Appx30 (2:36-38). And liners certainly were not well understood to attenuate *both* bending and shell mode vibration.

AAM solved these problems. It was the first to discover that liners could be "tuned" to attenuate bending mode vibration, or the combination of both bending and shell mode vibration. Majority at 3; Appx30. The claims of the '911 patent recite these solutions. Independent claim 1 of the '911 patent recites the following:

> 1. 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 at least one liner*** to attenuate at least two types of vibration transmitted through the shaft member; and

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> ***positioning the at least one liner*** within the shaft member such that the at least one liner is configured to damp shell mode vibrations in the shaft member by an amount that is greater than or equal to about 2%, and the at least one liner is also configured to damp bending mode vibrations in the shaft member, the at least one liner being tuned to within about ±20% of a bending mode natural frequency of the shaft assembly as installed in the driveline system.

Appx34 (emphases added).[1] "Tuning at least one liner," as construed by the District Court, requires "controlling characteristics of at least one liner to configure the liner to match a relevant frequency or frequencies." Appx1046. Numerous characteristics that must be controlled to properly tune a liner are disclosed in the '911 patent, including the mass, length, thickness, material, the quantity and configuration of external members attached to the liner, and the positioning of the liner in the driveshaft. Appx33 (7:56-8:2). Other examples disclosed in the patent (e.g., Figs. 10-14) illustrate how tuned liners may be structured in several distinct ways. Appx28-29. Dependent claims 12, 13, and 19-21 recite further requirements for properly "tuning" and "positioning" liners, including requirements about how (and where) the tuned liners can be inserted (claims 12, 20, and 21) or configured structurally (claims 12, 13, and 19). Appx34-35.

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1. Claims 1-6, 12, 13, 19-24, 26, 27, 31, and 34-36 are at issue on this appeal.

Thus, far from simply reciting a natural law and simply telling practitioners to "apply it," the '911 patent instructs persons of ordinary skill how to tune and position a liner to attenuate both bending and shell modes. These teachings fulfilled a long-felt need in the driveshaft industry. Just ask Defendant Neapco, which itself had an "issue" with damping both types of vibration—until, of course, it discovered the '911 patent. On March 24, 2014, Neapco explained:

> Current focus [s]hould be understanding AAM v. NDL. Obviously, knowingly or unknowingly, they have solved the issue with an extremely low cost solution [of reducing bending and shell mode vibrations]. I want to know the mechanics.

Appx3513. Neapco admitted that it had "more homework to do to really understand how to tune a liner." Appx1915-1916. Thus, in order to "catch up" with AAM, Neapco circulated AAM's '911 patent on March 25, 2014, among its engineers with the instruction that it taught "what [Neapco was] trying to achieve" for its liner products. Appx828; Appx3510; AAM Opening, Statement of Facts IV.B. Soon after, Neapco began manufacturing the liners accused of infringement in this case. Appx3531; Appx3538-3539; Appx6013-6018. And as a result of the '911 patent, both AAM and Neapco now use "tuned" liners. Appx4232; Appx4234-4243; Appx3459-3462.

The majority's decision (at summary judgment no less) forecloses AAM's patent infringement action at the eligibility gate based on a faulty premise that the claims at

issue recite laws of nature, not methods of manufacturing. The majority, however, could not articulate a concrete law of nature (or even combination of laws), that applies under step one of the *Alice* test.

The majority also erred in applying the second, "inventive concept" step of the *Alice* framework, which renders patents eligible when a claim involves more than the performance of "well-understood, routine, [and] conventional activities previously known to the industry." *Alice*, 573 U.S. at 225. At a minimum, it was *not* well understood, routine, and conventional to use a properly tuned and positioned liner to attenuate bending mode vibrations of driveshafts (much less both shell and bending mode vibrations) in 2006 when the '911 patent application was filed. This is why Neapco *needed* the disclosures of the '911 patent to manufacture liners that attenuated both shell and bending mode vibration. It is also why Neapco was forced to admit that AAM was the first to tune liners to attenuate bending mode vibrations:

> Q: [Y]ou're not aware of any liners being tuned to a bending mode frequency prior to 2006?
>
> A: Correct.

Appx1327. The majority ignored these facts. "[S]ummary judgment is inappropriate" when there is "a genuine issue of material fact" as to whether the claims are directed toward "well-understood, routine, and conventional activities." *Berkheimer*, 890 F.3d at 1370.

The majority also applied a new and erroneous Section 101 standard that subsumes the enablement requirement of Section 112. Enablement was not raised on appeal by Neapco, involves underlying questions of fact, and requires an assessment of whether the specification's teachings allow a *person of ordinary skill* to make and use a claimed invention without "undue experimentation." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1355 (Fed. Cir. 2012). These fact issues, even if raised here, are themselves not ripe for summary judgment. The majority nonetheless made an end-run around these requirements, holding that the claims are ineligible under Section 101 because, in its view, the asserted *claims* of the '911 patent do not sufficiently inform *judges* how to make and use the invention.

The Court should review and vacate the majority decision, correct the error as to the '911 patent, and restore the Court's precedent to avoid significant and improper expansion of the law on patent eligibility.

ARGUMENT

Congress defines patent-eligible subject matter broadly. The law-of-nature exception is purely judicial, and, given the breadth of Section 101, the Supreme Court has repeatedly cautioned against its expansive use: "[T]oo broad an interpretation of this exclusionary principle could eviscerate patent law." *Mayo*, 566 U.S. at 71. That is why this Court must "tread carefully in construing this exclusionary principle." *Alice*, 573 U.S. at 217. Methods applying natural laws have always been

eligible. *Diehr*, 450 U.S. at 187. "Industrial processes," more specifically, "have historically been eligible to receive patent-law protection." *Id*. at 175. Here, the majority expands Section 101 precedent past the Rubicon, holding that virtually any method of manufacturing or industrial process can be declared ineligible at summary judgment, so long as the method of manufacturing, no matter how detailed, can be associated with some undefined natural law.

I. The Majority Could Not Articulate What Natural Law(s) or Abstract Idea The Claims Are Allegedly Directed To

This case has been percolating through the courts for four years. During that time, not one of Neapco, the District Court, or the majority has been able to articulate a precise natural law or abstract idea to which the claims are directed at step one of the *Alice* framework. Neapco first argued that the claims were directed to two different laws of nature—(1) Hooke's law for bending modes and (2) friction damping for shell modes. Appx1248-1251; Appx1604-1605. Then, the District Court found the claims directed to something different, "applications of Hooke's law with the result of friction damping." Appx11. Neapco changed course on appeal and argued the claims were directed to an abstract idea instead of natural laws, and the majority held that the claims were directed to "Hooke's law, and possibly other natural laws." Majority at 15. This articulation of the natural law or abstract idea that allegedly applies here is, ironically, itself abstract. And the inability of anyone to clearly and consistently

articulate the "natural law" to which the claims are directed underscores that these claims, despite the majority's best efforts, are neither abstract nor directed to a law of nature.

This Court has made plain that it "must be careful to avoid oversimplifying the claims because '[a]t some level, 'all inventions…embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.'" *In re TLI Comm'cns LLC Patent Litigation*, 823 F.3d 607, 611 (Fed. Cir. 2016). Indeed, overgeneralizing claims, "if carried to its extreme, make[s] all inventions un-patentable." *Diehr*, 450 U.S. at 189 n.12. These admonitions exist to prevent judges from invalidating patents by simply alleging that *some* ineligible concept applies, however undefined. The majority's results-oriented judicial decision did precisely that.

The majority's failure to articulate a concrete abstract idea or natural law underscores its legal error. The majority, for example, relies heavily on *Mayo*, but that analogy is inapt. In *Mayo*, the Supreme Court explained that one could not patent a law of nature, such as E=mc2, by simply telling "linear accelerator operators" to "apply the law" in determining "how much energy an amount of mass has produced." 566 U.S. at 77-78. The majority begs the question—what natural law or laws do the claims at issue allegedly instruct engineers to apply? If driveshaft manufacturers were simply told to apply vague notions of "Hooke's law and possibly other natural laws" as articulated by the majority, they would at most determine the frequency of a mass-spring system and would not

obtain the claimed inventions of the '911 patent. That is confirmed by the failure of many companies, including Neapco, to successfully tune liners to damp both bending and shell mode vibrations in driveshafts before the '911 patent. Appx3513; Appx3531; Appx1915-1916; Appx828; Appx3510; Appx3538-3539; Appx6013-6018; AAM Opening, Statement of Facts IV.B.

Without a requirement of precision at step one, judges have free rein to invalidate claims based on a feeling that *some* undefined natural law or abstract idea may apply. But as *Mayo* makes clear, that may always be the case on some level, and the majority's opinion runs counter to the Supreme Court's admonition in *Diehr* against taking Section 101 "to its extreme."

II. The Majority Disregarded *Berkheimer* and the Summary Judgment Standard When It Overlooked Undisputed Facts And Engaged In Its Own Fact Findings

At step two, courts consider whether a claim merely recites concepts that are "well-understood, routine, and conventional." *Mayo*, 566 U.S. at 73. "[W]hether a claim element or combination of elements would have been well-understood, routine, and conventional to a skilled artisan in the relevant field at a particular point in time is a *question of fact*." *Berkheimer* at 1370 (emphasis added). On appeal from summary judgment, as here, the Court must review the factual record "in the light most favorable to" and draw "all reasonable inferences … in favor of" AAM. *Nicini v. Morra*, 212 F.3d 798, 805 (3d Cir. 2000). The majority overlooked

several facts that favored AAM and were at the very least "hotly" disputed—if not undisputed. Neapco Opposition at 57-59. The majority also made several of its own fact determinations, contrary to the record and certainly not in the light most favorable to AAM.

To start, the majority found that "it makes no difference to the section 101 analysis whether the use of liners to attenuate bending mode vibrations was known in the prior art." Majority at 12 n.3. This fact, which AAM affirmatively established and Neapco admitted, is absolutely relevant.[2] AAM's use of tuned liners, its use of tuned liners to attenuate bending modes, and its use of tuned liners to attenuate both shell and bending modes, were each "inventive concepts" "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the natural law itself." *Mayo*, 566 U.S. at 72-73; *see also* AAM Opening at 57-58; Dissent at 9-10.

In its effort to refute these inventive concepts, the majority *raised new evidence and made new fact findings for the first time on appeal.* The majority found that the damper of U.S. Patent No. 3,075,406 ("'406

2. The majority stated that AAM did not "argue that liners had not previously been used to damp bending mode—as opposed to shell mode—vibrations" before the district court in its summary judgment papers. Majority at 12 n.3. This is incorrect. *AAM v. Neapco*, 1:15-cv-01168-LPS, Dkt. 161 at 5 ("Prior to AAM's novel discovery, liners were used to provide general broadband damping of shell mode vibrations. Other dampers like slip yoke dampers, internal tuned dampers, and plugs were used to damp bending or torsion mode vibrations."); Id., Dkt. 160 at 3; Dissent at 7 n.2.

patent")—a patent that was never introduced or cited by the parties—is a prior art "liner" used to damp bending modes. Majority at 12 n.3. To be clear, the '406 patent is not relevant to whether the '911 patent discloses an inventive concept. The word "liner" appears nowhere in the patent, and neither AAM nor Neapco ever introduced or cited the '406 patent, let alone argued that the damper of the '406 patent is a "liner." Dissent at 8. The '406 patent does nothing to show that it was well understood, routine, or conventional to attenuate bending mode vibration with liners, let alone whether it was well understood, routine, and conventional to attenuate *both* bending and shell mode vibration with liners.

The majority's fact finding is also incorrect and inconsistent with its other findings. As the majority stated, "[l]iners are hollow tubes made of fibrous material (like cardboard)." Majority at 3. An example of a liner is depicted in Figure 8 of the '911 patent.

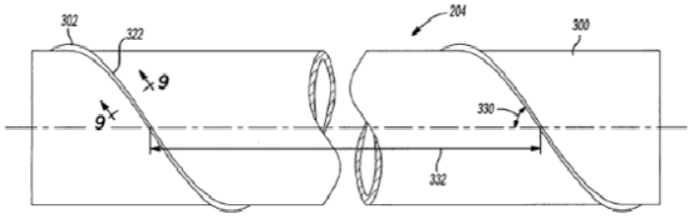

Fig-8

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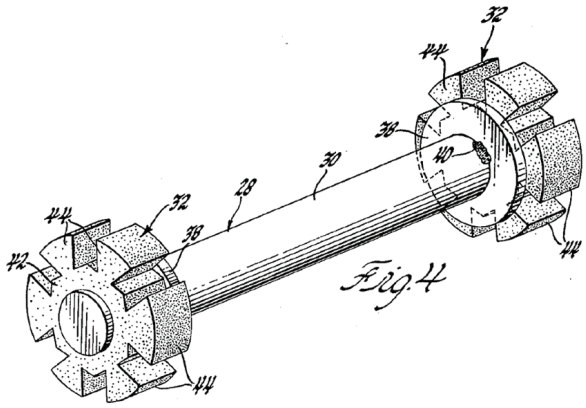
The dampers of the '406 patent are not "liners." They are dumbbell-shaped dampers as depicted below.



'406 patent at 2:5-18, Fig. 4. Neapco agrees—it argued to the district court that "liners" are hollow "tube[s]," not dumbbell-shaped dampers. Appx7198. Neapco's expert admitted that dampers are not covered by the Asserted Claims. Appx4333.[3]

Even assuming that the '406 patent discloses a liner, the majority erred by holding that the citation of the prior art '406 patent somehow proves that the use of purported liners to damp bending modes was "well-understood,

3. Several dependent claims referenced above recite particular liner materials and structures that are not cylindrical metal dumbbells. Appx34-35 (claims 12, 13, 19, 26, 27, 31). AAM did not waive any argument about these claims. Dissent at 4 n.1; see also Appx4331; Appx6194; Appx1252-1253; *AAM v. Neapco*, 1:15-cv-01168-LPS, Dkt. 217 at 59:7-8; AAM Opening at 13-14, 36, 57-59, 64-65; AAM Reply at 1, 16, 27.

routine, and conventional activity." *Mayo*, 566 U.S. at 73. This conclusion is contrary to the Court's precedent:

> Whether a particular technology is well-understood, routine, and conventional goes beyond what was simply known in the prior art. The mere fact that something is disclosed in a piece of prior art, for example, does not mean it was well-understood, routine, and conventional.

Berkheimer, 881 F.3d at 1369. Whether such use was well understood, routine, and conventional is also a quintessential fact issue, inappropriate for the majority to raise and decide *sua sponte* on an appeal of summary judgment. *Id. at* 1370. This is particularly true given Neapco admitted the use of liners to damp bending modes was unknown—the exact opposite of "well-understood, routine and conventional." Appx1327; Appx1309; Appx23.[4]

Whatever lack of clarity in patent eligibility persists, the law of this Court could not be clearer as to fact issues: Section 101 raises questions of fact, including "weighing evidence, making credibility judgments, and

4. To the extent the majority construed the claim term "liner" to include dampers *sua sponte*, doing so was also a mistake. This Court is "generally hesitant to construe patent claims in the first instance on appeal" "to avoid conflating de novo review with an independent analysis." *MyMail, Ltd. v. ooVoo, LLC*, 934 F.3d 1373, 1380 (Fed. Cir. 2019). This is a factual matter not appropriate for resolution by the majority for the first time on appeal. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 135 S. Ct. 831, 835 (2015).

addressing narrow facts that utterly resist generalization." *Berkheimer*, 890 F.3d at 1370. The majority raises and answers these questions of fact for the first time on appeal, all while shirking the summary judgment standard. Vacatur is appropriate.

III. The Majority Supplants Section 101 With Section 112 And Required The *Claims As A Matter of Law* To Recite How To Make And Use The Invention

The majority also applied a Section 101 standard that subsumes the enablement requirement of Section 112. In doing so, the majority seems to have created a requirement that, to survive Section 101, the *claims as written* must recite precisely how to make and use a particular invention. In other words, the claims must fulfill an enablement requirement under the Section 101 inquiry, notwithstanding the claim construction, teachings of the specification, or the knowledge of the person of ordinary skill. As the majority asserted:

- "[T]he patent claims do not describe a specific method for applying Hooke's law in this context." Majority at 11.

- "The claims here simply instruct the reader to tune the liner…without the benefit of instructions on *how* to do so." Majority at 19–20.

- "Most significantly, the claims do not instruct *how* the variables would need to be changed to produce the multiple frequencies

> required to achieve a dual-damping result." Majority at 14–15.

See also Dissent at 10-14. The premise of these statements is incorrect, as the claims themselves require "controlling characteristics of at least one liner to configure the liner to match a relevant frequency or frequencies," along with particular positioning steps that achieve the desired goal of attenuating multiple vibration modes. Appx34-35. Those characteristics are described in the specification, along with several examples that illustrate a range of different tuned liner configurations. Appx27-29, Appx33-34.

The majority, however, wanted something more and improperly expanded the Section 101 inquiry to include this new pseudo-enablement requirement. Thus, in the words of the dissent, "the Hydra has grown another head." Dissent at 13. Requiring the *claims* as written to meet some pseudo-enablement requirement under Section 101 is precisely the "eviscerat[ion]" of patent law the Supreme Court has repeatedly cautioned against. *Mayo*, 566 U.S. at 71; *Alice*, 573 U.S. at 217.

What the majority did here makes matters much worse. The majority's decision invites shifting patent-eligibility inquiries to any section of the patent code (including Section 112). Regardless of any factual disputes that remain, courts will have unfettered authority to declare patents ineligible under Section 101 based on their *sua sponte* views of the enablement, novelty, or obviousness of a claim, rendering future decisions and the bases for those future decisions under Section 101 highly uncertain. The "Hydra" will grow even more heads.

Ultimately, even if enablement is relevant, whether the patent would enable a skilled artisan to tune liners is an issue of fact that the majority improperly decided for the first time on an appeal. *Transocean*, 617 F.3d at 1305. Indeed, the parties briefed at length whether fact issues precluded summary judgment related to this very issue, and the district court has not made any factual findings on this question. *AAM v. Neapco*, 1:15-cv-01168-LPS, Dkt. 164 at 12-27; *id*., Dkt. 175 at 11-36; *id*., Dkt. 192 at 1-17; *id*., Dkt. 211 at 3-9; Appx7042-7049. Beyond the teachings of the '911 patent (which themselves raise questions of fact), AAM presented substantial evidence of Neapco's actual making and using tuned liners within a few months after learning of and studying the '911 patent. *Id*.; *see also* Appx3513; Appx828 (the '911 patent was "what [Neapco was] trying to achieve"); Appx3510; AAM Opening, Statement of Facts IV.B. All of these are facts that are highly probative of whether the patent provides sufficient "instructions on *how* to [tune liners]." Majority at 19-20; *see, e.g.*, *Intex Rec. Corp. v. Metalast, S.A.*, No. 01-1213, 2005 WL 1214600, *10 (D.D.C. May 20, 2005) ("The Court finds no meaningful distinction between one skilled in the art constructing the invention by 'copying' it, and 'making and using the full scope of the claimed invention.'").

The majority improperly redefined the enablement inquiry and entirely dismissed these facts. Majority at 7, 14-15, 19-20; Dissent at 10-13. On AAM's view of the facts, this case provides a textbook example of how the patent system should function. AAM received a patent, the invention was disclosed to the public, and Neapco used the teachings of that patent to manufacture tuned liners that attenuated both shell and bending mode vibrations in driveshafts. The system

worked. That is, until the majority intervened to proclaim how they, as *judges*, do not know how to make and use tuned liners. The Court should restore the Court's appellate role, reaffirm the patent system, and vacate the majority decision.

CONCLUSION

The Court should grant rehearing or rehearing en banc, and rehear this appeal.

November 18, 2019

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