

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUNTING TITAN, INC.

Petitioner

v.

DYNAENERGETICS EUROPE GMBH¹

Patent Owner

Case: PGR2020-00080
Patent No. 10,472,938

PATENT OWNER'S PRELIMINARY RESPONSE

¹ As noted in Patent Owner's Mandatory Notice Information (Paper 4), DynaEnergetics GmbH & Co. KG has been dissolved, and the case caption should reflect the correct entity, DynaEnergetics Europe GmbH.

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37 C.F.R. § 42.2071

EXHIBIT LIST

Exhibit No.	Description
2001	<i>Hunting Titan, Inc. v. DynaEnergetics Europe GmbH</i> , IPR2018-00600, Paper 67 (PTAB July 6, 2020)
2002	Declaration of John P. Rodgers, Ph.D., P.E.
2003	Declaration of Thilo Scharf
2004	HT ControlFire Assembly Gun Loading Manual
2005	HT ControlFire User Manual
2006	DynaStage Offshore Technology Conference 2014 Briefing
2007	Why the Big Pause? Balancing Long-Term Value with Near-Term Headwinds, Initiating Coverage of Oilfield Svcs and Equipment, STIFEL, September 10, 2018
2008	New Perforating Gun System Increase Safety Increases Safety and Efficiency, Warren Salt, SPE, and Ned Galka, SPE, DynaEnergetics, and John Segura, SPE, Weatherford, April 1, 2016
2009	DynaStage Gun System Product Brochure
2010	Spears & Associates, Wireline Market Update Q3 2019, October 15, 2019
2011	DynaEnergetics Celebrates Grand Opening of DynaStage Manufacturing and Assembly Facilities in Blum Texas, Global Newswire, November 16, 2018
2012	DynaEnergetics expands DynaStage factory-assembled, well perforating systems, WorldOil.com, March 14, 2017
2013	Introduction of a novel factory assembled selective plug and perf perforating system presentation, Presenter: John ‘JW’ Segura, Weatherford
2014	Prosecution History excerpt from Petitioner’s (Hunting Titan’s) own Amendment to Examiner’s Office Action in CA 2,933,756 distinguishing a gun body from a tandem or connector sub
2015	Resilience Against Market Volatility. Hunting PLC. Results Presentation For the Six Months Ended June 30, 2020
2016	Petition to Correct Inventorship of U.S. Patent No. 10,472,938
2017	Hunting is Not in a Race to the Bottom, Forbes, September 10, 2019

Pursuant to 35 U.S.C. § 323 and 37 C.F.R. § 42.207, Patent Owner DynaEnergetics Europe GmbH (“DynaEnergetics”) submits this Preliminary Response to Hunting Titan, Inc.’s (“Petitioner”) Petition for Post Grant Review of U.S. Patent No. 10,472,938 (“the ’938 Patent”). The Board should deny institution because Petitioner has failed to demonstrate that it is more likely than not that at least one of the challenged claims in the ’938 Patent is unpatentable.

I. INTRODUCTION

The Petition offers an industrial-sized “kitchen sink” approach. Petitioner trots out seven allegedly anticipatory references, hundreds (or even thousands) of proposed obviousness combinations, and written description and indefiniteness challenges to every claim. Each of the seven allegedly anticipatory references was cited and considered during prosecution, and the Examiner expressly found allowable subject matter over the art and arguments Petitioner now retreads. As set forth below, each reference is missing at least two features of the challenged claims—a detonator including three separate and distinct wireless electrical connectors and a wireless ground contact connector in wireless contact with a tandem seal adapter—and many are missing multiple features. The Petition thus fails on both procedural and substantive grounds.

Procedurally, the Board should use its broad discretion to deny institution for multiple independent bases: (i) the Petition recycles art cited and considered during

prosecution, and thus is fatally cumulative and redundant; (ii) the “grounds” of unpatentability lack the requisite particularity and instead put the onus on the Board and DynaEnergetics to wade through thousands of labyrinthine assertions and permutations; (iii) the Petition’s limitation-by-limitation approach violates well-established patent law; and (iv) Petitioner improperly relies on “common knowledge” throughout the Petition in the numerous instances where the asserted prior art fails to disclose a given element.

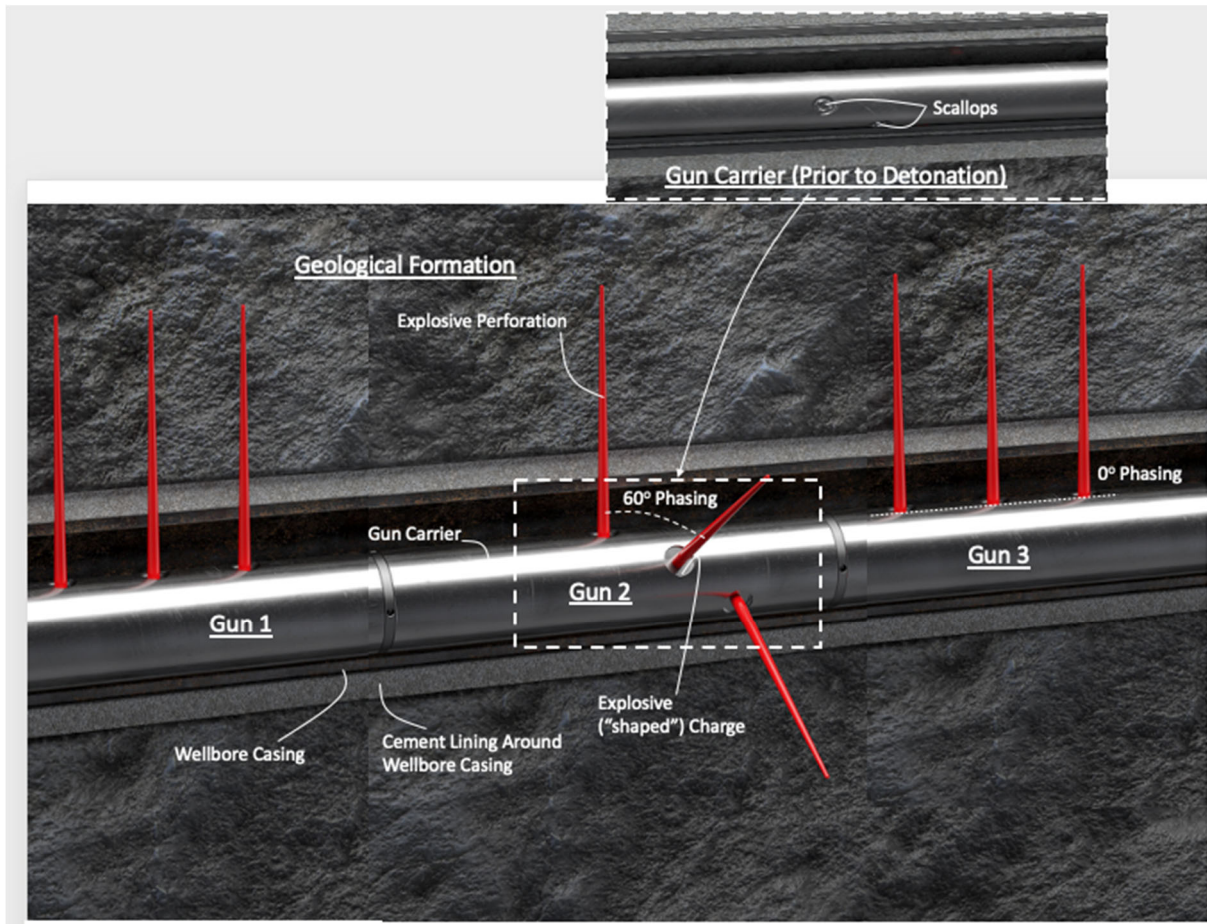
Substantively, Petitioner primarily relies on the anticipation grounds, as its § 103 and § 112 grounds fail to even apply the pertinent legal standards or provide any evidentiary support. Those anticipation grounds, however, are facially and fatally deficient because each of the seven references lacks at least two elements of the challenged claims, including the element highlighted by the Examiner in prosecution as one of the reasons for allowance. The Petition purports to lay out obviousness grounds based on certain combinations of art, yet in practice merely throws a number of underdeveloped “obviousness” arguments based on individual claim elements at the wall, failing to explain with any particularity which specific references a person of ordinary skill would be motivated to combine and how the proposed combination would teach every element of the challenged claims. The PTAB Precedential Opinion Panel (“POP”) repudiated Petitioner in IPR2018-00600 (“the ’422 IPR”), in which it challenged DynaEnergetics’ U.S. Patent No. 9,581,422, for this same

approach. *See* Ex. 2001, *Hunting Titan, Inc. v. DynaEnergetics Europe GmbH*, IPR2018-00600, Paper 67 at 25 (PTAB July 6, 2020) (finding that Petitioner had failed “to develop a persuasive theory of unpatentability” in opposing a motion to amend in which it used the same haphazard approach as it does here). The written description and indefiniteness challenges are likewise unexplained and flawed, factually and legally. In the end, DynaEnergetics is confident the Board will recognize the Petitioner’s failure to demonstrate any fully developed or persuasive ground of unpatentability and deny institution.

II. OVERVIEW OF THE TECHNOLOGY, THE ’938 PATENT, AND THE PRIOR ART

A. Overview of the Technology

The technology at issue relates to oil and gas wellbore perforating equipment, specifically perforating guns and methods of assembly thereof. Perforating gun loading requires experience, skill, and specialized workshop fixtures. Ex. 2002 ¶17. The perforation gun system is deployed in a wellbore and explosively penetrates a geological formation using explosive “shaped charges” carried by charge tubes within outer gun carriers of the perforation gun system. *Id.* ¶18-19.



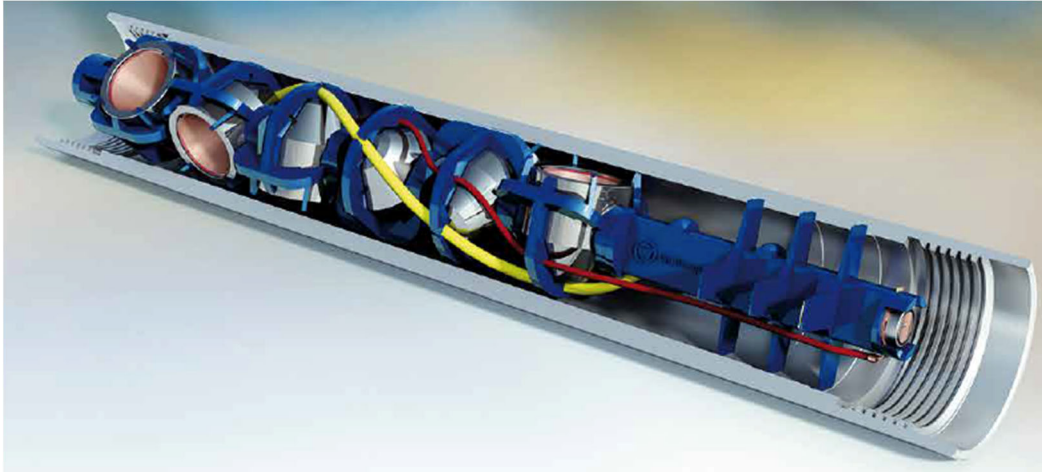
Prior to deployment in a wellbore, the shaped charges must be loaded into the charge tube and, typically, an explosive detonating cord is wrapped around or through the charge tube to make contact with an initiation point of each shaped charge. *Id.* Electrical connections, such as “through wires,” may also be wrapped around or through the charge tube, to relay electrical signals, such as selective detonation signals, between guns in a chain, or “string,” of perforating guns. *Id.* ¶25. Once the ballistic and electrical connections have been made on the charge tube, the charge tube is loaded into and fixed within the outer gun carrier. *Id.* ¶29.

Then, a detonator is positioned within the gun carrier or in a “tandem sub” connector. *Id.* ¶31. The tandem sub connects adjacent perforating guns in a string and includes a passage or other configuration for passing ballistic and/or electrical connections or components, such as detonators, electronic switches or circuit boards, wiring, etc. between adjacent guns. *Id.* ¶32. The electrical connections between adjacent guns frequently include electrical switches that signal a detonator for a particular gun to detonate upon receipt of a unique digital code sent from the surface of the wellbore. *Id.* ¶33. The reliable transfer of electrical signals, and thus the electrical connections between guns, is critical for ensuring proper and safe operation of the guns. *Id.* ¶35.

The perforating guns and their components must be stored, transported, and assembled according to specific quality and safety measures to avoid accidental detonation, damage from environmental conditions, and human error, which can be catastrophic or at least degrade perforating gun components and lead to inoperable guns or unintentional misfires. *Id.*; Ex. 2003 ¶3. In view of these issues, ballistic and electrical connections necessary for firing a device are typically not connected until the perforation gun assemblies arrive at a wellbore site. Ex. 2002 ¶30.

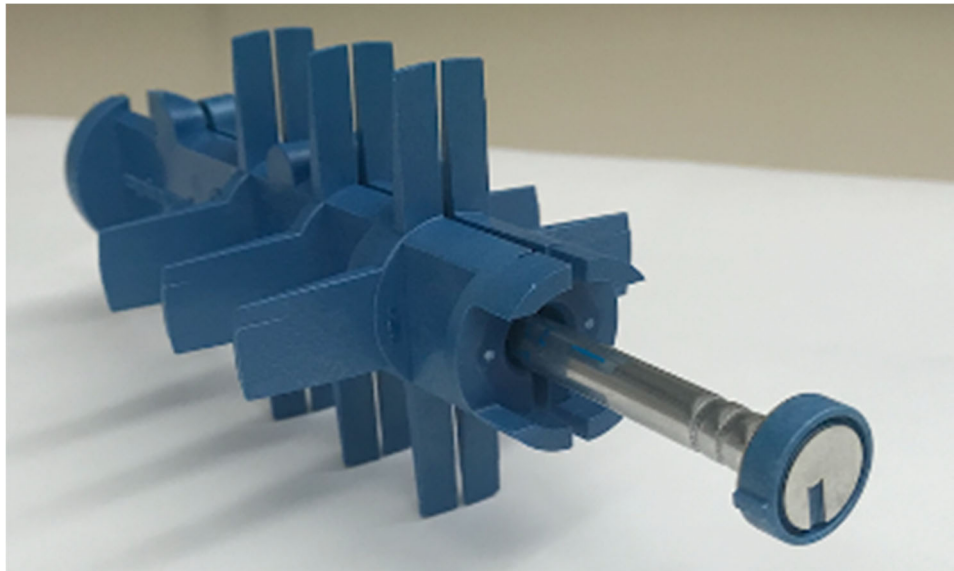
B. The DynaStage[®] Perforation System

In 2014, DynaEnergetics introduced their revolutionary DynaStage[®] perforation gun system (shown below as launched in 2014). Ex. 2003 ¶¶2-3.



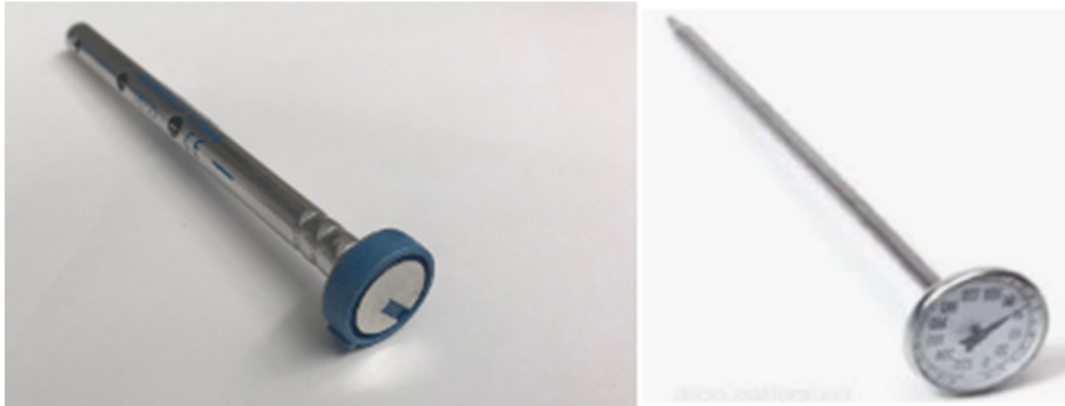
Conventional perforating guns required on-site assembly of the charge tube, positioning of the charge tube into a gun carrier, and on-site wiring of electrical and ballistic connections used to relay electrical detonation signals and detonate the shaped charges. *Id.* ¶5. The DynaStage[®] system removed these limitations and ushered in the era of “pre-wired” and factory assembled perforating guns that do not require cumbersome on-site assembly of internal components or wiring of electrical and/or ballistic connections. *Id.* ¶13. Indeed, the DynaStage[®] perforation gun system is assembled in DynaEnergetics’ facility, ballistically connected, tested for electrical and mechanical connectivity, shipped to the wellsite and as a last stage before entering the wellbore, a wireless detonator is inserted into each gun. *Id.* ¶14.

The heart of the DynaStage[®] system is, as shown above, a stackable assembly of injection-molded shaped charge holders and connectors for ballistic and electrical connections and DynaEnergetics' flagship wireless "push-in" Plug and Go[™] detonator. *Id.* ¶16. The injection-molded components are custom-formed to be an entirely self-contained, modular assembly completed, loaded, and locked into a gun carrier, and quality tested in the factory, and allow for an electrical connection between guns by using DynaEnergetics' wireless detonator and unique bulkhead/tandem seal adapter ("TSA") assembly. Ex. 2003 ¶17. Upon arrival at the wellbore site, the modular assemblies are armed and electrical feedthrough connections are completed by simply inserting the wireless detonator into an end of a connector, as shown below. *Id.* ¶19.



The wireless detonator is compact, resembling a meat thermometer (see below), and inserting it into the connector is simpler than inserting a battery into a

flashlight. *Id.* ¶20. All of the electrical connections and ballistic alignments are automatically made when the detonator is inserted into the connector. *Id.* ¶21.



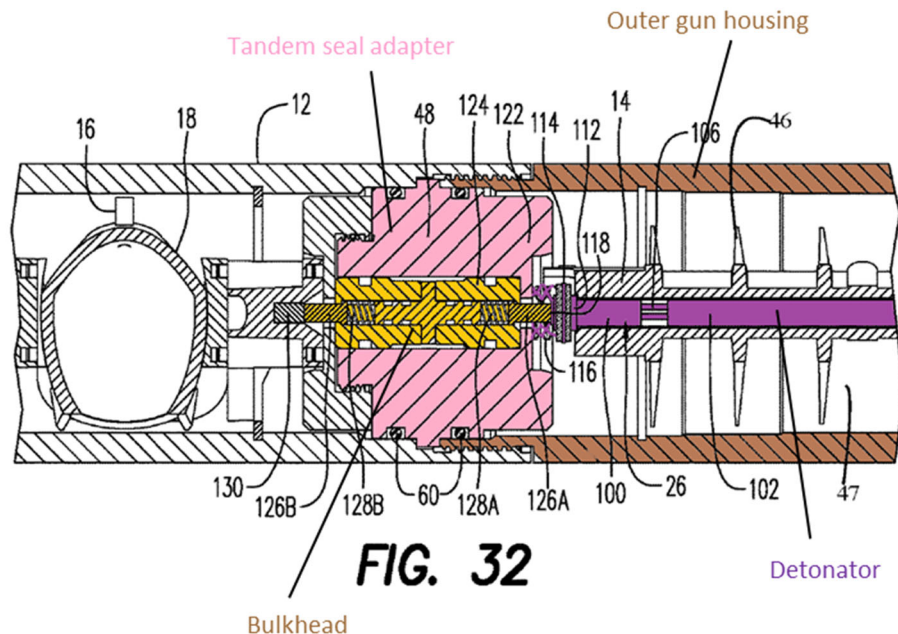
The above features and other aspects of the DynaStage[®] system are described and claimed in the '938 Patent. *Id.* ¶29.

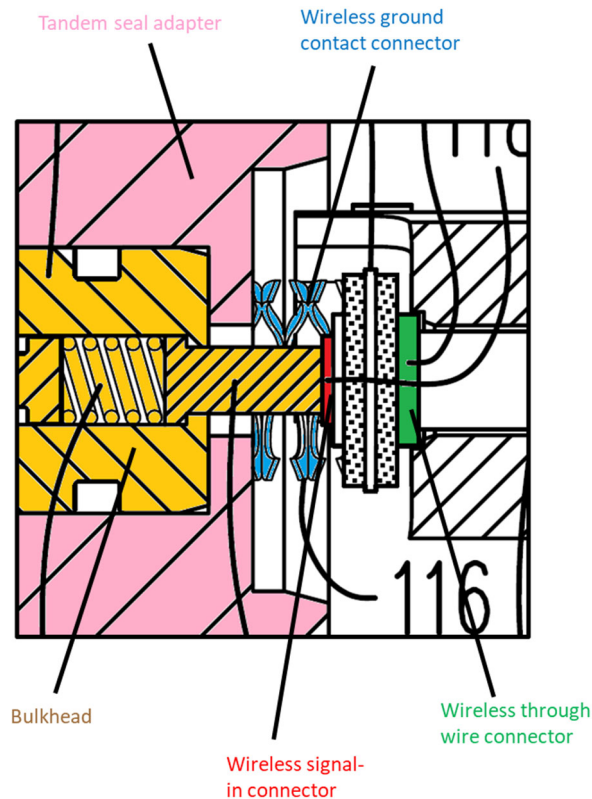
C. The '938 Patent

The '938 Patent is generally directed to a perforating gun and methods of assembly thereof in the oil and gas perforating industry. Ex. 2002 ¶36. The benefits of the invention claimed in the '938 Patent include providing factory assembled modular components and simplifying assembly and electrical/ballistic connectivity of perforating gun strings at a wellbore site to enhance reliability, efficiency, and safety. *Id.* ¶36.

Representative Claim 1 of the '938 Patent recites, with reference to Figure 32 below:

1. A perforating gun, comprising:
 - an outer gun carrier;**
 - a charge holder positioned within the outer gun carrier and including at least one shaped charge;
 - a detonator** contained entirely within the outer gun carrier, the detonator including
 - a detonator body containing detonator components,
 - a wireless signal-in connector, a wireless through wire connector,**
 - and **a wireless ground contact connector,** and
 - an insulator electrically isolating the wireless signal-in connector from the wireless through wire connector; and,
 - a bulkhead,** wherein the bulkhead includes a contact pin in wireless electrical contact with the wireless signal-in connector, wherein at least a portion of the bulkhead is contained within **a tandem seal adapter**, and the wireless ground contact connector is in wireless electrical contact with the tandem seal adapter.





Representative Claim 13, with reference to the Figure 32 above and Figure 18 below:

13. A method for assembling a perforation gun system, comprising:
- (a) inserting a charge holder within a hollow interior of an outer gun carrier, wherein the charge holder includes a detonating cord connected to the charge holder and at least one shaped charge;
 - (b) inserting a **top connector** into the outer gun carrier adjacent to the charge holder, the top connector comprising a hollow channel;
 - (c) inserting a **detonator** into the hollow channel of the top connector, the detonator including
 - a detonator body containing detonator components,

a wireless signal in connector, **a wireless through wire connector**,
and **a wireless ground contact connector**, and

an insulator electrically isolating the wireless signal in connector from the wireless through wire connector;

(d) connecting a through wire to the wireless through wire connector;

(e) energetically coupling the detonating cord to the detonator; and,

(f) transporting the perforation gun system to a wellbore site, wherein at least one of steps (a), (b), and (d) is performed before transporting the perforation gun system, and step (c) is performed at the wellbore site.

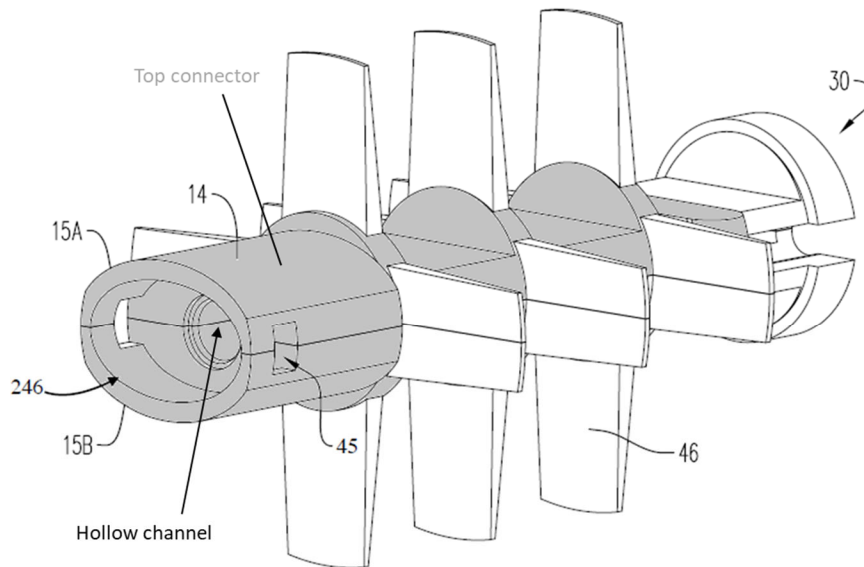


FIG. 18

III. PERSON OF ORDINARY SKILL AND CLAIM CONSTRUCTION

DynaEnergetics does not object to Petitioner's proposed person of ordinary skill in the art ("POSITA"). Pet. at 9.

Oddly, Petitioner offers a construction for nearly every term in the challenged claims. The claim terms are clear and understandable when read in view of the

specification, and largely do not require any construction. DynaEnergetics provides for the following terms a construction consistent with the specification, should the Board find it necessary to construe the terms:

1. “tandem seal adapter”

The term “tandem seal adapter” is not a common or accepted industry term. Ex. 2002 ¶40. However, the term is well-defined and described in the specification and claims, and a POSITA would understand that a TSA is a “*component that creates a seal between adjacent gun housings and provides a channel to receive or accommodate a bulkhead.*” *Id.* ¶40. For example, the ’938 Patent explains that “[t]he tandem seal adapter 48 is configured to seal the inner components within the carrier 12 from the outside environment, using sealing means 60 (shown herein as o-rings). Thus, the tandem seal adapter 48 seals the gun assemblies from each other.” Ex. 1001, 7:55-8:5; *see also id.*, 8:28-39; 10:1-14.

The figures of the ’938 Patent further support a POSITA’s understanding that the TSA 48 provides a seal between adjacent gun housings through o-rings 60, and also provides a channel (outlined in green below) to receive a bulkhead 58, as illustrated by exemplary Figure 19 below:

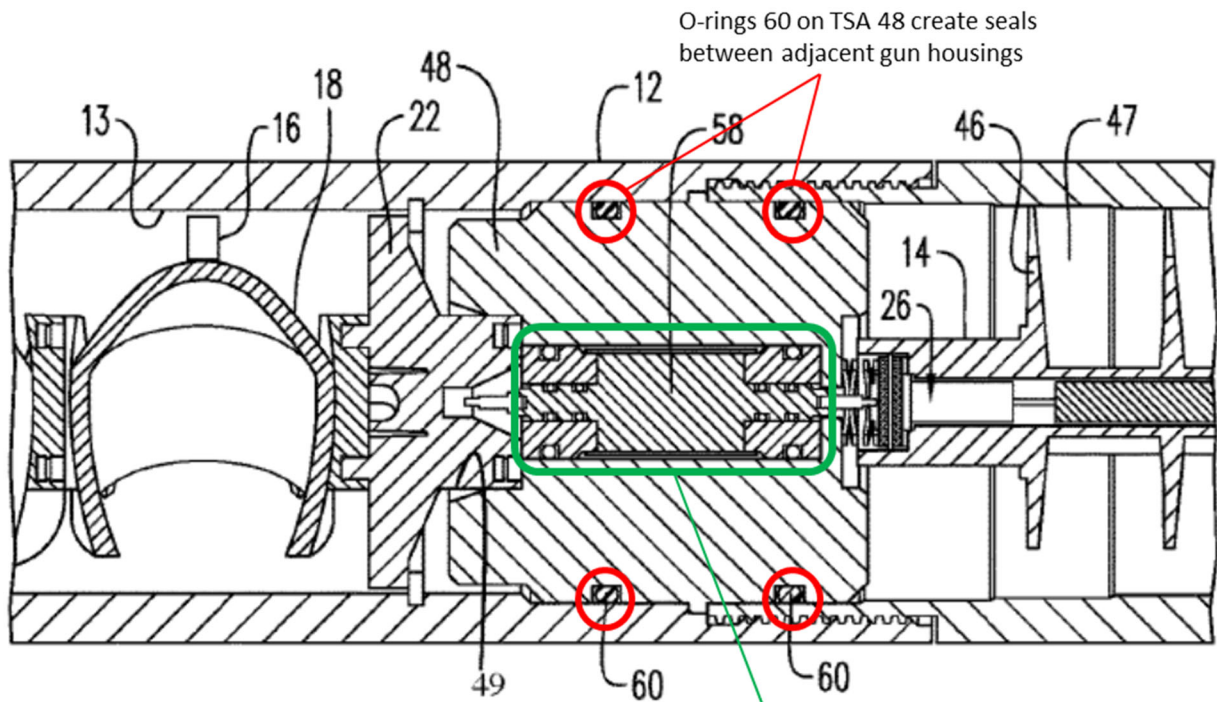


FIG. 19 TSA 48 has channel for accommodating bulkhead 58

2. “bulkhead”

The term “bulkhead” is a common and accepted industry term and is generally understood to include a device that pressure isolates adjacent guns and passes an electrical signal between the adjacent guns. Ex. 2002 ¶45. The ’938 Patent, including the specification and claims describe the bulkhead exactly as understood and used in the industry. Thus, while DynaEnergetics does not believe construction is necessary, “bulkhead” means “*a component that seals adjacent guns (when positioned within the TSA) and provides for electrically connecting adjacent guns.*” *Id.* ¶46.

For example, the '938 Patent explains that “the tandem seal adapter seals the gun assemblies from each other along with the bulkhead 58.” Ex. 1001, 7:55-8:5. Exemplary Figure 19 illustrates a bulkhead 58 positioned in a TSA 48 wherein both the TSA and the bulkhead are provided with seals:

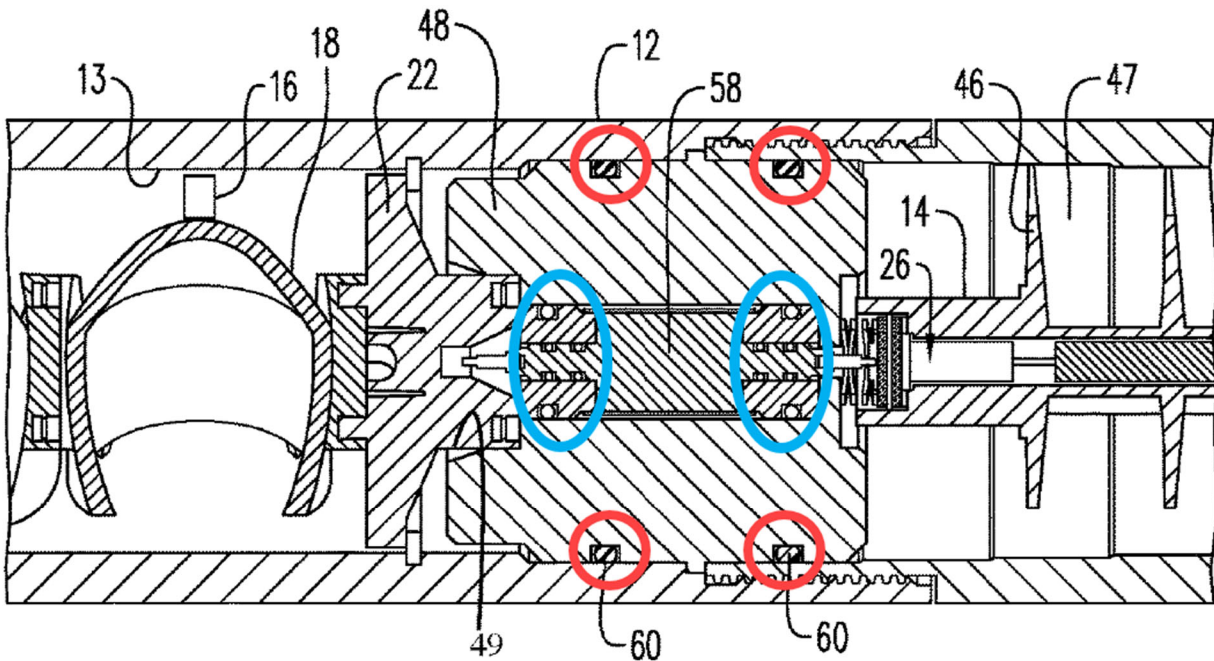
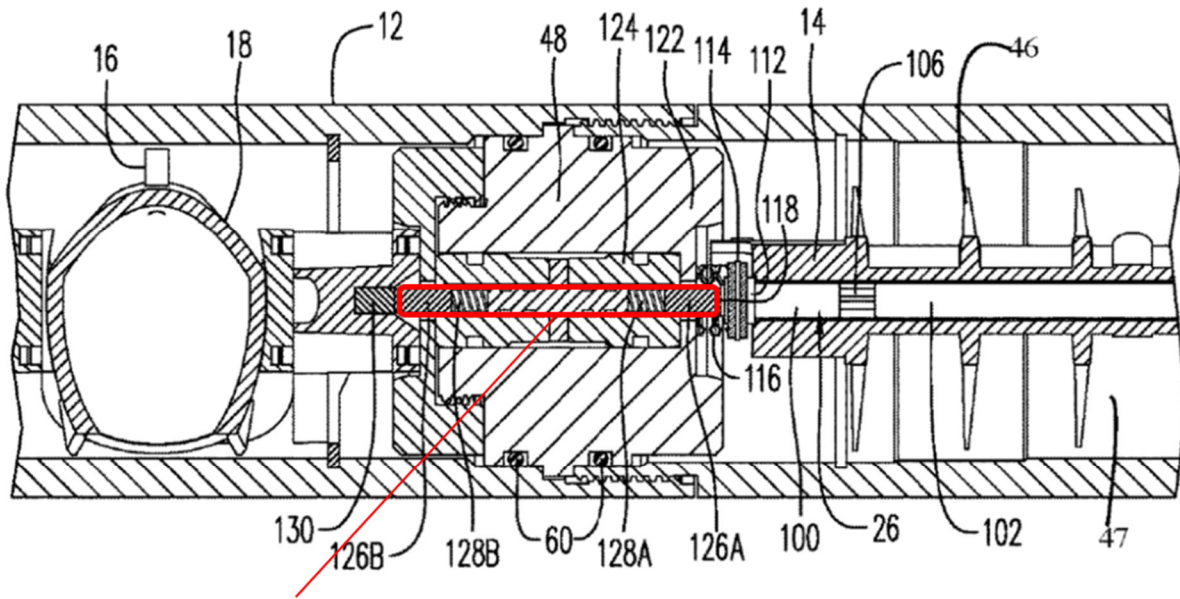


FIG. 19

Additionally, the '938 Patent provides wireless connectors electrically connecting the detonator to the bulkhead assembly. *Id.*, 8:17-39. Exemplary Figure 32 illustrates the electrical connection between adjacent guns outlined in red below:



Electrical connection
between adjacent guns

FIG. 32

IV. THE BOARD SHOULD EXERCISE ITS DISCRETION AND DECLINE TO INSTITUTE REVIEW OF THE '938 PATENT

The threshold requirement in any petition for post grant review (“PGR”) is to determine whether the petition “demonstrate[s] that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable.” 35 U.S.C. 324(a). Even when the threshold requirement is met, the Board has discretion to deny a petition on its merits or for administrative efficiency. *See BioDelivery Scis. Int’l, Inc. v. Aquestive Therapeutics, Inc.*, 935 F.3d 1362, 1365 (Fed. Cir. 2019) (citation omitted).² The Board’s discretion to deny a petition is especially salient given the

² Much of the law cited herein addresses discretionary denials of *inter partes* review under 35 U.S.C. § 314(a). Previous panels have found such case law to be persuasive

Supreme Court’s directive in *SAS Institute Inc. v. Iancu*, 138 S.Ct. 1348 (2018) for the Board to make a “binary choice—either institute review or don’t.” *Id.* at 1355. Post-*SAS* guidance from the Patent Office provides that where a petition contains voluminous or excessive grounds, “[t]he panel will evaluate the challenges and determine whether, in the interests of efficient administration of the Office and integrity of the patent system (*see* 35 U.S.C. § 316(b)), the entire petition should be denied under 35 U.S.C. § 314(a).” *See SAS Q&As* (June 5, 2018) at Part D, Effect of SAS on future challenges that could be denied for statutory reasons, Question D2. Consistent with this guidance, Board decisions post-*SAS* have considered the number of claims and grounds that meet the institution standard and whether institution would “be an efficient use of the Board’s time and resources.” *See RetailMeNot, Inc.*, 2020 WL 1169479, at *15; *Chevron Oronite Co. v. Infineum USA L.P.*, IPR2018-00923, Paper 9 at 10-11 (PTAB Nov. 7, 2018) (informative)).

The Petition here suffers from several fatal defects, each of which individually renders the Petition not likely to succeed on any of the asserted grounds and warrant exercise of the Board’s discretion under Section 324(a) to deny institution.

and applicable to PGR petitions. *See, e.g., Supercell Oy v. Gree, Inc.*, PGR2020-00041, 2020 WL 5519314, at *3 (PTAB Sept. 14, 2020); *RetailMeNot, Inc. v. Honey Sci. Corp.*, PGR2019-00060, 2020 WL 1169479, at *14-15 (PTAB Mar. 10, 2020).

A. Petitioner’s Applied References Are Cumulative of—and Identical to—Art Cited and Considered During Prosecution

The Board may deny institution where a Petition presents “the same or substantially the same” prior art that was considered by the Examiner during prosecution. *See* 35 U.S.C. § 325(d). The Petition represents one of those rare cases where every asserted primary prior art reference—and several secondary references—was considered during prosecution. As a result, the six factors the Board considers under Section 325(d) warrant denial here, including (1) the similarities and material differences between the asserted prior art and the prior art involved during examination; (2) the cumulative nature of the asserted art and the prior art evaluated during examination; (3) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection; (4) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art; (5) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and (6) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art arguments. *Apple Inc. v. Qualcomm Inc.*, IPR2018-01453, 2019 WL 994545, at *3 (PTAB Feb. 27, 2019) (citing *Becton, Dickinson &*

Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8 at 17-18 (PTAB Dec. 15, 2017) (informative)).

Regarding the first factor, each of the seven primary references asserted by Petitioner—Schacherer, Black, Lanclos, Rogman,³ Harrigan, EWAPS, and Goodman—were cited by DynaEnergetics and considered by the Examiner during prosecution. *See* Ex. 1008 at 93, 107, 113, 127, 145, 172, 178. There are no differences between Petitioner’s primary prior art references and those considered during prosecution. This factor heavily weighs in favor of denying institution.

Regarding the second factor, the asserted art is wholly cumulative of the prior art considered by the Examiner. In fact, Petitioner has cited no new primary references that were not previously considered during prosecution. Several secondary references relied on by Petitioner and its expert—mainly Lerche ’278 (*Ex.* Ex. 1011; Ex. 1007 ¶¶37, 191) and Lerche ’929 (Ex. 1016; Pet. at 49), Bonavides

³ The Petition cites U.S. Patent Application Publication No. 2015/0330192, which ultimately issued as U.S. Patent No. 10,077,641, which was cited by DynaEnergetics and considered by the Examiner during prosecution. Ex. 1008 at 109, 174. The portions of the specification and the figures of Rogman relied upon by Petitioner are identical.

(Ex. 1017; Ex. 1007 ¶¶42, 68), and Brooks⁴ (Ex. 1021; Ex. 1007 ¶¶47, 74)—were also cited and considered by the Examiner during prosecution (Ex. 1008 at 105-106, 108, 112). This factor heavily weighs in favor of denying institution.

Regarding the third factor, during prosecution the Examiner issued multiple rejections based on U.S. Patent No. 9,677,363 to Schacherer.⁵ Specifically, the Examiner rejected original application Claims 1, 2, 4, 5, 7, 11-16, 19 and 20 as anticipated by Schacherer (Ex. 1008 at 82-86); Claims 3 and 8 as obvious over Schacherer in combination with U.S. Patent No. 10,190,398; and Claim 18 as obvious over Schacherer in combination with U.S. Patent No. 8,695,506. *Id.* at 39-40, 86-87. However, the Examiner indicated that the prior art, including Schacherer, failed to anticipate or make obvious the subject matter in original Claim 6 (“at least a portion of the bulkhead is contained within a tandem seal adapter, and the wireless ground portion is in wireless electrical contact with the tandem seal adapter”) and original Claim 17. *Id.* at 87. The subject matter of original Claim 6 is incorporated in issued Claim 1 and the subject matter of original Claim 17 is incorporated in

⁴ Cited and considered as Publication No. 2005/0178282 to Brooks, which later issued as Ex. 1021.

⁵ This patent is a continuation of Ex. 1004. Both were cited during prosecution and share a common specification and figures.

issued Claim 13. The Examiner considered the remaining six primary references asserted in the Petition but did not issue rejections based on them. This factor weighs heavily in favor of denying institution.

Regarding the fourth factor, substantial overlap exists between, for example, how each of the Examiner and Petitioner applied Schacherer to the same features of the challenged claims. Most notably, the Examiner and Petitioner applied Schacherer to the “outer gun carrier” recited in Claims 1 and 13 in the same way as rejected by the POP in the ’422 IPR, and in a way contrary to Petitioner’s arguments during prosecution of its own patents over at least the past three years, discussed further below. The chart below further summarizes the overlap:

Claim Feature	Schacherer as applied by Examiner	Schacherer as applied by Petitioner
an outer gun carrier	outer housing 26 and connectors 28, 30 (Ex. 1008 at 83)	“outer housing 26 and connector 30 together serve as a carrier” (Pet. at 94)
a detonator contained entirely within the outer gun carrier	e.g., features 32, 38, 40 contained within the outer gun carrier (comprising outer housing 26 and connector 30) (Ex. 1008 at 84)	“Schacherer’s detonator, including electrical contacts, is entirely within the combination of housings 26 and 30” (Pet. at 126)
the detonator including a detonator body	annotated as the inner portion of connector 30, around features 32, 38, 40 (Ex. 1008 at 84)	“several bodies, including a body around detonator 38, connector 28, connector 30, and connectors 30 and 28 with couplers” (Pet. at 12)

<p>a wireless signal-in connector, a wireless through wire connector, and a wireless ground contact connector, and</p>	<p>“a wireless bulkhead connector portion (comprising 64), a wireless through wire connecting portion (comprising 66), and a wireless ground portion 46” (Ex. 1008 at 83)</p>	<p>“a variety of ‘wireless’ electrical connectors connecting selective firing modules 32, including in rotary electrical connections 46, 80, rotary electrical connectors 48, 82, electrical connector 76, and electrical couplers 62, 68 [e.g., contacts 64 and 66 in electrical coupler 62”] (Pet. at 27)</p>
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Each of the Examiner and Petitioner notably sought to apply the outer housing 26 and the connector 30 discussed by Schacherer to the claimed “outer gun carrier.” The POP rejected this interpretation for the claimed “outer gun housing” in the ’422 IPR. Ex. 2001 at 21-22. Petitioner’s arguments in support of its own patent application distinguish a gun body from a tandem or connector sub with respect to, e.g., the Lanclos⁶ reference asserted in this Petition. See Ex. 2014 at 3-4 (“Items...of Lanclos [that] are not a perforating gun body as claimed...are ‘upper connection sub 42’, [and] ‘connecting subs 15’.... Lanclos describes these as separate components performing separate functions.”); see also *id.* at 5 (“It would not have been obvious to thread the perforating gun bodies of Lanclos together because...Lanclos requires a cartridge sub 68 to contain the detonator and switch. Without the sub, there would be no place to put the cartridge of Lanclos.”).

⁶ U.S. Pre-Grant Publication (No. 2012/0199352) of U.S. Patent No. 9,080,433.

Regarding the fifth factor, Petitioner never explains how the Examiner erred in applying the references, all of which were considered during prosecution. Petitioner generally alleges that the Examiner overlooked the teachings of Schacherer and that those errors “are readily corrected.” Pet. at 9-10 (citing Ex. 1008 at 87). Petitioner then purports to “correct[.]” the Examiner’s “reasons for allowance” but never mentions that those statements were part of the reasons for the indication of allowable subject matter and supported the Examiner’s finding that Schacherer does not disclose at least “the wireless ground portion is in wireless electrical contact with the tandem seal adapter” and “[inserting the detonator] is performed at the wellbore site.” The Examiner posited that “a bulkhead 84...is contained within an outer housing 26 of the perforating gun”; i.e., Schacherer does not otherwise disclose a TSA. Accordingly, the Examiner properly analyzed Schacherer and Petitioner fails to articulate any error such that this factor weighs in favor of denial of institution.

Regarding the sixth factor, neither Petitioner nor its expert have added any additional facts or evidence not already considered and argued over during prosecution that would warrant reconsideration of the asserted prior art. Taken together, all six factors strongly favor denying institution under Section 325(d).

B. Petitioner’s Grounds Lack Particularity

35 U.S.C. § 322(a)(3) provides that a PGR petition must “identif[y], in writing and with particularity, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim.” Parties “should avoid submitting a repository of all the information that a judge could possibly consider, and instead focus on concise, well-organized, easy-to-follow arguments supported by readily identifiable evidence of record.” Trial Practice Guide, 77 Fed. Reg. 48,756, 48,763 (Aug. 14, 2012).

Here, the Petition’s lack of particularity is especially egregious given that Petitioner had the benefit of the ’422 IPR POP opinion when it filed this Petition, yet failed to heed the guidance in that decision. In opposing DynaEnergetics’ motion to amend in the ’422 IPR, Petitioner addressed individual limitations of the proposed substitute claims but failed to identify any specific combinations of prior art that it believed rendered the proposed substitute claims obvious. Ex. 2001 at 24. The POP vacated the Final Written Decision for the motion to amend and expressly “declin[ed] to piece together Petitioner’s arguments,” which “consist[ed] of a limitation-by-limitation recitation of where various prior art references allegedly disclose each limitation of the proposed substitute claims,” “to develop a persuasive theory of unpatentability.” *Id.* at 24-25. In doing so, the POP emphasized that the PTAB was not obligated to “raise, develop, and resolve every possible argument

supported by the evidence of record...even if the petitioner never raised or sufficiently developed that argument in the record.” *Id.* at 10 (emphasis added). Adopting Hunting’s approach, the Board found, would “put the onus on the Board to develop arguments for the petitioner” and disrupt the adversarial process which is at the heart of post grant review proceedings. *Id.* at 11-12. Like in the ’422 IPR, Petitioner puts the onus on the Board and DynaEnergetics to identify (and make) its arguments that are insufficiently developed in the Petition.

With respect to anticipation, for example, Petitioner has alleged that independent Claims 1, 9, and 13 are invalid based on six references but each of these references fail to disclose at least two of the limitations of Claim 1 and limitations in Claims 9 and 13. In its Section 112 argument, Petitioner states that Claims 1-20 are invalid but fails to offer or argue any specific grounds for multiple dependent claims. With respect to obviousness, Petitioner relies on a combination of as many as ten references in a single ground, all separated by “and/or,” resulting in an excessive number of grounds. For example, Ground 5, which asserts that Claims 1-20 are obvious based on Schacherer combined with common knowledge, Black, Lanclos, Rogman, Harrigan, EWAPS, Goodman, “and/or” SLB Catalog, results in as many as 255 unique reference combinations. Grounds 13, 17, and 19 likewise present 255 possible combinations. Ground 10 results in as many as 511 unique combinations. Worse still, Petitioner relies on a number of references (e.g.,

Bonavides, Carisella, Lerche, Brooks, and Crawford) not included in any ground to demonstrate common knowledge, further ballooning the total number of possible unique prior art combinations to more than 1689—the sheer volume of which would be impossible to address given the constraints in these proceedings. Rather than demonstrate unpatentability of the challenged claims, putting forward seven pieces of prior art as anticipatory and over 1600 obviousness combinations instead seems to prove the point that '938 Patent is novel and not obvious. It conjures Shakespeare: “Thou doth protest too much!”

Petitioner also fails to identify which limitations in the challenged claims are taught by which references, relying on the Board and DynaEnergetics to consider all possibilities for them. This is improper. *Adaptics Ltd. v. Perfect Co.*, IPR2018-01596, 2019 WL 1084284, at *8-9 (PTAB Mar. 6, 2019) (informative) (denying institution for “lack of particularity that result[ed] in voluminous and excessive grounds” where the petition’s catch-all ground relied on “up to ten references connected by the conjunction ‘and/or,’” “yielding hundreds of possible combinations”) (emphasis added); see also *Invue Security Prods., Inc. v. Mobile Tech., Inc.*, IPR2019-00078, 2019 WL 1978426, at *6-7 (PTAB May 1, 2019) (noting that “a Petition that requires the panel or the Patent Owner” “to scour the Petition to discern Petitioner’s evidence” lacks particularity and “is tantamount to impermissibly shifting Petitioner’s burden under 35 U.S.C. § 312(a)(3)); *PayPal*,

Inc. v. IoEngine, LLC, IPR2019-00931, 2019 WL 5586646, at *10-11 (PTAB Oct. 29, 2019) (finding that the “multiplicity of theories” asserted by Petitioner “for each claim element results in a burdensome number of potential combinations for each claim”).

Petitioner fails to clearly set forth what, in each reference, renders the challenged claims invalid, instead asking the Board and DynaEnergetics to scour the evidence and piece together Petitioner’s arguments to develop a persuasive theory of unpatentability—a task the POP and other panels have consistently rejected.

C. Petitioner’s Element-By-Element Analysis Violates Black-Letter Patent Law

The Petition is flawed for the additional reason that it does not analyze the challenged claims as a whole, instead adopting the same limitation-by-limitation approach that was expressly rejected by the POP in the ’422 IPR when it declined to “piece together Petitioner’s arguments to develop a persuasive theory of unpatentability.” Ex. 2001 at 24-25. This flaw manifests itself in different ways based on the statutory ground Petitioner relies upon. With respect to anticipation, Petitioner’s approach leads to the identification of the same feature in the prior art as allegedly teaching multiple different claimed elements. It is nearly impossible to track, however, because there is a gap of 20-30 pages in the Petition between discussing successive claim elements for the one reference. For example, Petitioner

points to “coupler 62” of Schacherer as teaching both the bulkhead and the TSA (and the distinct wireless electrical contacts) in various parts of the Petition. Pet. at 54-55, 73-75. With respect to obviousness, Petition simply analyzes the claim elements and references in isolation and never explains how the prior art and descriptions should be matched together (and why a POSITA would do so) to arrive at the entire claimed invention of the ’938 Patent. Nowhere does Petitioner address, let alone analyze, how the asserted prior art references teach each and every element of Claims 1, 9, and 13 *as a whole*. Indeed, Petitioner never maps the full language of the claims against even a single prior art reference and repeatedly fails to even address the precise wording of the claims, instead using haphazard paraphrasing that often omits important claimed features.

It is axiomatic in patent law that, in analyzing the validity of challenged claims, the subject matter of the claims must be *viewed as a whole*. *In re DiStefano*, 808 F.3d 845, 848 (Fed. Cir. 2015). It is not sufficient to point out, as Petitioner attempts (unsuccessfully) to do, where individual elements of the challenged claims are allegedly present in each reference. *See Abbott Labs. v. Andrx Pharms., Inc.*, 452 F.3d 1331, 1336 (Fed. Cir. 2006) (“[M]ere identification in the prior art of each element is insufficient to defeat the patentability of the combined subject matter as a whole”) (citation, quotation omitted). Petitioner’s decision to address only separable elements of the challenged claims and not the challenged claims as a whole

is improper and justifies discretionary denial of institution. *See Invue Security Prods.*, 2019 WL 1978426, at *6-8 (denying institution where the Petitioner “argues only individual features in a claim and does not address the subject matter of a claim as whole as required to demonstrate obviousness”); *PayPal*, 2019 WL 5586646, at *12 (denying institution where the Petitioner “fail[ed] to recognize and address the interrelationship between the claim elements”).

D. Petitioner Improperly Relies on Common Knowledge to Supply Missing Limitations

Petitioner also improperly relies on “common knowledge” in its ten obviousness grounds, adding even more “evidence” to the excessive combinations. While common knowledge can be used to supply missing claim limitations in an obviousness analysis, it “cannot be used as a wholesale substitute for reasoned analysis and evidentiary support” and must be supported by documentary evidence and reasoned analysis. *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361-63 (Fed. Cir. 2016).⁷ Several Board panels have declined to institute petitions based on

⁷ The PTO recently published guidance following *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330 (Fed. Cir. 2020) addressing the use of statements in a patent’s specification as evidence of the general knowledge of a POSITA. *See Treatment of Statements of the Applicant in the Challenged Patent in Inter Partes Reviews Under*

generalized and unsupported assertions of common knowledge. *See HP Inc. v. Big Baboon, Inc.*, CBM2016-00020, 2016 WL 5105568, § II.F.2 (PTAB June 28, 2016); *Arris Sols., Inc. v. Realtime Adaptive Streaming LLC*, IPR2019-01586, 2020 WL 1264370, at *10-11 (PTAB Mar. 16, 2020).

Petitioner's reliance on common knowledge here is not supported by sufficient evidence or analysis. For example, Petitioner fails to cite any evidence that a "POSITA's common knowledge includes making a second gun" other than the *ipse dixit* of Dr. Parrott, who himself provides no supporting evidence. Pet. at 174 (citing Ex. 1007 ¶¶735). Petitioner cites two of Hunting Titan's patents (which tellingly Petitioner does not assert as references) but does not point to any specific teachings in those patents or provide any analysis tying the teachings of the patents to the challenged claims. *See* Pet. at 26 ("wireless connectors" (citing figures in Ex. 1023, 1024; Ex. 1007 ¶¶285, 283)); Pet. at 40 ("insulator" (citing Ex. 1007 ¶¶337-

§ 311 (August 18, 2020) at 6-7, available at https://www.uspto.gov/sites/default/files/documents/signed_aapa_guidance_memo.pdf. Use of such statements to supply missing claim limitations that were generally known in the prior art must be supported by "substantial evidence." *Id.* at 7. Petitioner fails to provide substantial evidence as required under *Arendi* and *Koninklijke*.

39)); Pet. at 152 (“wires” (citing Ex. 1007 ¶¶585, 610, 635)). Petitioner and Mr. Parrott also cite the ’938 Patent itself but never demonstrates how statements in the ’938 Patent constitute evidence of the common knowledge of a POSITA. *See* Pet. at 54 (“a bulkhead transferring a signal” (citing Ex. 1001; 1007 ¶387)); Pet. at 73 (“tandems” (citing Ex. 1001; 1007 ¶441)). Petitioner further cites references not included in any obviousness ground, including Bonavides, Carisella, the Lerche references, Brooks, and Crawford, as demonstrating the “ubiquity” of the missing claim limitations in the prior art but never ties the alleged teachings of the references to a POSITA’s common knowledge or challenged claims. *See* Pet. at 87, 93, 100, 113, 126, 138, 171.

V. PETITIONER’S ARGUMENTS FAIL TO ESTABLISH THE UNPATENTABILITY OF THE CHALLENGED CLAIMS

A. Each Allegedly Anticipatory Reference Lacks Two or More Features of the Challenged Claims

It is well established that “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. Inc. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). Every reference relied upon in the Petition lacks multiple features of the challenged claims. Claims 1 and 9 each require a “wireless ground contact connector” that is “in wireless electrical contact with the tandem seal adapter.” During prosecution, the Examiner pointed to this feature as allowable

subject matter over the applied art, including Schacherer. Ex. 1008 at 87. None of the art cited in the Petition discloses this feature. In addition, every challenged claim requires a detonator including three separate and distinct wireless connectors, but the cited art lacks all of these features.

Cited Art	Claimed Features	
	“a detonator including...a wireless signal-in connector, a wireless through wire connector, and a wireless ground contact connector” (Claims 1, 9, 13)	“the wireless ground contact connector is in wireless electrical contact with the tandem seal adapter” (Claims 1, 9)
Schacherer	X	X
Black	X	X
Lanclos	X	X
Rogman	X	X
Harrigan	X	X
EWAPS	X	X
Goodman	X	X

All of the cited references also fail to teach one or more of the steps recited in Claim 13. For at least these reasons, Petitioner’s anticipation grounds must fail.

1. Schacherer Does Not Anticipate the Challenged Claims (Ground 3)

Petitioner alleges that Schacherer anticipates Claims 1-2, 4-5, and 7-20. Schacherer was cited during prosecution, and the Examiner considered and

discussed its disclosure and teachings at length, but ultimately found the challenged claims patentable over Schacherer. Ex. 1008 at 87.

Schacherer is generally directed to a perforation gun system (i.e., explosive assembly 20) in which a connector or sub 28, 30 connects adjacent gun housings 26 in such a way that allows free rotation of the explosive components within the housing 26, while providing electrical and ballistic transfer by screwing the connector 30 to the gun housing 26. See Ex. 1004, Abstract, 2:30-34, Figs. 2, 5 (below); Ex. 2002 ¶53. The connector 30 is pre-assembled housing detonator components and attached to the housing 26 at the wellbore site. Ex. 1004, 6:37-41, Fig. 8.; Ex. 2002 ¶53.

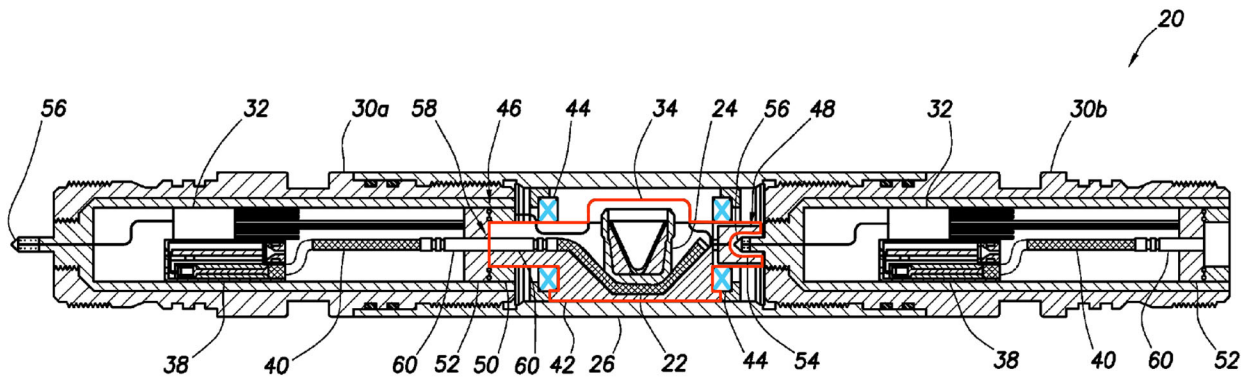
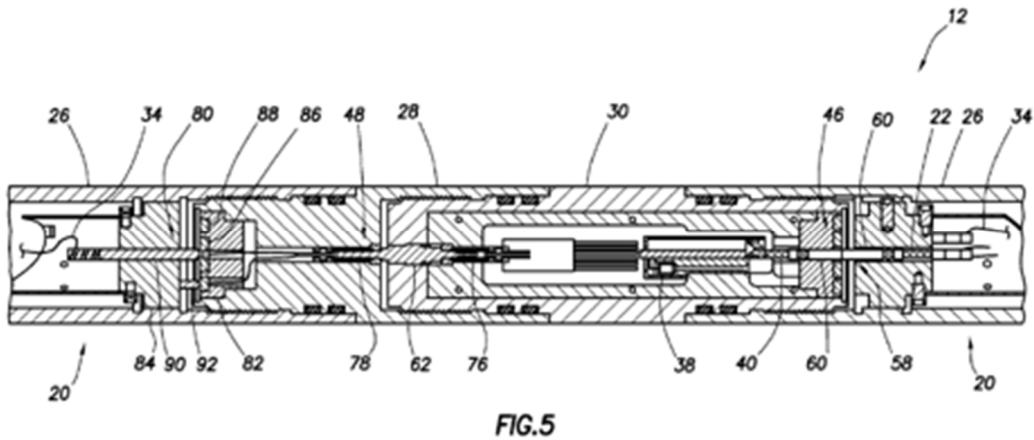
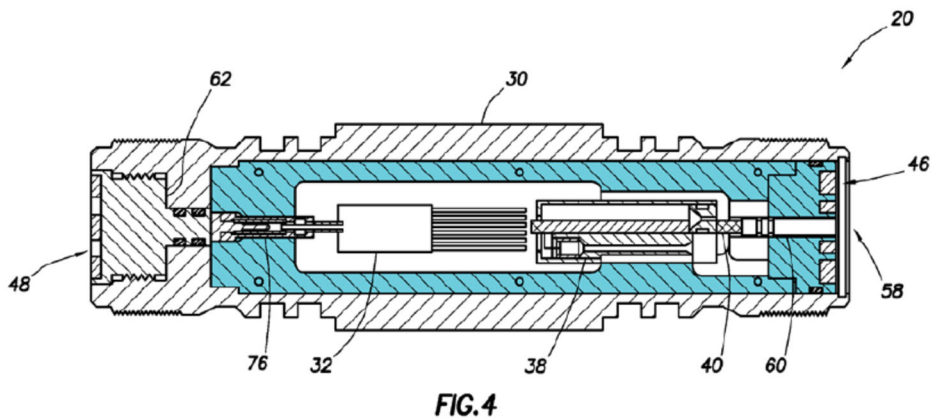


FIG.2



a) Schacherer fails to disclose a detonator including three separate and distinct wireless connectors, as claimed in Claims 1, 9, and 13.

The Petition identifies the blue shaded portion as the claimed detonator body and that the coupler 62 is either the claimed bulkhead or TSA. Pet. at 13. Petitioner variously cites that rotary electrical connections 46, 48, 80, 82; contacts 64, 66, 68, 70; electrical connector 76; and electrical couplers 62, 68, 78 are the “wireless electrical connectors”⁸ of the claimed detonator. Pet. at 26-29.



⁸ This does not accurately reflect the claim language for any of the three connectors.

Even under Petitioner's strained interpretation of the "detonator," coupler 62 cannot be considered part of the detonator either as described by Schacherer or as presented in the Petition. Ex. 2002 ¶¶62. Thus, at least rotary electrical connections or contacts 48, 64, 66, 68, 70, 80, and 82, associated variously with embodiments of the coupler 62 (i.e., bulkhead/TSA), do not correspond to the claimed three separate and distinct wireless connectors included with the detonator. *Id.* Schacherer shows and describes the remaining connections as only signal connections for the switch assembly 32. *Id.*

Schacherer describes a wired bypass to the gun housing 26. Ex. 1004 6:18-22. At the very least, Schacherer fails to disclose a detonator including a wireless ground contact connector. Ex. 2002 ¶¶58-61. Petitioner fails to specify which of these structures specifically correspond to the wireless connectors of Claims 1, 9, and 13, leaving it to the Board and DynaEnergetics to decide which, if any, of these connectors correspond to the claimed structures.

b) Schacherer fails to disclose that the wireless ground contact connector is in wireless electrical contact with the TSA, as claimed in Claims 1 and 9.

Even a cursory examination of Schacherer shows that it does not disclose this feature of Claims 1 and 9. Petitioner repeatedly fails to address the precise wording of the claims but apparently posits that Schacherer discloses a wireless ground contact connector in wireless electrical contact with a TSA because: (1) the outer

housing (not the TSA, as claimed) is in contact with the “ground contact” (Pet. at 9-10); or (2) the outer housings 28, 30, and 26, and coupler 62 provide “a fluid seal” and are respectively in contact with a ground contact of the detonator and selective firing module (*id.* at 73-77).

Petitioner argues that Schacherer discloses that the outer housing (the gun housing 26, not the connector 28, 30) is in contact with the wireless ground portion. Pet. at 9-10. However, Claims 1 and 9 recite the wireless ground contact connector is in wireless electrical contact with the TSA, not the outer gun housing. Petitioner fails to apply Schacherer against the actual language of Claims 1 and 9.

The Petition generally alleges that the blue shaded portions below are the detonator of Schacherer:⁹ Pet at 12-14.

⁹ Petitioner also argues in the alternative that the entire structure 30 of Schacherer is a detonator. This argument is self-defeating because structure 30 is not contained entirely within any other structure as recited in Claim 1. The inventors of Schacherer themselves consistently refer to structure 26 as the “outer housing” and structure 30 as a “connector.” Ex. 1004 2:33-34. Further, a POSITA would clearly understand that the structure 30 of Schacherer is a type of sub. Ex. 2002 ¶ 60n2.

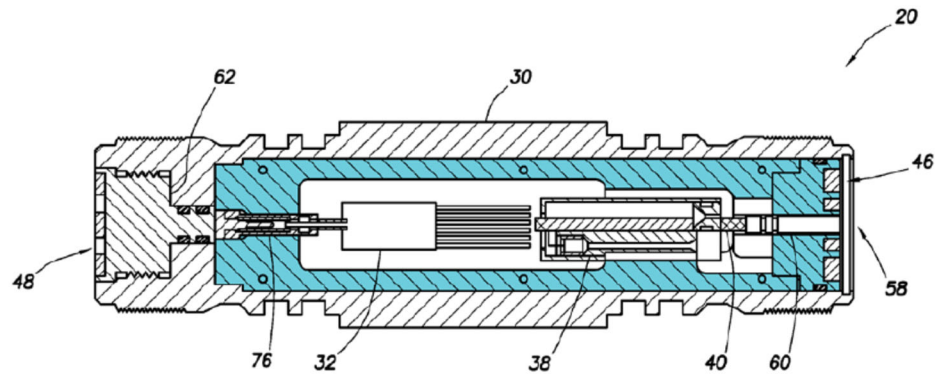


FIG. 4

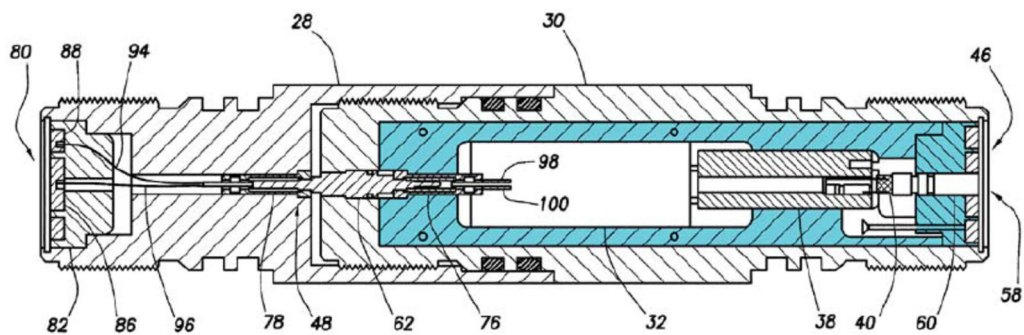


FIG. 7

Petitioner fails to specifically identify any connector as a “wireless ground contact connector.” Accordingly, it follows that Petitioner failed to establish that Schacherer discloses “a wireless ground contact connector in wireless electrical contact with the tandem seal adapter.” Regarding conductors 94, 96 cited by Petitioner, Figure 7 shows that these are clearly wires, and conductors 98, 100 are connected between electrical coupler 76 and selective firing module 32. Ex. 1004, 6:13-18, Fig. 7; Ex. 2002 ¶62. Thus, conductors 98, 100 are not wireless ground contact connectors and do not make wireless electrical contact with a TSA. In fact, none of the connectors or contacts that Petitioner vaguely alleges are “a variety of

‘wireless’ electrical connectors” (Pet. at 27), make wireless electrical contact with a TSA.

c) Schacherer fails to disclose a detonator contained entirely within the outer gun carrier, as claimed in Claim 1.

The blue shaded portions below, which Petitioner contends to be the detonator of Schacherer, clearly are not contained entirely within the outer gun carrier of the gun assembly in Schacherer.

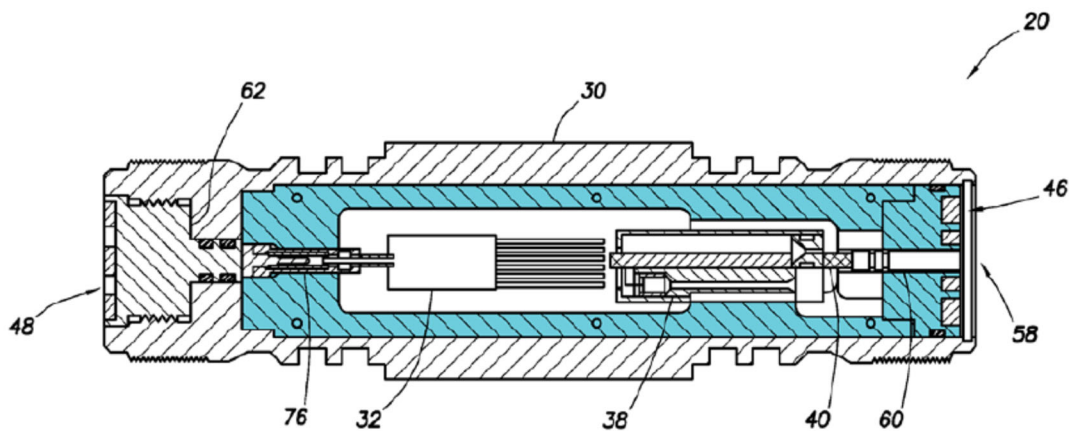


FIG. 4

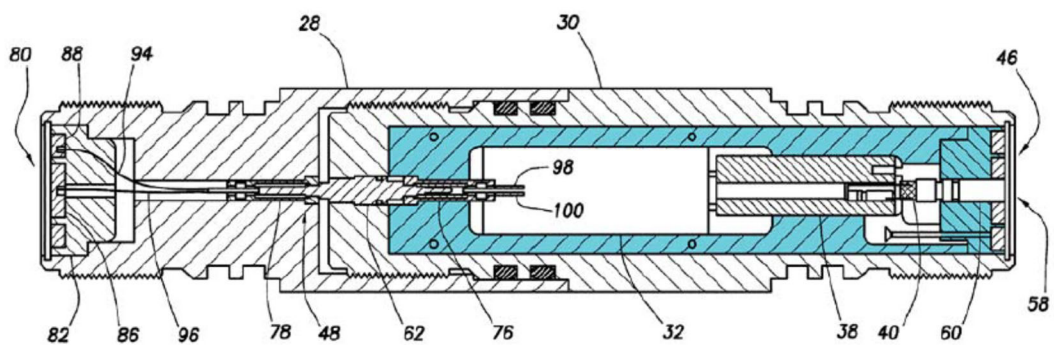


FIG. 7

Pet. at 12-14. Petitioner also argues that structure 30 is part of the outer gun housing.

Id. at 126-27. However, a POSITA would understand that an outer gun carrier is a

structure that includes a shaped charge. Ex. 2002 ¶67. Schacherer does not disclose any embodiments in which a shaped charge is provided within connector 30; instead, the shaped charge is exclusively provided within outer housing 26. Accordingly, connector 30 is clearly not an outer gun housing as the term would be understood by a POSITA. *Id.* ¶67.

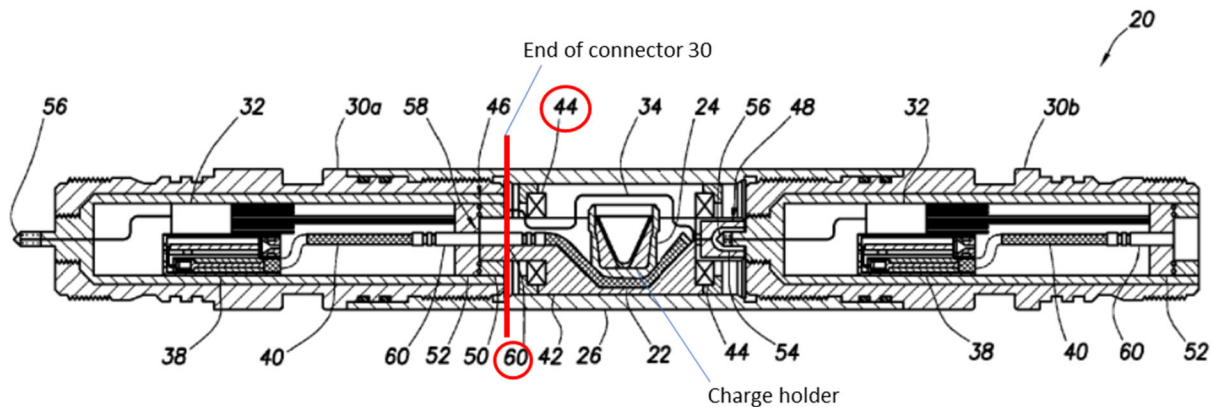
Petitioner relies heavily on the statement that “the PTAB has already held that Schacherer’s outer housing 26 and connector 30 act as a single housing containing a detonator.” Pet. at 127. This is grossly misleading, as the POP reversed the Board’s initial decision more than a month before the filing of the instant Petition, holding that Schacherer does not support an interpretation that the connector 30 is part of the outer gun housing. Specifically, the POP held that “[t]hough the Board decision interpreted Schacherer’s connector 30 to ‘act as a single housing’ with housing 26, this interpretation is not clearly stated by Schacherer and does not rise to the sort of readily identifiable and persuasive evidence.” *Id.* at 21-22. Accepting Petitioner’s position that connector 30 is part of the outer gun housing would be tantamount to reversing the POP’s finding with respect to this exact same reference.

d) Schacherer fails to disclose all of the steps of Claim 13.

Claim 13 recites in relevant part “(b) inserting a top connector into the outer gun carrier adjacent to the charge holder, the top connector comprising a hollow channel; (c) inserting a detonator into the hollow channel of the top connector, . . .

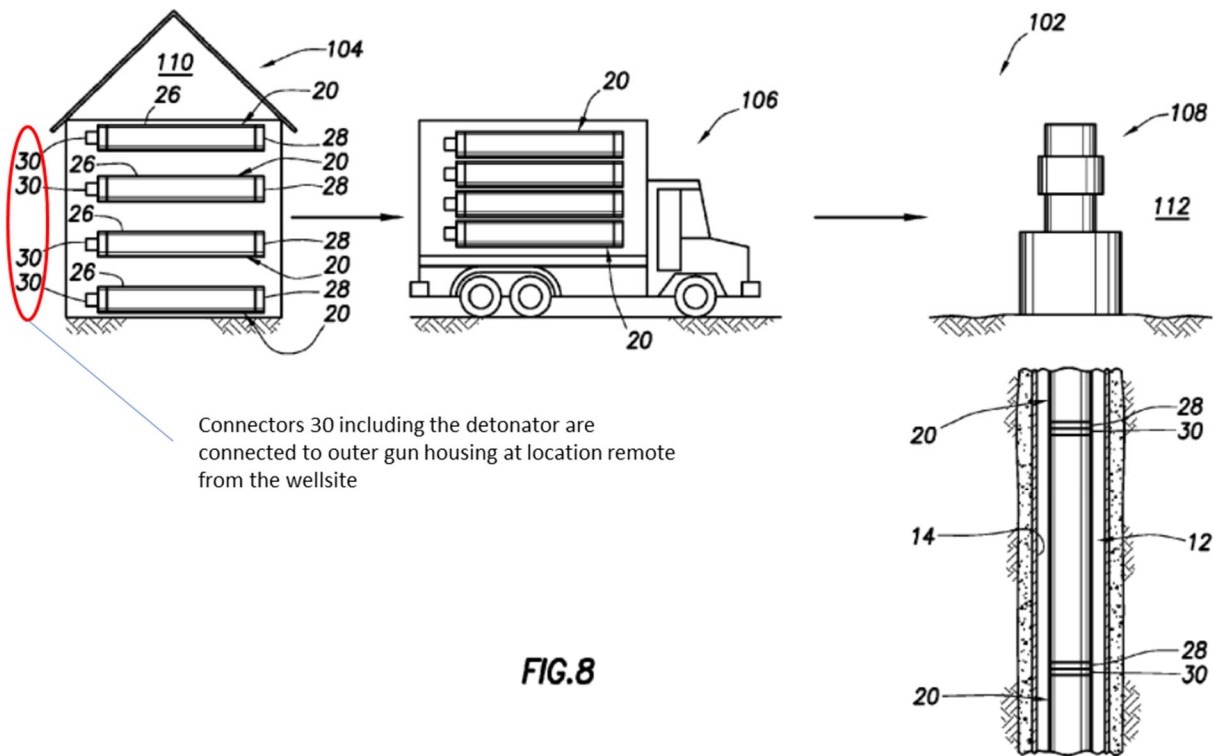
(f) transporting the perforation gun system to a wellbore site, wherein at least one of steps (a), (b), and (d) is performed before transporting the perforation gun system, and step (c) is performed at the wellbore site.”

Regarding steps (b) and (c), Petitioner first argues that “Schacherer teaches a detonator inserted within connector 30, which is inserted in carrier adjacent the charge holder.” Pet at 113. While Petitioner fails to explicitly state it, this statement seems to imply that Petitioner considers connector 30 to be the top connector. This position is inconsistent with Petitioner’s other arguments in which connector 30 is alleged to be part of the outer gun carrier. Pet. at 126-27. Further, connector 30 is not adjacent to the charge holder. As seen in Fig. 2 of Schacherer below, bearings 44, detonation boosters 60, and a significant amount of space are provided between connector 30 and the charge holder. Accordingly, connector 30 cannot be the claimed top connector. Ex. 2002 ¶69.



Next, Petitioner asserts that “each of the items in Schacherer discussed above as teaching a detonator body also teach the claimed top connector because they all hold a detonator and couple it to the detonating cord and are within the carrier.” Pet. 114. However, the detonator and the top connector are claimed as separate and distinct structures (e.g., “inserting a detonator into a hollow channel of the top connector”). Thus, Petitioner’s argument fails because the same structures cannot be cited for both the detonator and the top connector. *See Becton, Dickinson & Co v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) (“Where a claim lists elements separately, ‘the clear implication of the claim language’ is that those elements are ‘distinct component[s]’ of the patented invention.”) (quoting *Gaus v. Conair Corp.*, 363 F.3d 1284, 1288 (Fed. Cir. 2004)); *Hopkins Mfg. Corp. v. Cequent Performance Prods., Inc.*, IPR2015-00613, 2015 WL 4760586 at *7 (PTAB Aug. 7, 2015) (rejecting petitioner’s argument that “a single structure may satisfy two limitations in a claim” where the specification requires that the claim elements are “separate and distinct”).

Petitioner further argues that structures 46, 58 are top connectors. Pet. at 114. However, Figure 5 of Schacherer, reproduced below, shows that structures 46, 58 are substantially solid and only include a narrow channel for a detonation cord.



According to Schacherer, “in the assembling step 104, preferably each of the explosive assemblies 20 is completely assembled, including coupling the electrical detonator 38 to the explosive component 40 and installing these in the connector 30.” Ex. 1004, 6:37-41.

2. Harrigan Does Not Anticipate the Challenged Claims (Ground 14)

Petitioner alleges that Harrigan anticipates Claims 1-9 and 11-20 of the '938 Patent. Harrigan is only prior art for teachings supported in the provisional

application (Ex. 1028¹⁰), because Harrigan (Ex. 1012) as cited and applied in the Petition was not filed until May 2, 2014, after the priority date of the '938 Patent.¹¹ Harrigan was cited and considered during prosecution, and the Examiner found the challenged claims patentable over Harrigan. Ex. 1008. While the Petition focuses on features of Harrigan, this Preliminary Response will address features as described and illustrated in only the Harrigan Provisional.

The Harrigan Provisional is generally directed to a perforating gun “that is fully assembled including the initiator at a location other tha[n] the wellsite.” Ex. 1028 at 3, Figs. 1 and 3. The “perforating gun with integrated initiator” includes a loading tube (for positioning shaped charges), and a bulkhead that is “designed to support [the] initiator.” *Id.* at 1, Figs. 1 and 5a.

¹⁰ While the Petition gives lip service to the Harrigan Provisional, the primary language and figures used in the Petition are not supported by the Provisional.

¹¹ No such distinctions between the disclosures of Harrigan and the Harrigan Provisional were made, however, when DynaEnergetics cited Harrigan to the USPTO.

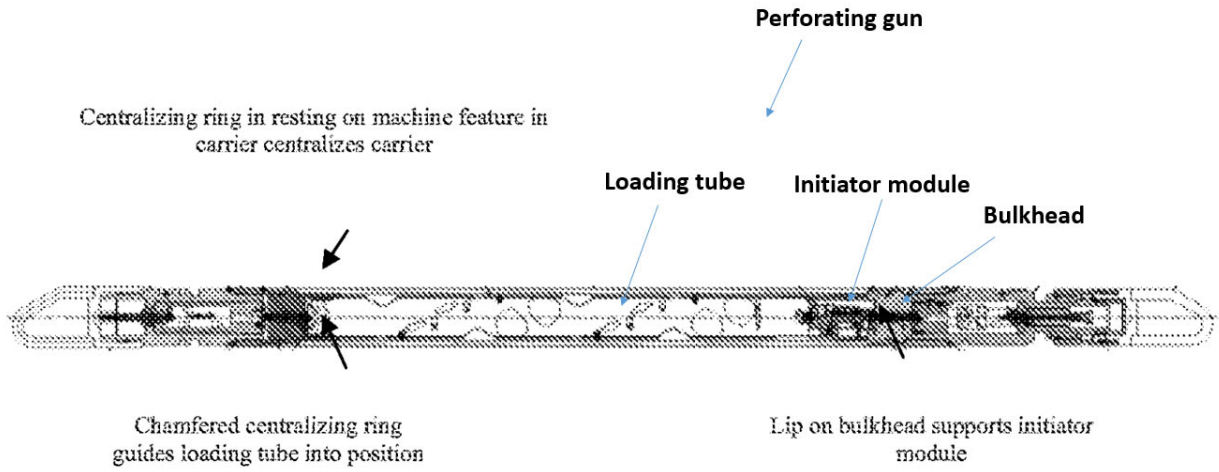
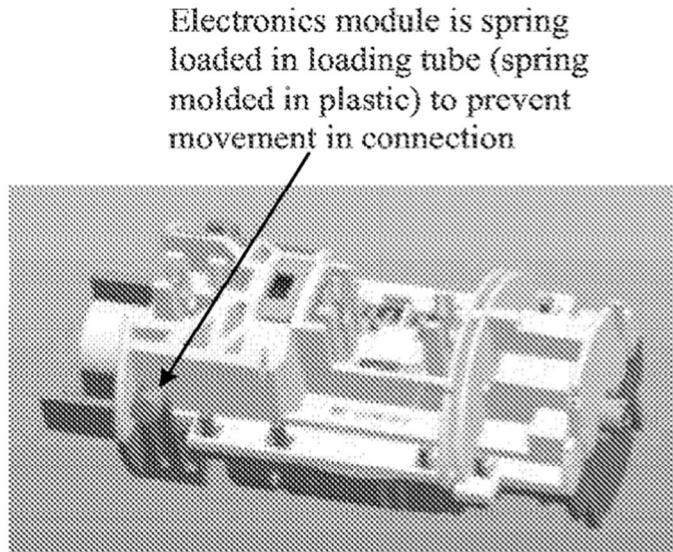


Fig. 1: Fractal Assembly

Fig. 3: Eclipse Initiator Module



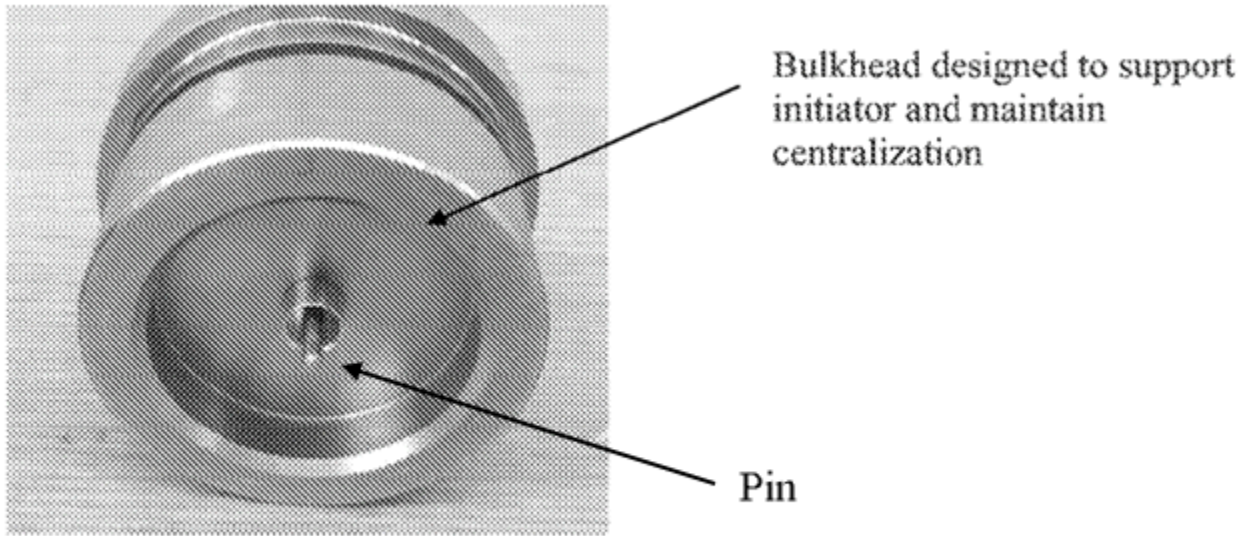
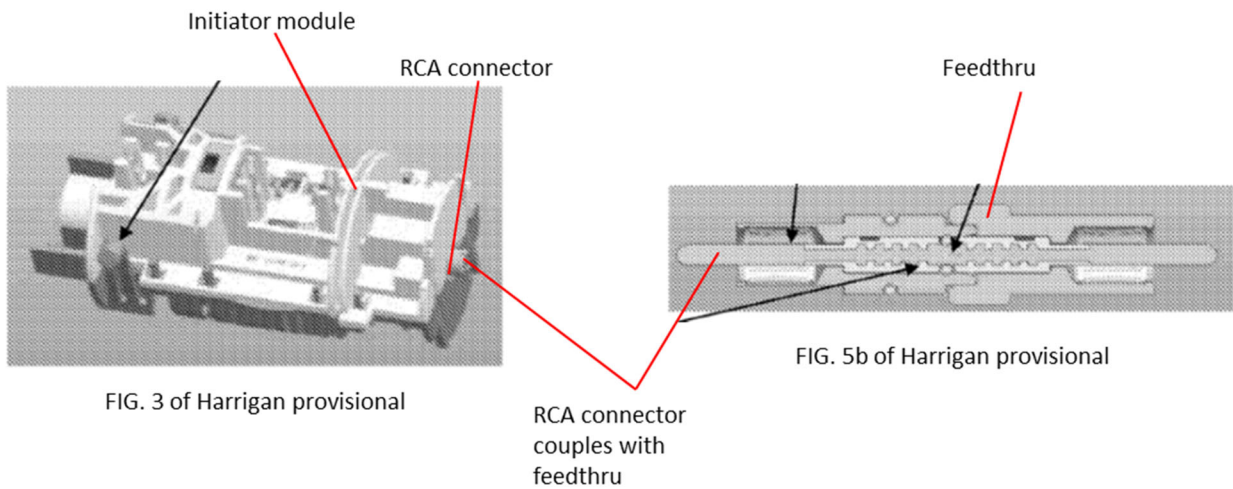


Fig. 5a: Bulkhead End

The Harrigan Provisional further describes a feedthru (sic) with a pin for “contact to RCA connector.” *Id.*, Fig. 5b. While not explicitly described or illustrated in the Harrigan Provisional, it appears that the outer end of the initiator module includes an RCA connector (Fig. 2) that receives the feedthru pin depicted in Fig. 5b below. Ex. 2002 ¶80.



a) Harrigan fails to disclose a detonator including three separate and distinct wireless connectors, as claimed in Claims 1, 9, and 13.

The Petition never cites with any particularity what specific structures of Harrigan¹² correspond to the wireless signal-in connector, the wireless through wire connector, and the wireless ground contact connector. Instead, Petitioner cites a variety of connectors in Harrigan and blithely asserts that these connectors teach the claimed wireless connectors. Pet. at 29-32.

The Petition asserts that the initiator module purportedly corresponds to the detonator. *Id.* at 14-15. The Petition further asserts that “Harrigan teaches electrical connections 430, 440 on both ends of initiator 125 for connection to a feedthrough...” *Id.* at 30. Even if the Board were to assume that (i) the initiator assembly is the detonator, and (ii) one of the “connections” of the RCA connector is a wireless ground contact connector and the other is a wireless signal-in connector, Harrigan contains no description that the initiator assembly has a wireless through wire connector. There is simply no description of how Harrigan transfers the signal through the gun. Ex. 2002 ¶87.

¹² For ease of reference in this section, reference to “Harrigan” as used in the Petition refers to both Harrigan and the Harrigan Provisional.

Assuming the initiator assembly corresponds to the claimed detonator, the Petition fails to identify with particularity which of the claimed connectors are disclosed by Harrigan. Petitioner further argues that Harrigan's structure "requires at least three electrical contacts for a signal-in to the initiator, a signal through the initiator to a next initiator, and a ground connection to function." Pet. at 31-32. Even if true, Petitioner has not shown that all three of these electrical contacts are made via wireless electrical contacts.

b) Harrigan fails to disclose that the wireless ground contact connector is in wireless electrical contact with the TSA, as claimed in Claims 1 and 9.

As noted, Petitioner has failed to establish with any particularity what structure of the initiator module of Harrigan corresponds to the wireless ground contact connector, but giving the Petition a generous reading, the wireless ground contact connector could be part of the feedthru pin-to-RCA connection. Ex. 1028 at Fig. 2. Regarding a TSA, Petitioner argues that the bulkhead of Harrigan corresponds to the claimed TSA. Pet. at 77. However, the RCA of the initiator assembly never makes wireless electrical contact with any portion of the TSA. Ex. 2002 ¶91. Instead, as seen below, the bulkhead/feedthru, and not the TSA/bulkhead of Harrigan, is connected to the RCA connector of the initiator assembly. Ex. 2002 ¶91.

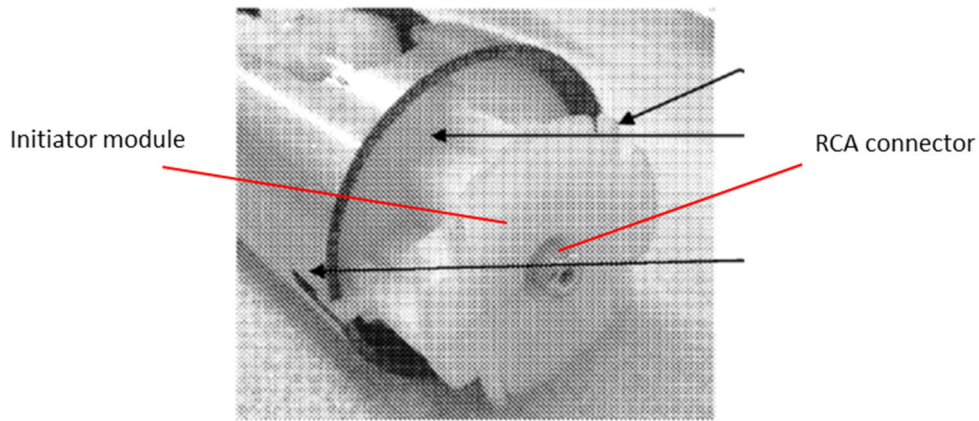
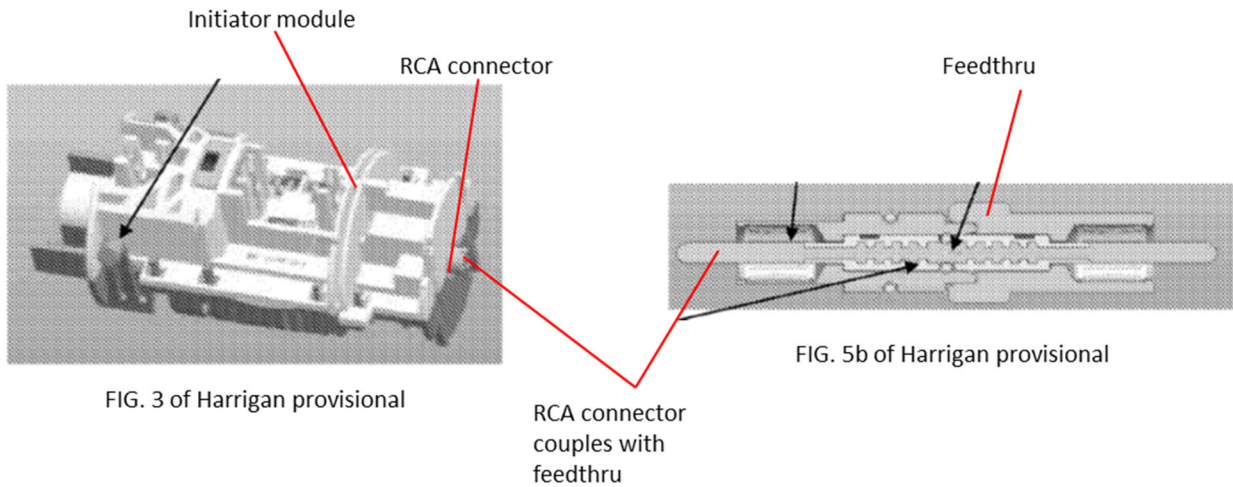


Fig. 2: Loading Tube End



Indeed, the Harrigan Provisional specifically states that “feedthru pin is over-molded with plastic” and the plastic sleeve can be seen (along with the feedthru pin) extending from the end of the bulkhead, thus isolating the RCA from the TSA. Ex. 1028, Figs. 5a and 5b; Ex. 2002 ¶92.

c) *Harrigan fails to disclose all of the steps of Claim 13.*

Claim 13 states in relevant part, “(c) inserting a detonator into the hollow channel of the top connector . . . wherein . . . step (c) is performed at the wellbore”

site.” Ex. 1001, at 12:34-58 (emphasis added). Harrigan describes a perforating gun “that is fully assembled including the initiator at a location other than the wellsite.” Ex. 1028 at 3, Figs. 1 and 3 (emphasis added). Thus, Harrigan fails to disclose “inserting a detonator into the hollow channel of the top connector at the wellbore site.”

Regarding step (d) and as noted above, the Petition has failed to establish what structures of Harrigan purportedly correspond to the specifically claimed wireless through wire connector. In any event, the Petition fails to directly address step (d) of Claim 13 with regard to Harrigan. Harrigan fails to disclose all of the steps in Claim 13.

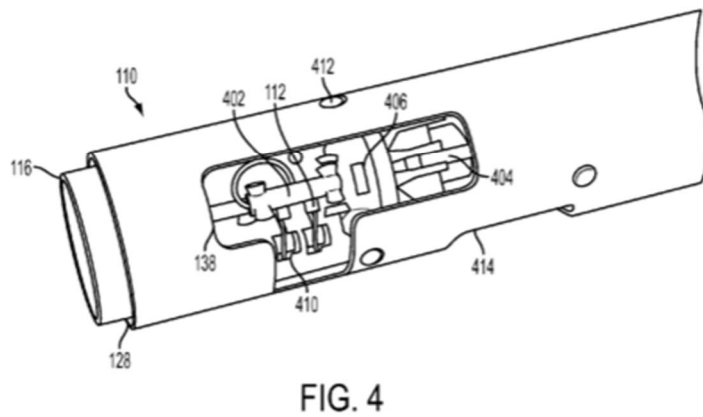
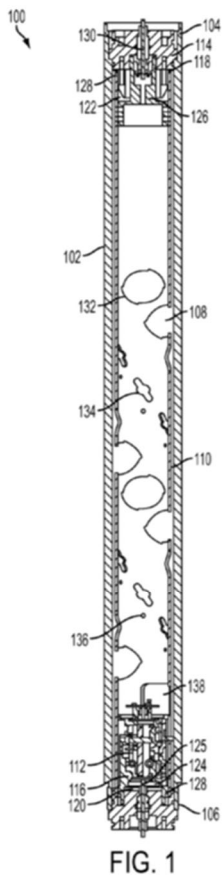
3. Rogman¹³ Does Not Anticipate the Challenged Claims (Ground 11)

Petitioner alleges that Rogman anticipates Claims 1-17 and 19-20 of the '938 Patent. With respect to Claims 1 and 9, Rogman, which is co-assigned to

¹³ Like Harrigan, only the Rogman Provisional (Ex. 1020) is prior art. The application on which Rogman was based was not filed until December 4, 2013, well after the claimed priority date of the '938 Patent. The provisional application on which the Rogman publication is based, U.S. App. No. 61/733,129, includes

Schlumberger, is substantially cumulative with Harrigan, and is accordingly deficient for many of the same reasons as noted above in Section V.A.2.

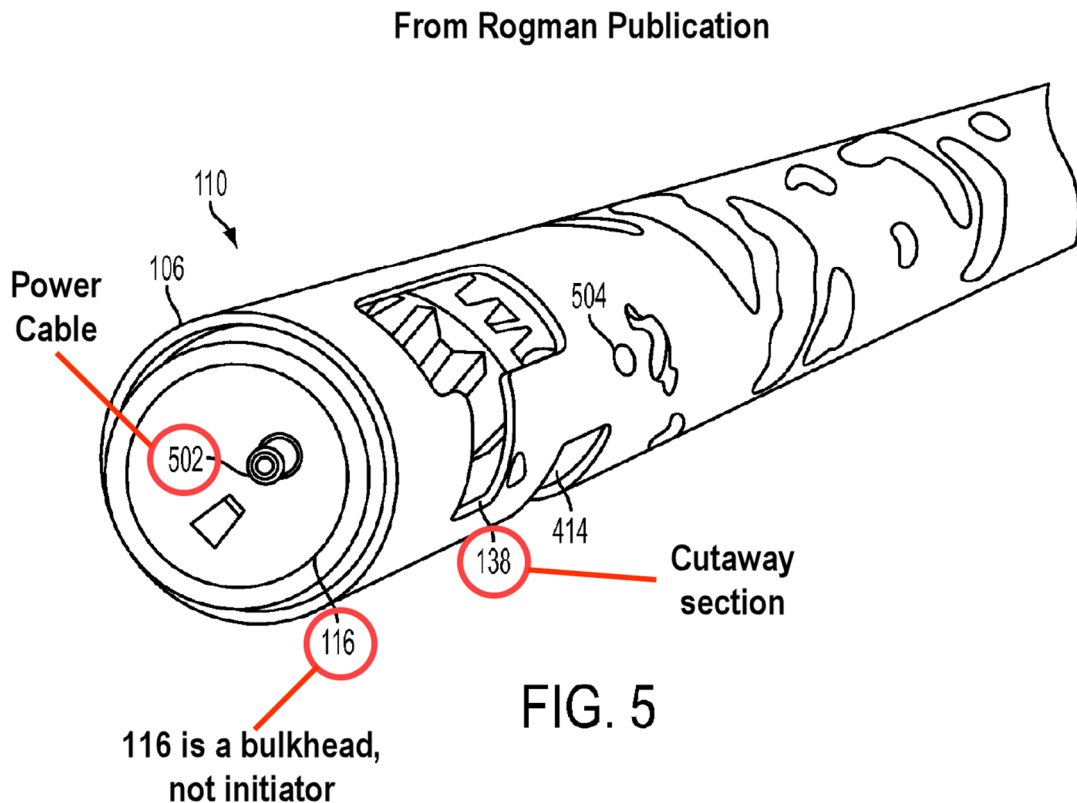
Rogman generally describes a perforating gun including an initiator assembly 112 with a wired detonator 402 wired via IDCs to a circuit board (not shown) and a loading tube 110 (for positioning shaped charges). Ex. 1014 ¶[0036], Figs. 1 and 4.



significantly less detail than the Rogman publication. DynaEnergetics reserves the right to challenge any teachings of Rogman relied upon by Petitioner as prior art.

a) Rogman fails to disclose a detonator including three separate and distinct wireless connectors, as claimed in Claims 1, 9, and 13.

For the same reasons as described above for Harrigan, Rogman does not disclose each of the separate and distinct claimed wireless connectors. Though Rogman, like Harrigan, discusses a coaxial/RCA-style connector extending from the bulkhead (power cable 502 shown below), Rogman contains no description that the initiator assembly has a wireless through wire connector or a wireless ground contact connector. Ex. 2002 ¶100.



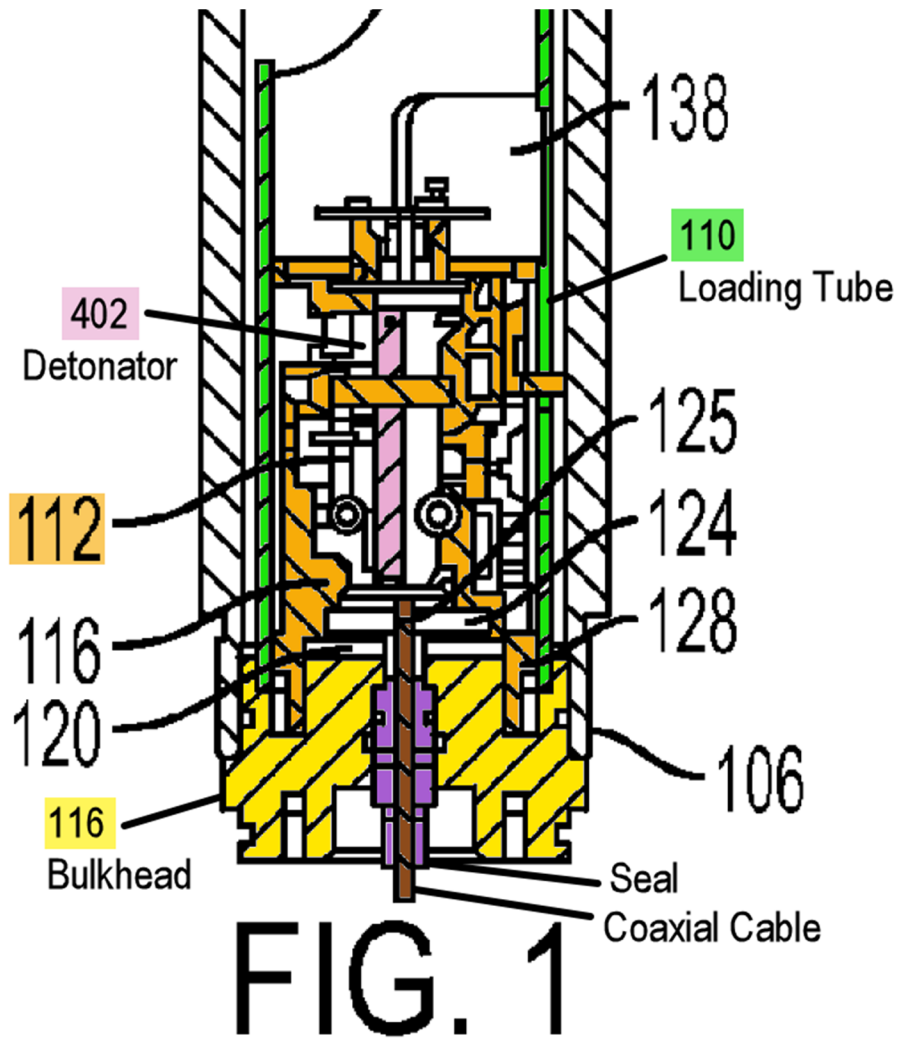
b) Rogman fails to disclose that the wireless ground contact connector is in wireless electrical contact with the TSA, as claimed in Claims 1 and 9.

The Petition further argues that “Rogman teaches a tandem” reciting bulkheads 114, 116, 314, 316, and concluding that these bulkheads include “a ground contact connected to a ground contact of the initiator.”¹⁴ Pet. at 79-80.

Even assuming the bulkheads of Rogman correspond to the claimed TSA, there is simply no disclosure that requires that the wireless ground contact connector (not specifically found in Rogman nor alleged in the Petition) be in wireless electrical contact with the bulkhead 114, etc. Ex. 2002 ¶105

With reference to an enlarged highlighted “lower end” of the perforating device of Fig. 1, it is readily seen that a cable (brown), which is surrounded by the seal (purple) extends through the bulkhead 116 (yellow and properly labeled) to the initiator 112 (orange); there is no disclosure in Rogman to a wireless ground contact connector, much less a wireless electrical contact of the wireless connector with the TSA. Ex. 2002 ¶106.

¹⁴ The correct claim language actually requires “the wireless ground contact connector is in wireless electrical contact with the tandem seal adapter.”



While no details of the coaxial cable are given, a POSITA would understand “coax” to mean two wires and further that one wire would be the signal-in wire and the other wire would be the ground wire. *Id.* ¶107. As highlighted in this excerpt, however, there is simply no teaching in Rogman as to how such a cable would attach to the initiator 112. Indeed, the figure shows the coaxial cable dead-ending into an unlabeled space, presumably at a lower end of the initiator 112. *Id.* ¶107. Rogman suggests that the cable may connect to the circuit board (not shown in detail

anywhere in Rogman) through an RCA-style connector but the circuit board is not the detonator/initiator. Ex. 2002 ¶107; Ex. 1014 ¶[0031].

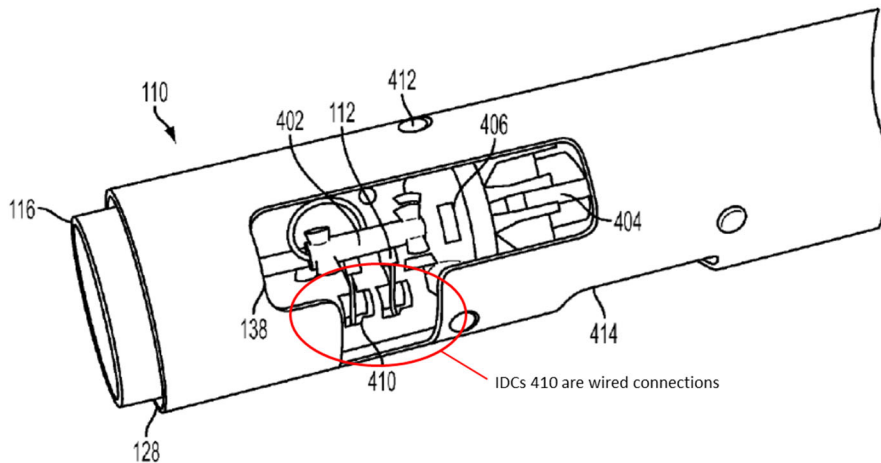
There is no disclosure, however, that the “wireless ground contact connector is in wireless electrical contact with the tandem seal adapter” as claimed. In fact, upon examination of Fig. 1, the coaxial cable (colored in brown) extends through the TSA/bulkhead 116 (colored yellow) without making any contact since it is completely surrounded by the seal (colored purple). Ex. 1014 ¶[0031]; Ex. 2002 ¶108.

c) Rogman fails to disclose all of the steps of Claim 13.

Claim 13 claims in relevant part, “(d) connecting a through wire to the wireless through wire connector.” As noted above, the Petition does not specify which structures of Rogman purportedly correspond to the specifically claimed wireless through wire connector. Further, the Petition never directly addresses limitation (d) of Claim 13 for any of the cited references, including Rogman.

Further, Rogman actually discloses the opposite of what is claimed in Claim 13. For example, paragraph [0036] of Rogman describes that power cables 502 (the coaxial cable extending from, for instance, the bulkhead 116 as shown in Fig. 5) are pre-wired into loading tube 110. Ex. 1014 ¶[0036]. As further explained, IDCs 410 are pushed into the circuit board to connect the pre-wired power cable 502 to the initiator 112. *Id.* Thus, the circuit board directly receives the signal from the cable

502. Ex. 2002 ¶111. There is no teaching in Rogman as to how the detonator is connected to the circuit board, but Figure 4 of Rogman clearly shows that connections between the detonator 402 and the IDCs 410 are wired, not wireless, connections:



4. EWAPS Does Not Anticipate the Challenged Claims (Ground 16)

Petitioner alleges that EWAPS anticipates Claims 1-6, 8-10, and 12 of the '938 Patent. EWAPS is an industry presentation that discloses a similar system to that described in Harrigan and Rogman, but with even less detail or disclosure, and it fails for many of the same reasons. Ex. 1013; Ex. 2002 ¶113.

EWAPS generally describes a gun system that is transported in a “fully assembled form.” Ex. 1013 at 9. The photo shows a fully assembled interior

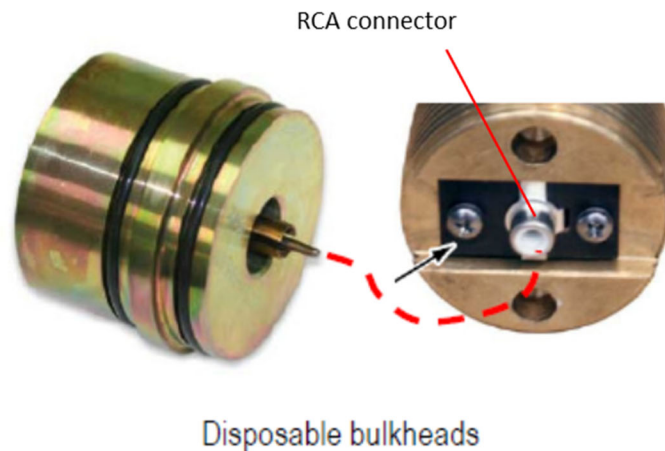
assembly laying side-by-side with a perforating gun housing. *Id.* The fully assembled interior assembly includes a loading tube including a shaped charge, detonation cord, wire channel, and a bulkhead with what appears to be a pin extending from the bulkhead to the end of loading tube:



a) EWAPS fails to disclose a detonator including three separate and distinct wireless connectors, as claimed in Claims 1 and 9.

The Petition points generally to the end of the loading tube to which the bulkhead attaches and asserts “EWAPS teaches the claimed detonator body.” Pet. at 18-19. Not only does the Petition not cite with any particularity what specific structure of the EWAPS loading tube is the claimed detonator, it similarly fails to identify with any particularity how the detonator includes specific features that correspond to the separate and distinct claimed wireless connectors: the wireless signal-in connector, the wireless through wire connector, and the wireless ground contact connector. Instead, Petitioner argues generally that EWAPS discloses

“coaxial RCA connectors.” *Id.* at 33. The images in EWAPS, however, only show what appears to be a single RCA connector on a photo showing two metallic structures and labeled “disposable bulkheads”:

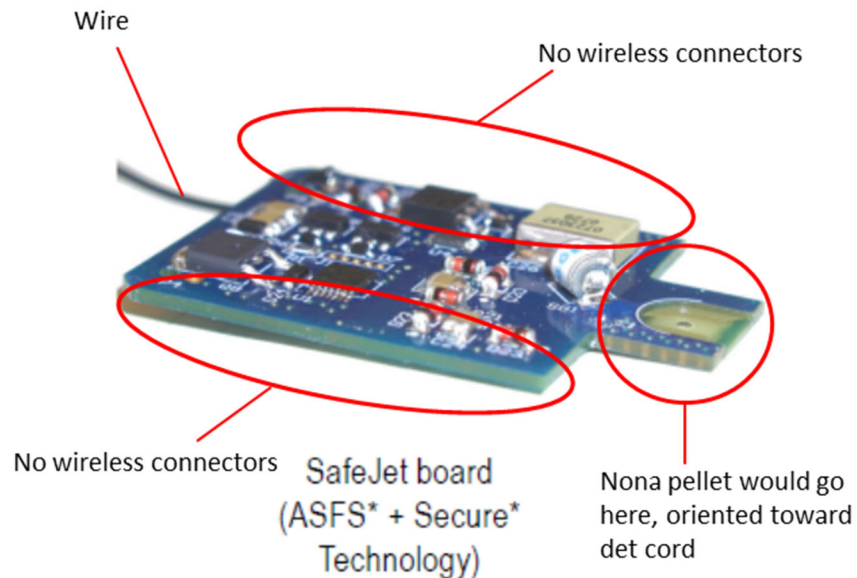


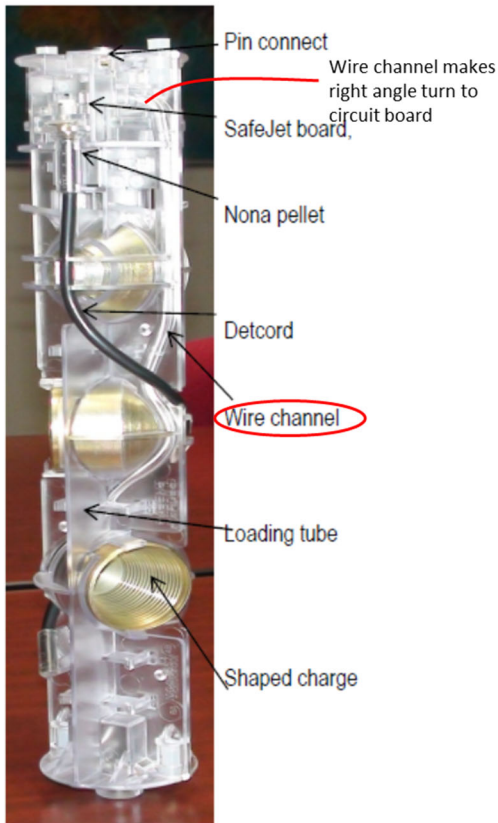
Ex. 1013 at 10. In fact, while EWAPS appears to show a single RCA connector, this connector is shown protruding from what appears to be another metallic structure (another disposable bulkhead as the image is labeled). Ex. 2002 ¶116. In the fully assembled interior assembly photo shown on page 9 of EWAPS, no structure is shown corresponding to a RCA connector and the photo from page 10 merely describes a “pin connect.” Ex. 1013 at 9.

Assuming *arguendo* that the RCA connector shown associated with the disposable bulkhead is used at the end of the loading tube to receive the pin from the bulkhead (which is not described in EWAPS), this would at best only account for two of the three specifically separate and distinct claimed wireless connectors, and

the Petition does not even allege with any particularity which two wireless connectors the RCA connector is supposed to represent.

The Petition further asserts that EWAPS teaches “a signal-in [], ground, and feed-thru wires associated with an addressable switch and detonator connected to coaxial RCA connectors on each end of a loading tube.” Pet. at 33-34. As set forth above, EWAPS does not specifically teach an RCA connector associated with the detonator, much less that such a connector is positioned “on each end of a loading tube.” Ex. 2002 ¶118. In any event, EWAPS makes no mention of a third wireless connector as part of the detonator, and no wireless through wire connector is visible as part of the detonator as claimed in the '938 Patent.



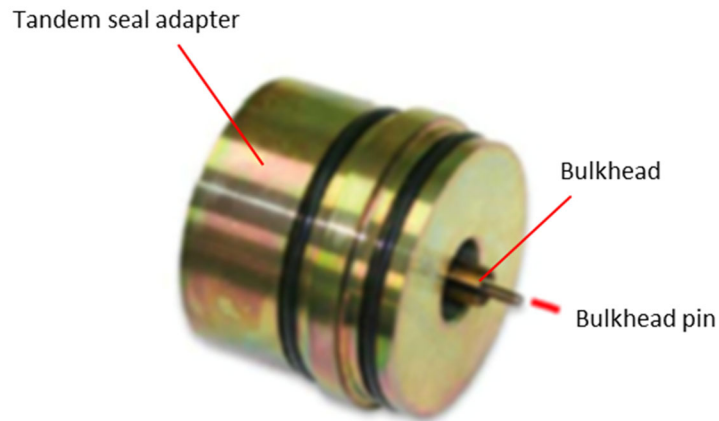
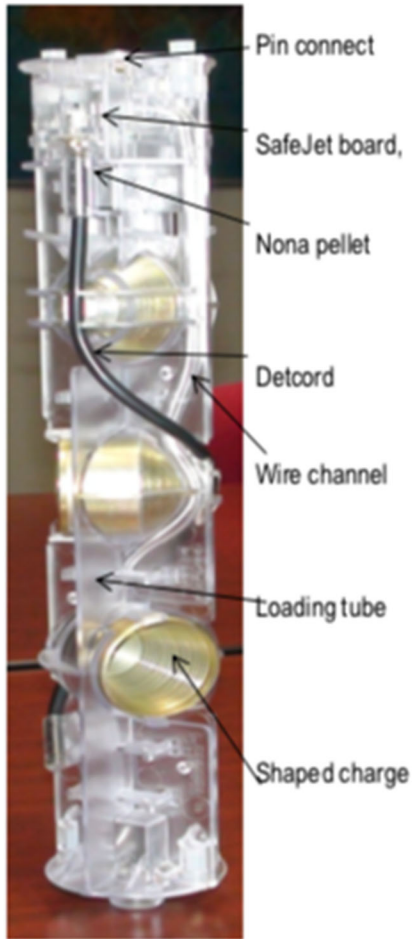


Based on the above photographs from EWAPS, any through wire provided in the wire channel would have to be connected to the circuit board through a wired connection as shown by the wire labelled above in the photo of the circuit board. In other words, EWAPS does not disclose or even suggest the possibility of a “wireless through wire connector.” Indeed, while a POSITA might understand that the slot positioned on the right side of the circuit board (opposite the wire) is the “position” for contacting the Nona pellet, a POSITA is completely uninformed as to how the RCA connector (assuming there is one) connects to the circuit board. Ex. 2002 ¶119.

b) EWAPS fails to disclose a wireless ground contact connector in wireless electrical contact with the TSA, as claimed in Claims 1 and 9.

As mentioned above, the Petition has failed to specify what structure in EWAPS corresponds to the claimed “wireless ground contact connector.” Further, the Petition has failed to specify which structure of EWAPS corresponds to the TSA. The Petition includes the same photograph above regarding the disposable bulkheads, but does not label which portion it believes to be the claimed TSA.

To the extent that EWAPS even conceivably discloses a wireless ground contact connector (as part of the RCA connector) and TSA, Petitioner never addresses how wireless electrical contact is made between these structures because it does not do so. Based on a fair read of EWAPS, however, a POSITA may infer (though it is not disclosed) that the wireless ground contact connector is part of the “pin connect” shown at the end of the loading tube:

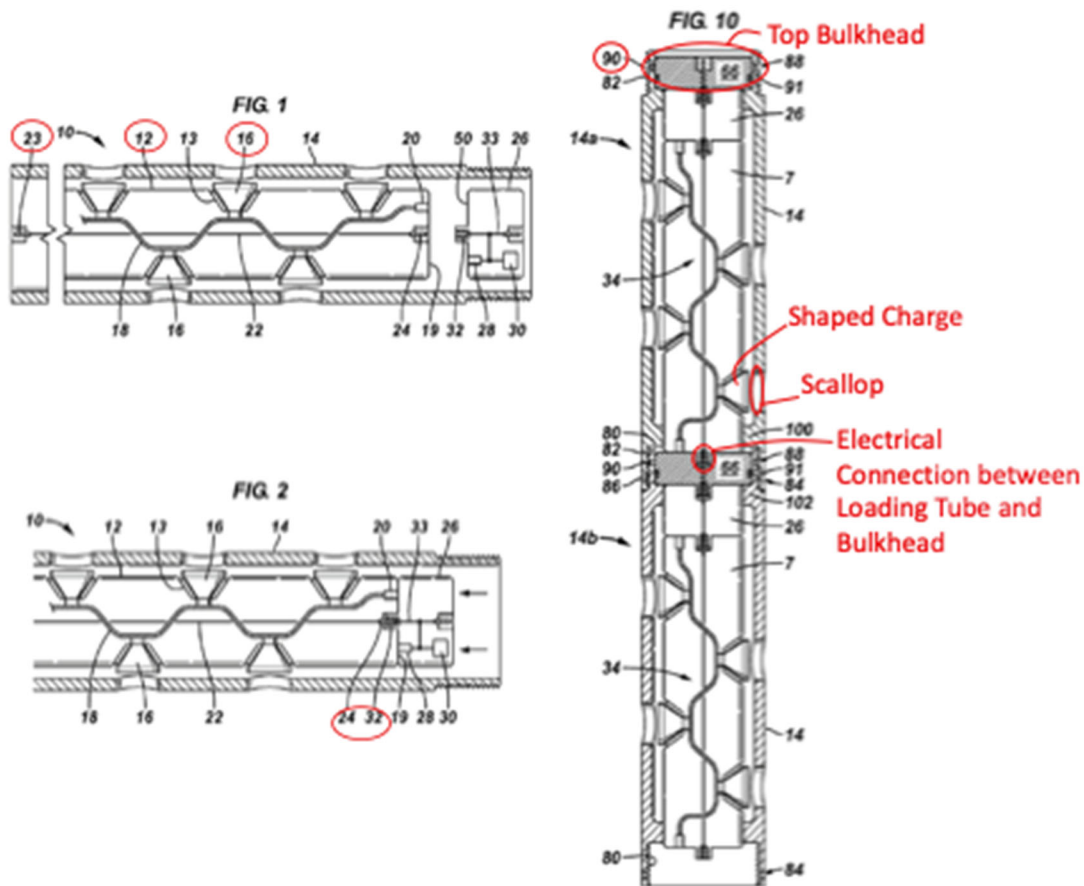


However, as seen above, the pin extending from the bulkhead would be received by the pin connect, and thus the wireless ground contact connector never

contacts the TSA itself, much less “is in wireless electrical contact with” as claimed in ’938 Patent. Ex. 2002 ¶123.

5. Black Does Not Anticipate the Challenged Claims (Ground 6)

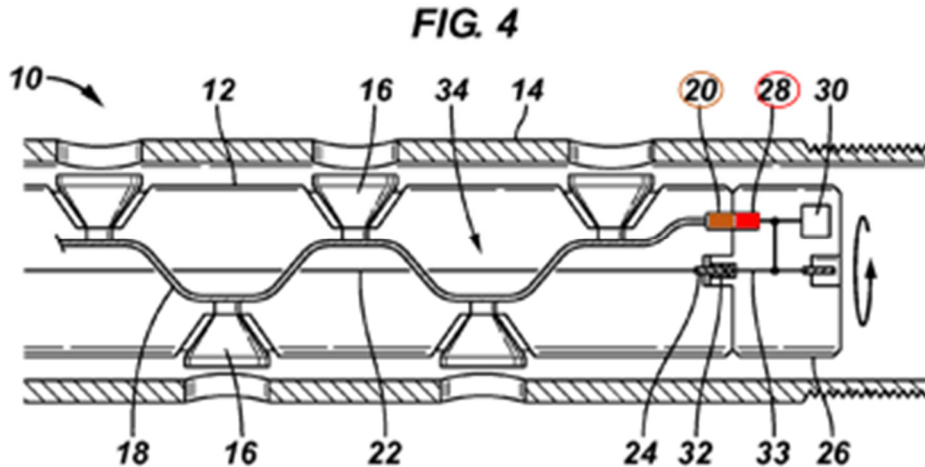
Petitioner alleges that Black anticipates Claims 1-2, 4-5, 7-9, and 11-20 of the ’938 Patent. Black generally describes a perforating gun 10 with a conventional charge tube (“loading tube” 12) disposed inside of a gun carrier 14 (Fig. 10 (below)), and an Electronic Before Ballistic Arming (“EBBA”) assembly (arming device 26) according to well-known EBBA safety standards within the oil and gas perforating industry. Ex. 2002 ¶124; Ex. 1002 ¶¶[0006], [0023], Figs. 2, 4, 8-10.



For example, Black (as shown above) very generally discloses an EBBA system in which, first, an electronic connection between perforating gun carriers 14a, 14b is made by an “electrical connector 23 of the loading tube 12...connected to [a] bulkhead 66.” Ex. 1002 ¶[0038], Fig. 10; Ex. 2002 ¶126.

The EBBA arming device 26 that Black discloses connects initially to the loading tube 12 in a “park” position, in which the arming device 26 and the loading tube 12 are electrically connected between electrical connectors 24, 32. Ex. 1002 ¶[0025], Fig. 10; Ex. 2002 ¶127. The arming device 26 is moved to an “armed” position in which a detonator 28 within the arming device 26 is aligned with an end

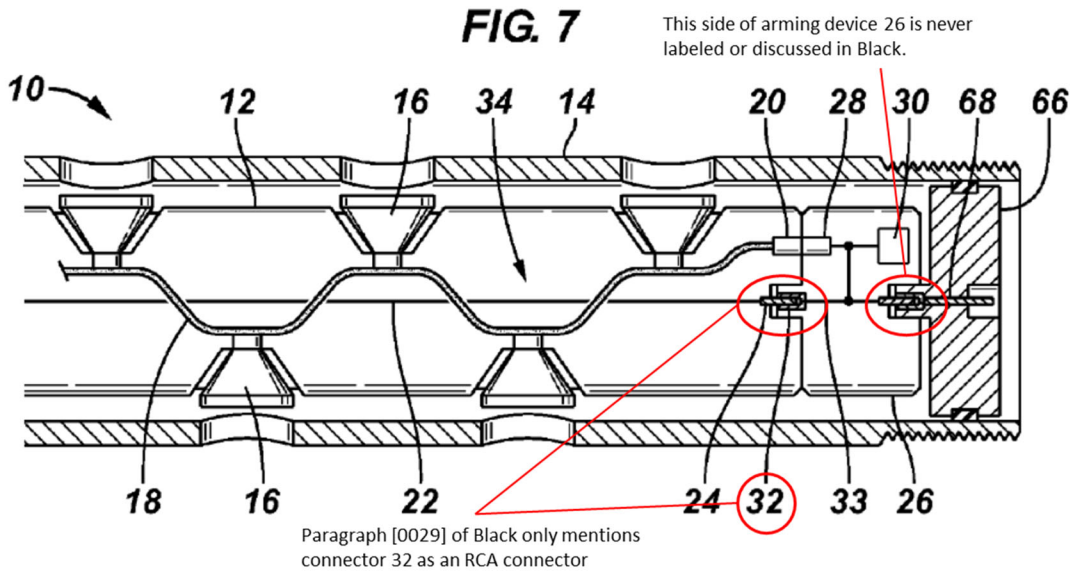
20 of a detonating cord 18 in the loading tube 12. Ex. 1002 ¶¶[0027]-[0028], Fig. 4 (below); Ex. 2002 ¶127.



Black is therefore overwhelmingly directed to the arming procedure—i.e., moving the detonator 28 into ballistic alignment with the end 20 of the detonating cord 18, and securing the loading tube 12 and the arming device 26 in the required orientation by locking the top bulkhead 66 with the set screw 90. Ex. 2002 ¶128.

a) Black fails to disclose a detonator including three separate and distinct wireless connectors, as claimed in Claims 1, 9, and 13.

Petitioner never cites with any particularity what specific structures of Black correspond to the wireless signal-in connector, the wireless through wire connector, and the wireless ground contact connector. Instead, Petitioner argues that arming device 26 corresponds to a detonator and “Black teaches that electrical connectors of arming device 26 can be two conductor RCA connectors.” Pet at 34-35.



Black makes no mention of a ground connection, much less a wireless ground contact connector as claimed. Ex. 2002 ¶131. It is possible that such a ground connection could be provided by a wired connection that is not shown; it is frankly impossible to conclude that Black discloses a wireless ground contact connector because Black simply does not discuss electrical ground at all. *Id.* ¶131

b) Black does not disclose a wireless ground contact connector in wireless electrical contact with the TSA as claimed in Claims 1 and 9.

As noted above, Petitioner never identifies with particularity any structure in Black that purportedly corresponds to a wireless ground contact connector. Petitioner argues that “[t]he electrical contacts on the arming device 26, provide for...a ground connection.” Pet at 35. However, Black fails to mention anything about electrical ground even once; there is no mention whatsoever about how the circuits are grounded. Ex. 2002 ¶134. Petitioner’s expert witness attempts to

overcome this deficiency by arguing that a ground would be required for the electronics of Black to function properly. Ex 1007 ¶304. However, the general requirement for a ground by no means establishes the specifically claimed limitation of a wireless ground contact connector in wireless electrical contact with a TSA. To presume without evidence, as the Petitioner does, that a ground is provided by the connectors on the arming device 26 goes far beyond the disclosure of Black.

c) Black fails to disclose the steps recited in Claim 13.

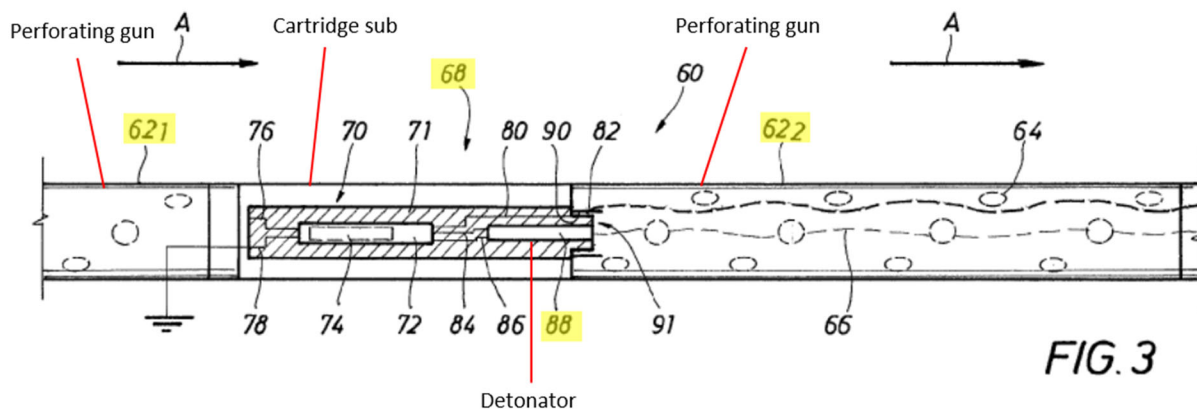
Claim 13 recites a specific set of method steps to be performed with the claimed structures. Black is silent as to where parts of the perforating gun are assembled or any transportation of parts. Ex. 2002 ¶136. Petitioner tacitly admits this by stating “a POSITA reading Black in light of their understanding of common industry practices and safety requirements would understand the perforating gun of Black is assembled away from the well site.” Pet. at 148. Conditioning a POSITA’s reading of Black on their understanding of common industry practices and safety requirements is tantamount to admitting that Black does not anticipate Claim 13 because limitation (f) is not satisfied without recourse to these other sources. *See Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1335 (Fed. Cir. 2008) (“[A]nticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim.”) (citation, quotations omitted). Paragraphs [0026]-[0027] of Black cited by Petitioner make no mention of assembly

sites for different parts of the perforating gun, and the Parrott declaration merely copies verbatim the argument from the Petition (Pet. at 148 (citing Ex. 1002 ¶¶[0026]-[0027]; Ex. 1007 ¶[566) without explanation or citation of the common industry practices or safety requirements.

6. Lanclos Does Not Anticipate the Challenged Claims (Ground 8)

Petitioner alleges that Lanclos anticipates Claims 1-2, 4-5, and 7-20 of the '938 Patent.

Much like Schacherer, Lanclos is generally directed to providing a detonator in a sub positioned between adjacent guns. As shown in Figure 3 of Lanclos below, the detonator 88 is positioned in a cartridge sub 68, and subsequently connecting the cartridge sub 68 between perforating gun 62₁ and perforating gun 62₂:



The detonator 88 of Lanclos is not provided in the perforating gun 62₂ that includes the shaped charges. Further, Lanclos clearly shows wired connections 76 and 78 to the cartridge sub 68.

a) Lanclos fails to disclose a detonator including three separate and distinct wireless connectors, as claimed in Claims 1, 9, and 13.

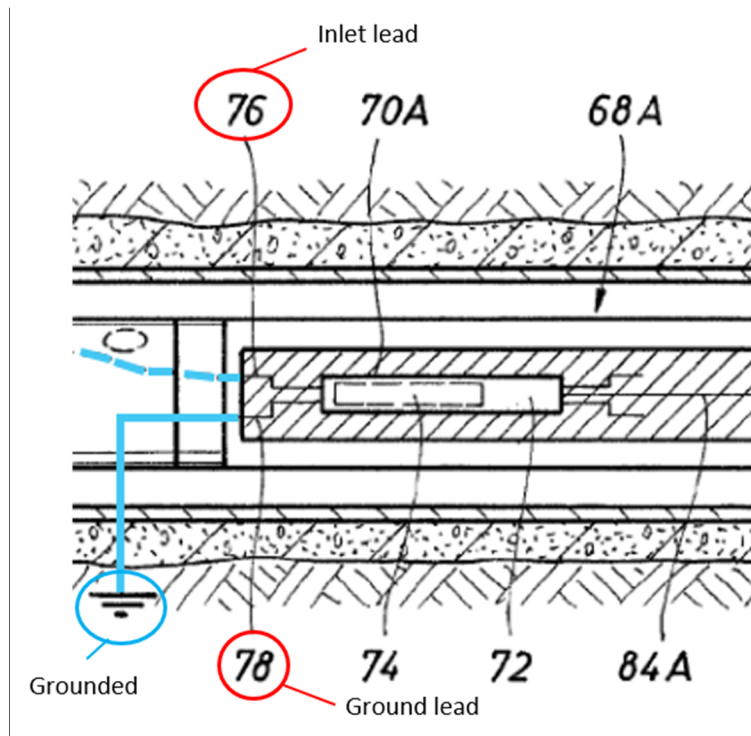
Petitioner never identifies any structures of Lanclos as particularly corresponding to a wireless signal-in connector, a wireless through wire connector, or a wireless ground contact connector. Instead, Petitioner argues that Lanclos purportedly discloses “a cartridge sub 68 with electrical connector 90” connecting the cartridge sub to a perforating gun, and posits that such “connectors” are provided “on the upstream and downstream sides of the cartridge sub 68,” without any specific reference to such a teaching in Lanclos (because it does not exist). Pet. at 36.

Petitioner alleges that the connector 90 provided at the downstream side of the cartridge sub 68 is at least one of the claimed separate and distinct wireless connectors, and then leaves it up to the Board and DynaEnergetics to figure the rest out. Lanclos discloses a single wireless connector 90 on the downstream side of the cartridge sub 68; this only accounts for one connector, whereas Claims 1, 9, and 13 require separate and distinct connectors.

Petitioner further asserts that “the connectors lead to ‘an inlet lead 76, a ground lead 78 and a supply lead 80.’” Pet. at 36. Petitioner appears to allege that the inlet lead wire 76 and the ground lead wire 78 are connected to a wireless connector at the upstream side. Ex. 2002 ¶145. This is simply not described in

Lanclos and a POSITA would not understand that the upstream side has a wireless connector. *Id.* ¶145.

To the contrary, Lanclos clearly depicts that both the inlet lead 76 and the ground lead 78 are wires extending from the upstream gun to the cartridge sub 68 as shown in annotated excerpted Figure 3.



Lanclos does not provide any detail about how the ground lead wire 78 is ultimately connected to the ground, with the exception of Figure 3. Ground lead wire 78 is shown in rough schematic form as being grounded through the upstream gun and wired to the cartridge sub 68.

Lanclos merely describes the inlet lead 76 and the ground lead 78 as they relate to the switch assembly; there is no discussion at all in this passage describing

any sort of wireless connection between the switch assembly and the inlet lead 76 and ground lead 78, much less that there is some sort of wireless connector between either the bulkhead and the detonator or between the wireless ground contact connector and the TSA as claimed in the '938 Patent. Ex. 2002 ¶148.

b) Lanclos fails to disclose that the wireless ground contact connector is in wireless electrical contact with the TSA, as claimed in Claims 1 and 9.

As noted above, Petitioner hasn't even attempted to establish what particular structure in Lanclos purportedly corresponds to the claimed wireless ground contact connector, and Lanclos itself does not readily present any such structure.

Petitioner argues that the “connector sub 116 is in electrical contact with the ground contact connector (sic) of the detonator.” Pet. at 82. However, Lanclos does not disclose that the connector sub 116 is in wireless electric contact with anything. In fact, the only mention of connector sub 116 provides that “[c]onnector subs 116 may optionally be provided for coupling upstream ends of the cartridge subs 68 with an upstream perforating gun.” Ex. 1015, 7:17-19. With reference to Figure 5 of Lanclos, the connector sub 116 is shown without any detail, and the arrangement shows gun 62₂ connected to the cartridge sub 68, which is connected to the connector sub 116, which is connected to gun 62_n. Connector sub 116 is a blank box.

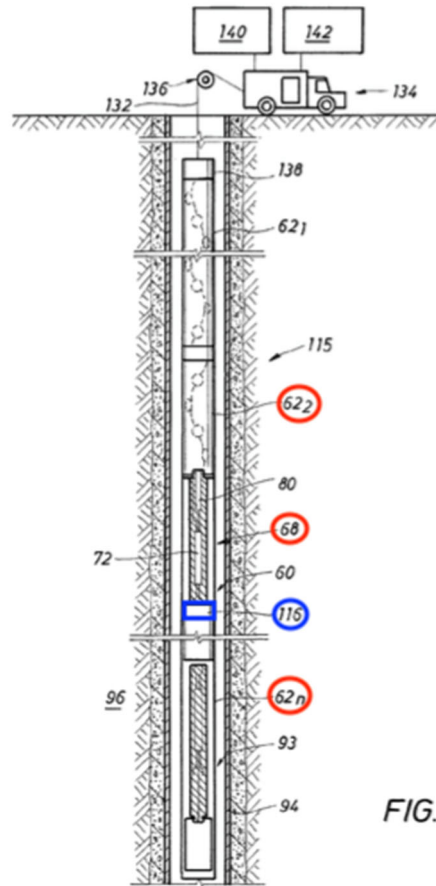


FIG. 5

In any event, the Petition once again misstates claim limitations. Claims 1 and 9 do not merely claim a “ground contact connector,” they claim a “wireless” ground contact connector. Further, Claims 1 and 9 do not merely claim that the TSA is “in electrical contact” with the wireless contact ground connector, the claim requires that the TSA is in “wireless” electrical contact with the wireless contact ground connector.

c) Lanclos fails to disclose a detonator contained entirely within the outer gun carrier, as claimed in claim 1.

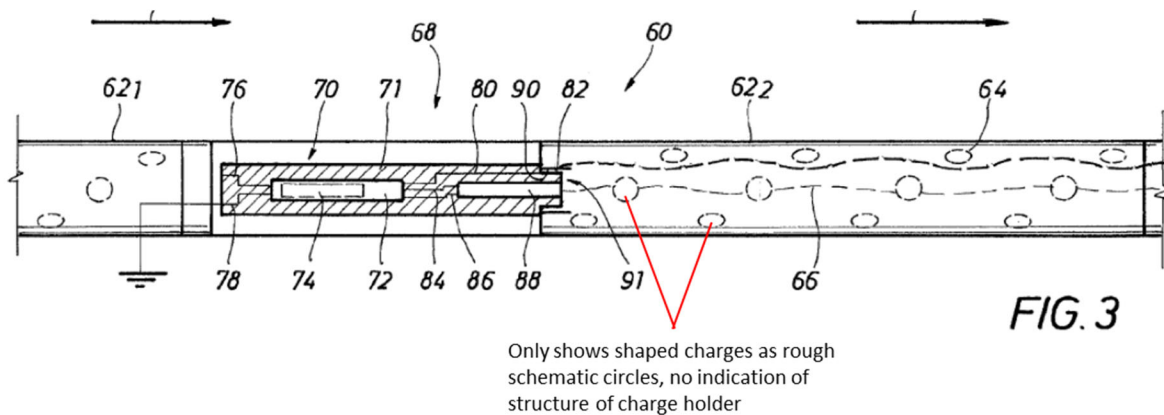
A POSITA would understand that an outer gun carrier is a structure that includes a shaped charge. Ex. 2002 ¶157. Once the carrier including the shaped charge transitions to a separate housing or sub within the tool string, that second structure is not part of the first outer gun housing. *Id.* ¶157. As shown in Figure 3 of Lanclos, the cartridge sub 68 is a separate structure from the perforating gun 62 that actually includes the shaped charges; based on the claim construction discussed above (*see supra* Section III.1), cartridge sub 68 actually corresponds more closely to a TSA than any part of the outer gun housing. Ex. 2002 ¶157. Without any shaped charges being provided in cartridge sub 68, a POSITA would not consider cartridge sub 68 of Lanclos to be an outer gun housing, and therefore elongated body 71 (i.e., the purported detonator) is not contained entirely within an outer gun housing.

d) Lanclos fails to disclose the steps of Claim 13.

First, Lanclos fails to disclose the step of “(b) inserting a top connector into the outer gun carrier adjacent to the charge holder, the top connector comprising a hollow channel.” Petitioner argues that “Lanclos’ cartridge assembly 70 inside a cartridge sub 68, each of which hold a detonator and are in a carrier adjacent to a charge holder, teaching the claimed top connector.” Pet. at 122-23. Petitioner appears to argue that cartridge assembly 70 is a top connector. Cartridge sub 68 is separate from the perforating gun 62₂ and thus is not an outer gun carrier.

Accordingly, cartridge assembly 70 is clearly never inserted into an outer gun carrier, as required by Claim 13.

Further, Lanclos never discloses that cartridge assembly 70 is adjacent to a charge holder. The charge holder is not shown in Figure 3 of Lanclos; all that is shown is dotted lined circles, presumably designating recesses 64 in the gun carrier that would be adjacent to the shaped charges, illustrated in a rough schematic form:



Without any information about the structure of the charge holder, it is impossible to determine whether the cartridge assembly 70 is adjacent to a charge holder. Further, connector 90 is provided at the downstream end 91 of cartridge sub 68, which would necessarily be positioned between the cartridge assembly 70 and any charge holder within perforating gun 62₂. Lanclos fails to disclose that cartridge assembly 70 is inserted into an outer gun housing adjacent to a charge holder, and therefore cartridge assembly 70 cannot be the top connector of Claim 13. Ex. 2002 ¶162.

Lanclos also fails to disclose the step of “(c) inserting a detonator into the hollow channel of the top connector . . . wherein . . . step (c) is performed at the wellbore site.” The Petition simply points to the background section of Lanclos, which notes that “detonators are connected to the detonating cords in the field,” and argues that this discloses the limitations of Claim 13. Pet. at 148. Merely connecting a detonator to a detonator cord in the field does not satisfy the limitation of inserting a detonator into a hollow channel of a top connector (not to mention satisfy the remaining structural limitations relating to the wireless detonator). For example, Petitioner asserts that cartridge assembly 70 is the top connector. Pet. at 122-23. It is entirely possible for the detonator 88 to be inserted into the cartridge assembly 70 at a factory, yet there is no teaching in Lanclos that the detonator 88 is connected to a detonator cord and is energetically coupled to the detonating cord until the cartridge sub 68 is connected to the perforating gun 62₂ in the field. In fact, Lanclos strongly suggests that connection of the detonating cord to the cartridge sub 68 does not occur until the assembly is shipped to the field: “[t]hus they are shipped to the field with the electrical portions and high explosive coupled together in a single unit.” Ex. 1015, 2:23-25. In other words, detonator 88 and related electronics are inserted into the cartridge assembly 70 (i.e., the purported top connector) and then shipped to the field, rather than being inserted into the cartridge assembly 70 at the wellbore site. Ex. 2002 ¶164.

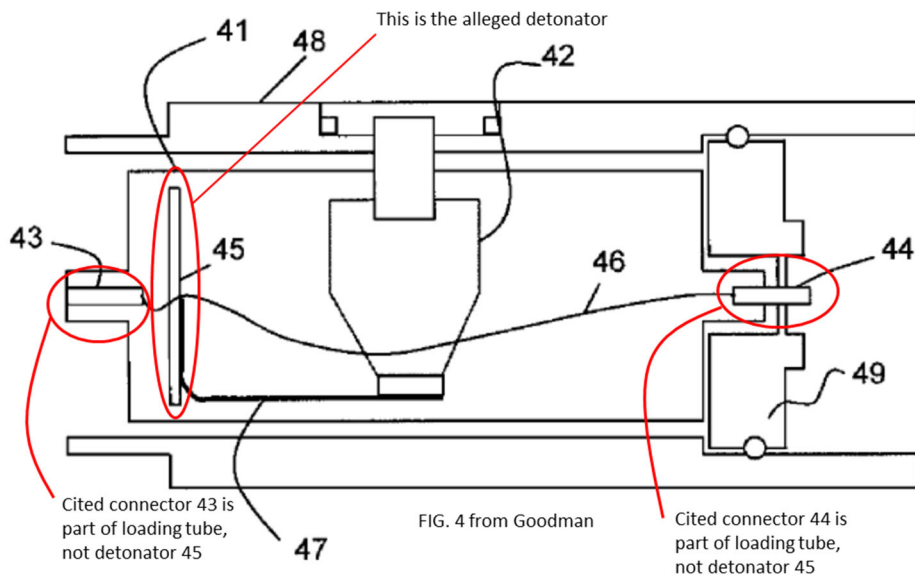
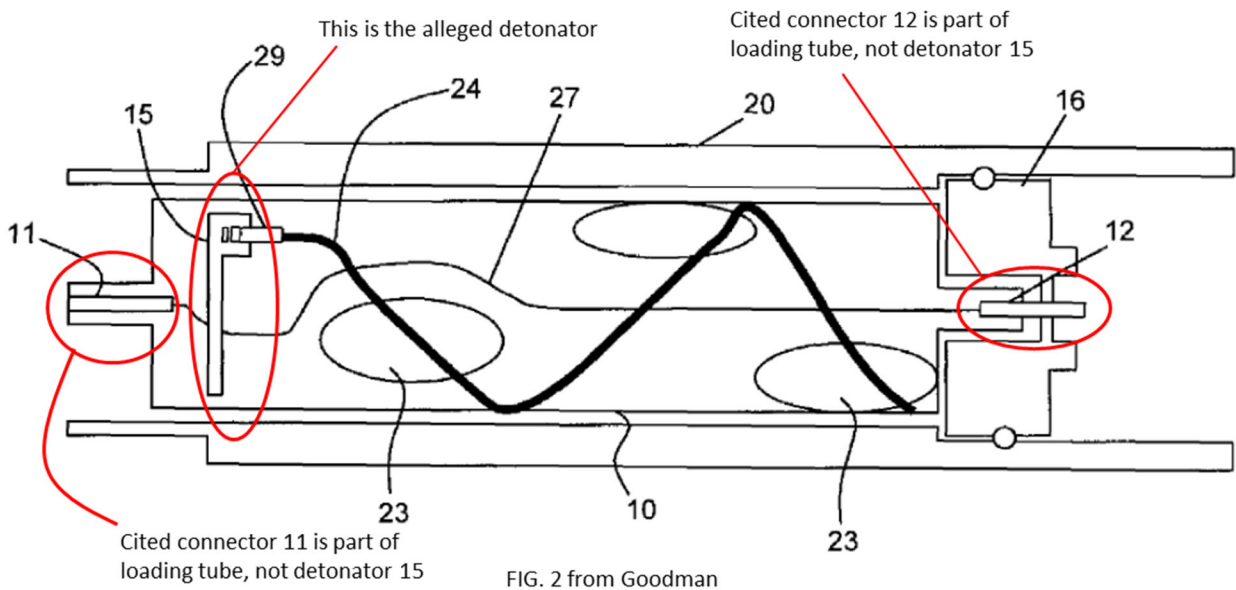
7. Goodman Does Not Anticipate the Challenged Claims (Ground 18)

Petitioner alleges that Goodman anticipates Claims 1-17 and 19-20 of the '938 Patent, but Goodman fails to disclose all of the limitations of Claims 1, 9, and 13.

Goodman is generally directed to a pre-assembled perforating gun that includes assembling “[a]t a first location, e.g., a shop, which is not the location at which perforating operations will be conducted, the loading tube is completely assembled.” Ex. 1018, Abstract. A wired RF-safe initiator is also pre-installed prior to shipment. Ex. 1018 [0025].

a) Goodman fails to disclose a detonator including three separate and distinct wireless connectors, as claimed in Claims 1, 9, and 13.

Petitioner asserts that structures 15, 45, and 47 of Goodman each correspond to a detonator. Pet. at 130. However, Petitioner fails to cite with particularity any structure that corresponds to a wireless signal-in connector, a wireless through wire connector, or a wireless ground contact connector. Instead, Petitioner merely argues in very general terms that an addressable detonator would require three connections, and that electrical connectors 11, 12, 43, and 44 of Goodman could “be used with RCA connectors.” Pet. at 37-38. What Petitioner fails to address is that the cited connectors 11, 12, 43, and 44 are not part of any detonator. Ex. 2002 ¶167. As seen in the annotated Figures 2 and 4 of Goodman provided below, each of connectors 11, 12, 43, and 44 are provided on a loading tube 10, and not a detonator:



From the above, it is clear that connectors 11, 12, 43, and 44 are not part of the alleged detonators 15, 45; instead, these connectors are provided on the loading tubes. Ex. 2002 ¶168. Further, Goodman itself indicates that the electrical connections to the detonators 15, 45 are in fact wires; paragraph [0020] of Goodman indicates that “wiring” 27 is used to connect to alleged detonator 15, whereas

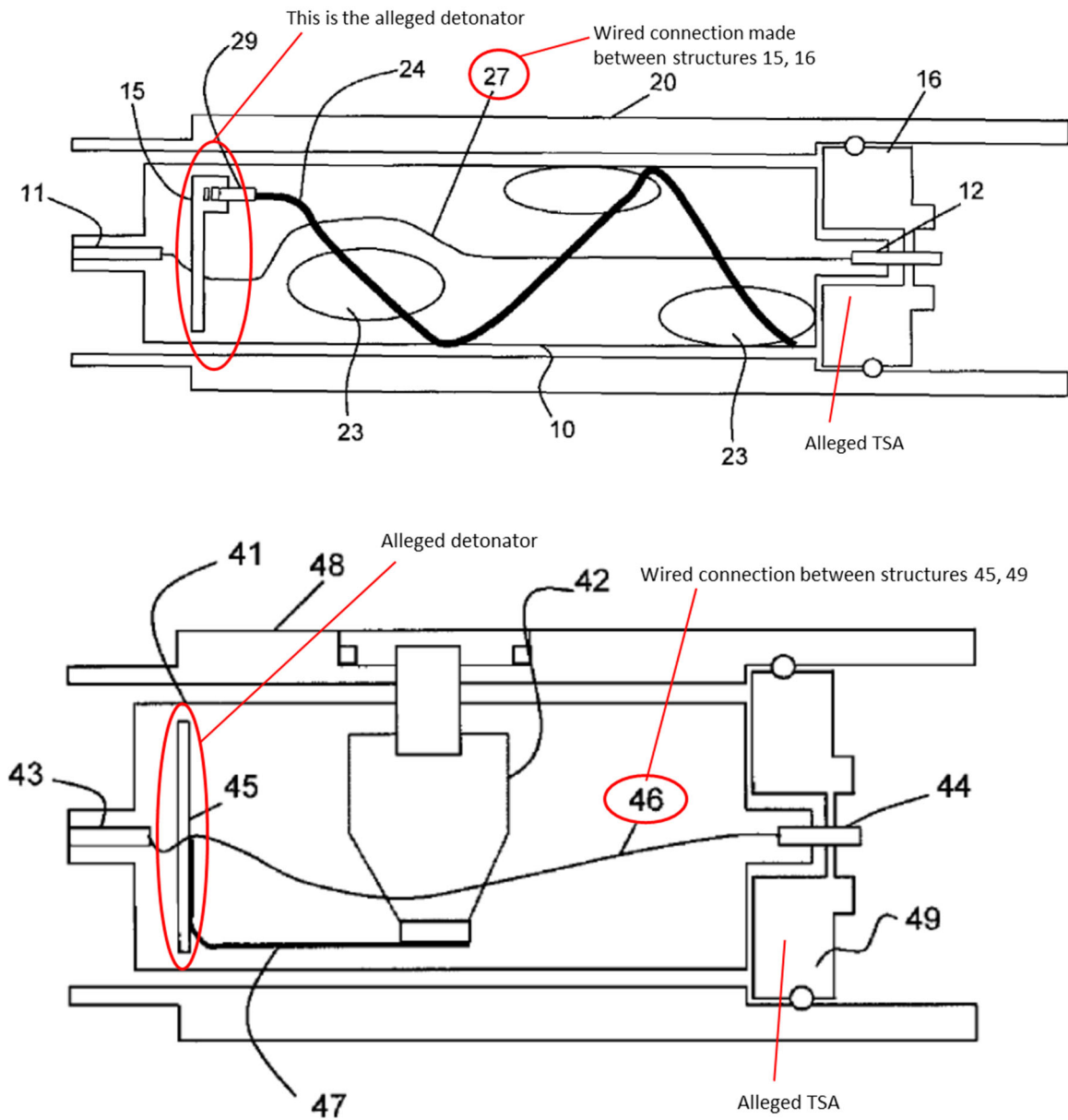
paragraph [0024] states that “wiring” 46 connects to alleged detonator 45. Ex. 1018 ¶¶[0020], [0024]. In other words, not only does Petitioner cite connectors 11, 12, 43, and 44 that are not even part of the alleged detonators 15, 45, even a cursory reading of Goodman demonstrates that any electrical connections to detonators 15, 45 are in fact wired, not wireless. Ex. 2002 ¶168. Goodman does not disclose a detonator with wireless connectors.

b) Goodman fails to disclose a wireless ground contact connector in wireless electrical contact with the TSA, as claimed in Claims 1 and 9.

As mentioned above, Petitioner fails to cite with particularity any structure in Goodman that purportedly corresponds to a detonator including a wireless ground contact connector. Petitioner further argues that bulkheads 16, 49 are TSAs that engage connectors 11, 12. Pet. at 83-86. Assuming arguendo that these bulkheads are TSAs, there is no disclosure that the (nonexistent) wireless ground contact connector is in wireless electrical contact with the TSA. Rather, since the RF-safe initiator is always described as wired in Goodman, a POSITA would understand that the connectors 11, 12 are wired to the initiator in the field. Ex. 2002 ¶170.

Connectors 11, 12 are not part of the detonator 15 and cannot be the claimed wireless ground contact connector. Further, to any extent that structures 16, 49 are considered TSAs, electrical connection between the detonators 15, 45 and 16, 49 is

made by wirings 27, 46. Figure 4 of Goodman is excerpted and annotated below showing the wired connections:

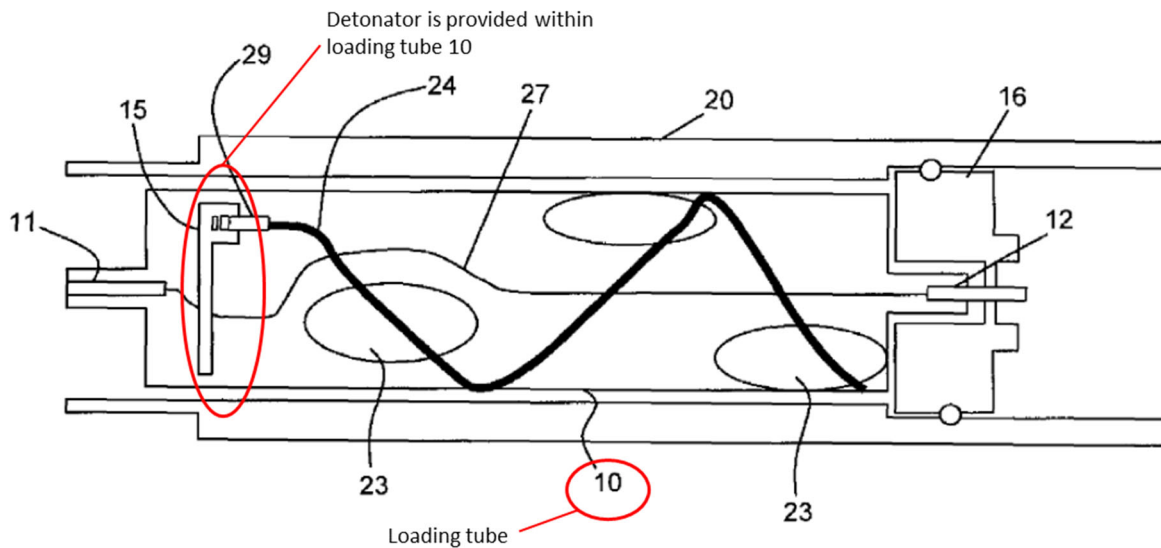


Ex. 1018 Fig. 4. From the above, there is clearly no wireless electrical contact between a wireless ground contact connector of the alleged detonators 15, 45 and alleged TSAs 16, 49, as required by Claims 1 and 9.

c) Goodman does not disclose all of the steps of Claim 13.

Goodman fails to disclose multiple recited steps of Claim 13, which is not surprising, since it is not at all concerned with a pre-wired gun and modular detonator like the '938 Patent.

First, Goodman fails to disclose the step of “(b) inserting a top connector into the outer gun carrier adjacent to the charge holder, the top connector comprising a hollow channel.” Petitioner asserts that the device in Goodman must “inherently” include a component to hold the detonator 15, 45. Pet. at 123-124. Instead, Figure 2 of Goodman shows that the detonator 15 is provided within loading tube 10 (i.e., the charge holder) itself and not “adjacent to the charge holder” as claimed:



There is simply no structure corresponding to a top connector in Goodman and Petitioner completely fails to demonstrate such. Ex. 2002 ¶175. Accordingly, to any extent that there is inherently a component to hold the detonator, such a

component would be found in the loading tube 10 itself and not adjacent to the loading tube.

Next, Goodman fails to disclose the step of “(c) inserting a detonator into the hollow channel of the top connector.” As noted above, Goodman does not disclose a top connector, and therefore it is not possible for Goodman to disclose inserting a detonator into a hollow channel of the top connector.

Finally, Goodman fails to disclose “wherein . . . step (c) is performed at the wellbore site.” Petitioner cites paragraph [0005] of Goodman as disclosing inserting a detonator into the hollow channel of a top connector at the wellbore site. Pet. at 148. This passage of Goodman merely relates to how conventional wired detonators (not the claimed detonators including three separate and distinct wireless connectors) are connected to perforating guns, and makes no mention of inserting a detonator into a hollow channel of a top connector at a wellbore site. Ex. 2002 ¶176. To the contrary, Goodman’s wired RF-safe initiator (i.e., the detonator) is pre-installed at the shop prior to shipment to the field location (i.e., wellbore site). Ex. 1018 ¶¶[0017], [0025].

B. Petitioner’s Obviousness Combinations, to the Extent They Are Decipherable, Fail to Establish a Prima Facie Case of Unpatentability

As explained above, Petitioner’s obviousness grounds are voluminous and excessive because each ground relies on no fewer than six references amounting to

hundreds, if not thousands, of distinct combinations of references that must be analyzed for all twenty claims. *See supra* Section IV.B.

Even if Petitioner's scattershot approach to asserting obviousness were appropriate (it is not), Petitioner fails to demonstrate that the asserted references in combination teach or suggest each and every element of the challenged claims. Most importantly, every reference lacks the limitation of a wireless signal-in/through wire/ground contact connector and a wireless ground contact connector in wireless electrical contact with the TSA, and thus no potential combination could make out a prima facie case of obviousness. Beyond that threshold failing, the Petition lacks any coherent motivation for a POSITA to combine specific references in a manner described in the challenged claims.

1. The Cited Art Fails to Teach or Suggest, Alone or in Combination, All of the Limitations of the Challenged Claims.

As noted in detail above, Petitioner has failed to establish that any of its primary references disclose the limitation of a detonator including a wireless signal-in connector, a wireless through wire connector, and a wireless ground contact connector. Further, Petitioner has failed to establish that any of the primary references discloses the limitation of a detonator including a wireless ground contact connector in wireless electrical contact with a TSA.

The secondary references fail to overcome these deficiencies. For instance, Petitioner only cites Lendermon as purportedly teaching injection molding (Pet. at 169), and never makes any allegation that Lendermon teaches anything remotely related to wireless connectors or wireless electrical contact with a TSA. Similarly, Petitioner only cites the SLB Catalog as purportedly teaching sealed bulkheads (*id.* at 54, 73) and purported industry standard safety practices (Pet. at 8, 149) and never makes any allegation that the SLB Catalog teaches anything remotely related to wireless connectors or wireless electrical contact with a TSA.

Thus, the cited references fail to teach or suggest all of the limitations of Claims 1, 9, and 13, and Petitioner has failed to establish that any claims would be obvious over any combination of the cited references.

2. The Petition Fails to Articulate Specific Motivations to Combine the Cited References.

Petitioner fails to identify any particular motivation to combine for any of the references. Instead, Petitioner merely asserts in conclusory fashion that “[a]ll of the cited references are in the field of oilfield perforating and discuss perforating,” and proceeds to argue that any of the references could be combined based on five generic rationales. *See, e.g.*, Pet. at 8-9.

Petitioner’s generic pronouncements on motivation to combine further ignore specific details of the individual references that demonstrates a POSITA would not

combine the references as proposed. The cited references propose differing solutions to issues encountered in oilfield perforation; combining the references would present significant technical obstacles and require substantial redesign of the underlying structures. Ex. 2002 ¶181.

Notwithstanding the above, Petitioner has failed to even identify any particular combinations of references in support of a coherent theory of obviousness, instead relying on “and/or” conjunctions to propose hundreds, if not thousands, of reference combinations. *See supra* Section IV.B. Accordingly, to any extent that Petitioner does allege an actual motivation to combine, it is impossible to evaluate the legitimacy of such motivations because Petitioner never presents its proposed modifications or combinations of references with the requisite specificity.

3. Secondary Considerations of Nonobviousness

Even if the Board finds that Petitioner has presented a prima facie case of obviousness, Petitioner will present compelling evidence of secondary considerations during trial demonstrating that the challenged claims would not have been obvious to a POSITA, including that the invention claimed in the '938 Patent has experienced widespread commercial success and received praise from those knowledgeable in the industry for its safety, efficiency, and reliability.

For example, since its introduction to the industry in 2014, sales of the DynaStage[®] system have significantly increased. Ex. 2007 at 53; Ex. 2003 ¶24.

Industry experts have projected continued growth for the DynaStage[®] system. Ex. 2007 at 53; Ex. 2003 ¶27. DynaEnergetics' market share has also steadily increased, with the most noticeable increases coming since 2017 following widespread adoption of the DynaStage[®] system in the industry, when DynaEnergetics' share increased from approximately 12% (2017) to 24% (2019). Ex. 2010 at 104; Ex. 2003 ¶26. Tellingly, Petitioner experienced a similar increase in market share following the introduction of its copycat H-1[™] Perforating Gun System in 2015, from 20% of the market in 2015 to 25% in 2019. Ex. 2010 at 104; Ex. 2003 ¶26. The DynaStage[®] system has also received extensive publicity and positive press in the industry for its safety and its 99.99% operating efficiency. Ex. 2008 at 2, 6; Ex. 2003 ¶28.

The DynaStage[®] perforation gun system has displaced traditional perforation gun sales since its introduction. Ex. 2003 ¶24. No company before DynaEnergetics had ever offered a wireless perforation gun system that was built to exact customer specifications and ready to use upon arrival at the well site, thereby reducing downtime at the well site, providing greater efficiency, reliability, and safety in the completion process, and improving customers' bottom lines. *Id.* ¶¶3, 11-13. Indeed, Petitioner recognizes the benefits of such a system and has touted it to its investors. Ex. 2015 at 21 (claiming—incorrectly—that “Hunting developed the concept of the ‘no wire drop in system’”). But Petitioner's developments, including its patents,

came *after* DynaEnergetics' invention, hence the reason they are not (and cannot be) cited against the '938 Patent. The success of the DynaStage[®] system is a direct result of the new, novel aspects of the claimed invention of the '938 Patent described above in Section II.B. Ex. 2003 ¶29. In particular, specific claimed features of the challenged claims have contributed to the success of the DynaStage[®] system, including but not limited to, the “wireless signal-in connector,” “wireless through wire connector,” and “wireless ground contact connector,” as well as the “wireless electrical contact” between the wireless ground contact connector and the tandem seal adapter, all of which contribute to providing safe transport of explosive components and efficient, secure, and durable electrical connections within a tool-string. *Id.* ¶23.

C. Petitioner's Deficient Challenges Under 35 U.S.C. § 112

Petitioner's Section 112 arguments are a compilation of partially developed ideas which fail to address the precise wording of the claims and lack any coherent or logical organization, often contradicting the clear disclosures of the '938 Patent and even Petitioner's own positions elsewhere in its Petition.

To satisfy the definiteness requirement, a claim must “particularly point[] out and distinctly claim the subject matter which the inventor ... regards as the invention.” 35 U.S.C. § 112(b). “[A] patent is invalid for indefiniteness if its claims, read in light of the specification ... and the prosecution history, fail to inform, with

reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). In describing the invention, “[e]xact precision is not required.” *Telebrands Corp. v. Tinnus Enters., LLC*, PGR2017-00024, 2017 WL 6209221, at *8 (PTAB Nov. 30, 2017).

To satisfy the written description requirement, the specification must “reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (citations omitted). When examining the written description support for a claimed invention, the exact terms appearing in the claim “need not be used *in haec verba*.” *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997).

1. The “detonator body” limitations in Claims 1, 9, and 13 are definite and have adequate written description support

Petitioner argues in conclusory fashion that the “detonator body” limitations of Claims 1, 9, and 13 lack written description (Pet. at 10-11), but ignores the clear disclosure of the ’938 Patent specification of a detonator body with components. The specification describes that the detonator assembly 26 includes “a detonator head 100, a detonator body 102 and a plurality of detonator wires 104, including a through wire 106, a signal-in wire 108 and a ground wire 110.” Ex. 1001, 8:7-10. Figure 27, for example, shows the plurality of detonator wires 104, including

through wire 106, signal-in wire 108, and ground wire 110 as being contained within the detonator body 102. *Id.*, Fig. 27; *see also* Figs. 28-32.

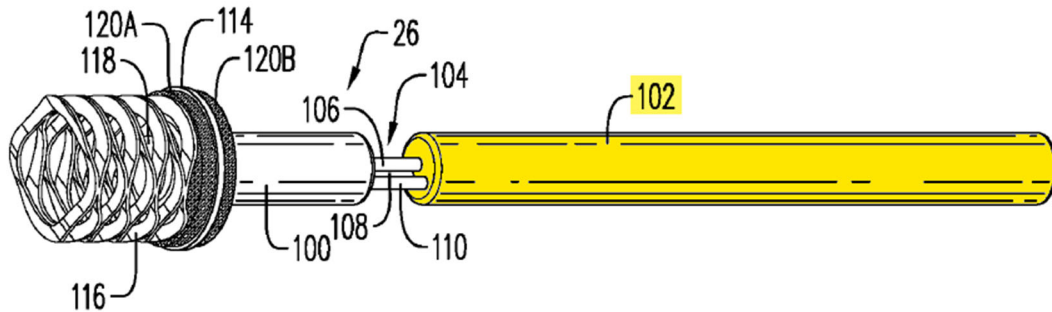


FIG. 27

A POSITA reading the specification and viewing the figures would understand that the '938 Patent describes a detonator that has parts, i.e., components, within a housing or body and therefore provides adequate written description support for a detonator body containing detonator components. Ex. 2002 ¶191. Petitioner separately suggests that the preamble phrase “modular detonator” of Claim 9 is indefinite. Pet. at 11. The '938 Patent describes the detonator as a “basic component” of the claimed gun system which can be built in multiple configurations. Ex. 1001, 5:59-6:11. A POSITA would readily understand that the “modular detonator” in Claim 9 has components or parts which “can be put together in different ways” to become part of the claimed perforation gun assembly. Ex. 2002 ¶192.

2. The “wireless connector” limitations in Claims 1, 8, 9, 12, and 13 are definite and have adequate written description support¹⁵

Despite claiming “wireless connectors” to be “common knowledge” (Pet. at 26), Petitioner makes several disparate arguments regarding the alleged indefiniteness and lack of written description support for the limitations of Claims 1, 8, 9, 12, and 13. Pet. at 21. To the extent the arguments are cognizable, Petitioner essentially alleges that the “wireless connector” elements are indefinite and lack written description support because “the Patent does not provide a definition or explanation of the wor[d] ‘wireless’” and, as a result, “it could mean anything from wifi to a terminal on a wire.” Pet. at 23-24. Petitioner ignores the disclosures of the ’938 Patent specification and the plain meaning of the word “wireless.” The specification describes that a basic component of the claimed perforation gun system

¹⁵ Petitioner separately argues that Claims 9-12 are allegedly indefinite because “a POSITA is left guessing as to what a gun assembly is.” Pet. at 26. But the “gun assembly” is not a “wireless connector,” and Petitioner does not argue that Claims 10 and 11 are allegedly indefinite elsewhere. Because DynaEnergetics cannot, and is not required to, respond to arguments which are not presented with any particularity, DynaEnergetics does not address Petitioner’s claim that the “gun assembly” of Claims 9-12 are indefinite (which is itself an absurd position).

is “a push-in detonator *that does not use wires to make necessary connections*. The push in-detonator may use[] spring-loaded connectors, *thus replacing any required wires and crimping*.” Ex. 1001, 6:8-11 (emphasis added). A POSITA would readily understand, based on these disclosures, that the ’938 Patent does not have anything to do with radio communications or Wi-Fi. Ex. 2002 ¶193; Pet. at 21, 23. Rather, a POSITA would understand that a “wireless connector” in the ’938 Patent is capable of being electrically connected within a perforating gun without connecting wires directly to the detonator. Ex. 2002 ¶193; Pet. at 26.

Elsewhere, Petitioner admits that a POSITA would understand these terms to mean “three electrical contacts” (Pet. at 25), i.e., without the need to connect or attach wires directly to each other. Ex. 2002 ¶194. The ’938 specification teaches that the detonator head 100 includes “a bulkhead connector element 118 for connecting the signal-in wire 108 to the bulkhead assembly 58,” as shown in Figures 19, 27, 28, 33, and 35A. Ex. 1001, 8:17-19. Figure 32, excerpted and annotated below, shows that the bulkhead connector element 118 is in wireless contact with contact pin 126A of the bulkhead 124.

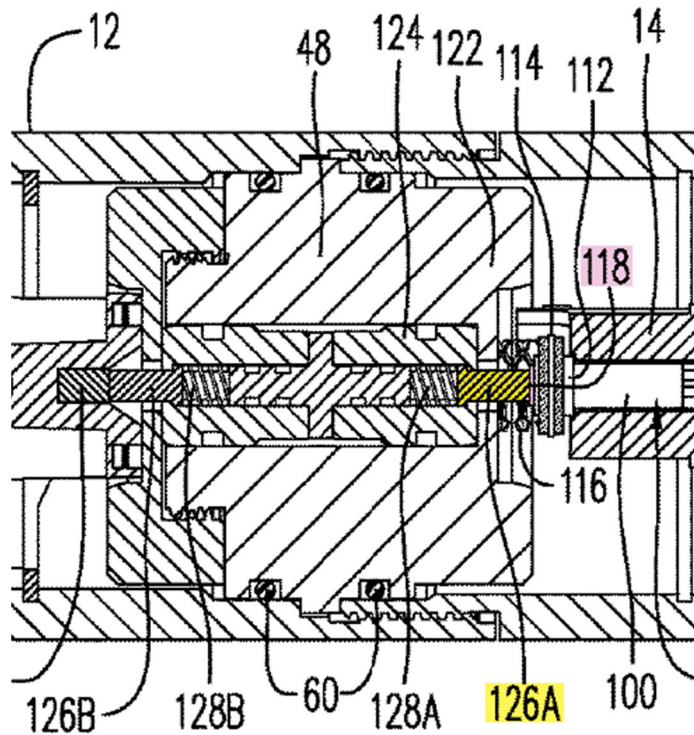


FIG. 32

The specification also describes the “wireless through wire connector.” Specifically, the specification teaches that the “through wire [] goes from the top connector 14 to the bottom connector 22, whose ends are connectors.” *Id.*, 6:24-28. Detonator head 100 of the detonator assembly 26 includes a through wire connector element 112 that connects to the through wire. *Id.*, 8:7-14, Figs. 27, 28, and 35B.

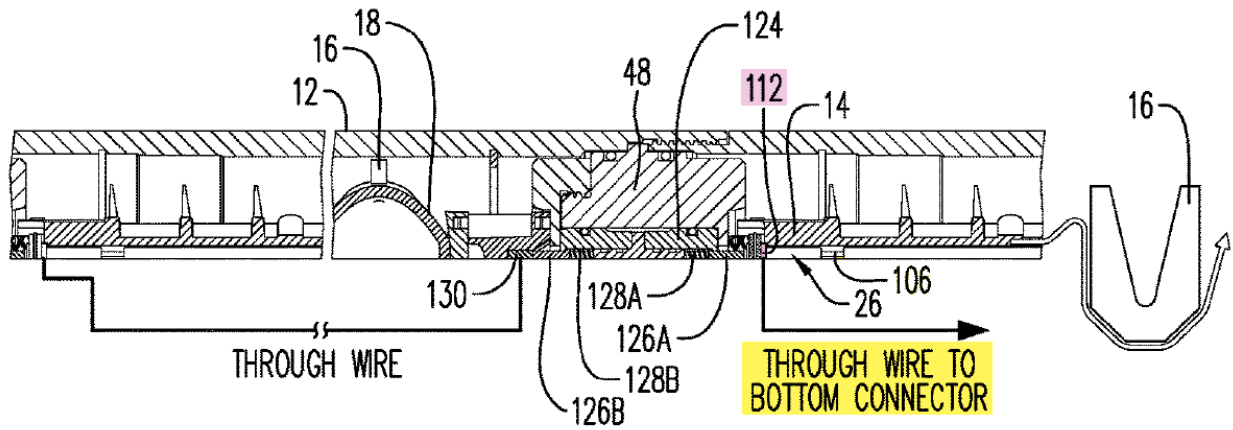


FIG. 35B

The specification further provides support for a “wireless ground contact connector.” Ex. 1001, 8:14-17. Figure 32, excerpted and enlarged below, shows ground springs 116 in contact with TSA 48.

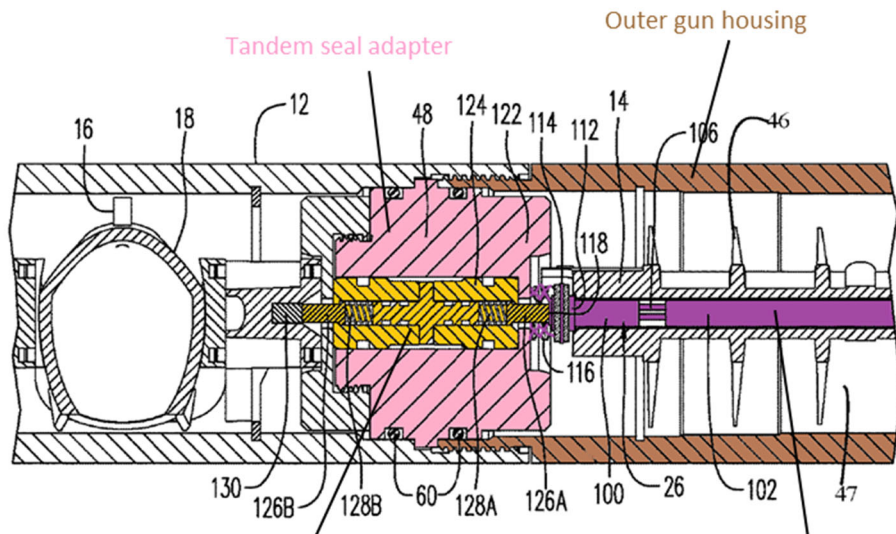
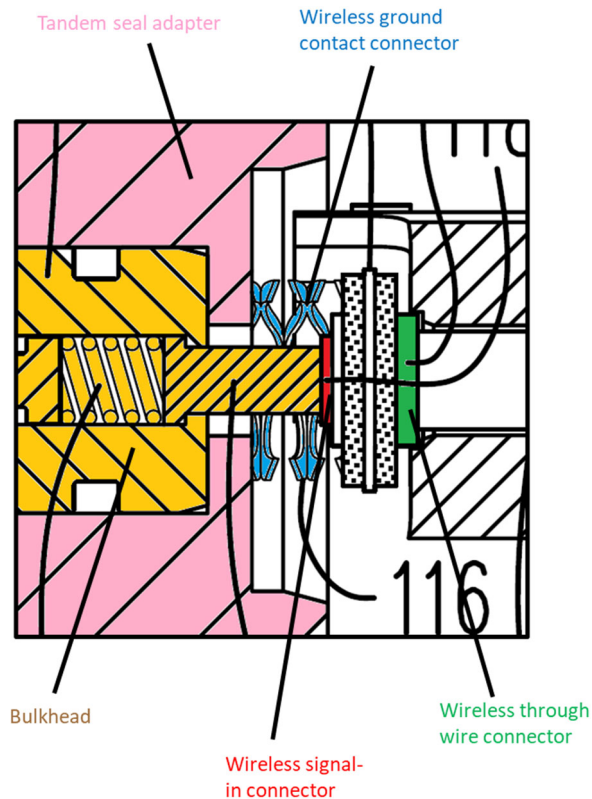


FIG. 32

Bulkhead

Detonator



3. The “insulator” limitations in Claims 1, 9, and 13 have adequate written description support

Despite claiming “insulators” to be “common knowledge” (Pet. at 40), Petitioner argues that the limitations lack written description support because the ’938 Patent “never describes ‘an insulator electrically isolating the wireless signal-in connector from the wireless through wire connector.’” Pet. at 38. To the contrary, the ’938 Patent explicitly describes that “[d]ifferent insulating elements 120A, 120B are also provided in the detonator head 100 for the purpose of insulating the detonator head 100 and the detonator wires 104 from surrounding components.” Ex. 1001, 8:19-22. Figure 35A shows that the insulating elements 120A and 120B

(highlighted below) physically separate, and therefore electrically isolate, the wireless signal-in connector 118 from the wireless through wire connector 112. *Id.*, Fig. 35A (annotated).

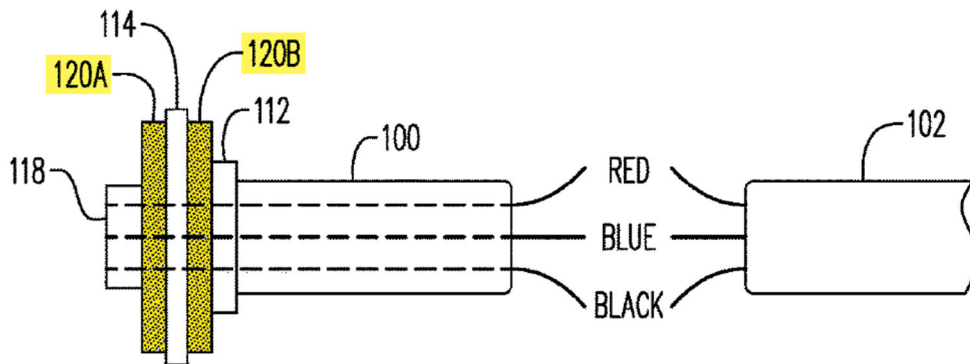


FIG. 35A

A POSITA reading the specification and viewing the figures would readily understand that the inventor of the '938 Patent was in possession of an insulator (i.e., insulating elements 120A and 120B) positioned between—and therefore electrically isolating—two electrical contacts (i.e., the wireless signal-in connector 118 and the wireless through wire connector 112) of a detonator. Ex. 2002 ¶199; Pet. at 40.

4. The “bulkhead” limitations of Claims 1, 4, 9, and 16 are definite and have adequate written description support

Again, despite asserting that “bulkheads” are within the “common knowledge” of a POSITA (Pet. at 54), Petitioner contrarily asserts that this term is indefinite. Petitioner strangely avers that “[a] POSITA cannot tell what a gun assembly is” even though the cited portions of Claims 1, 4, 9, and 16 do not include

any gun assembly limitation. Pet. at 52-53. Claim 9 recites a “bulkhead assembly,” not a bulkhead, and the portion of Claim 4 cited by Petitioner does not recite a bulkhead at all. Pet. at 50. As with much of the Petition, the “bulkhead” arguments lack particularity.

Regardless, the '938 Patent provides adequate written description support for a bulkhead in wireless electrical contact with the wireless signal in connector. The '938 Patent describes a “connection of the above-described detonator assembly 26 to the tandem seal adapter 48 and a pressure bulkhead 124” where the “bulkhead 124 includes spring connector end interfaces comprising contact pins 126A, 126B, linked to coil springs 128A, 128B.” Ex. 1001, 8:28-33. The dual spring pin connector assembly of the bulkhead 124 “is positioned within the tandem seal adapter 48 extending from a conductor slug 130 to the bulkhead connector element.” *Id.*, 8:33-37. Figure 32 below shows the contact pin 126A of the bulkhead 124 in wireless electrical contact with the wireless signal-in connector 118. *Id.*, Fig. 32.

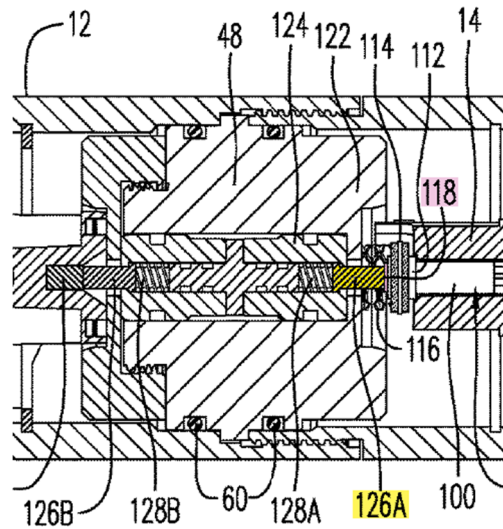


FIG. 32

A “bulkhead” is a common industry term, and the scope of the bulkhead recited in the claims is readily ascertainable and supported by the written description of the ’938 Patent. Ex. 2002 ¶202.

5. The “transferring a signal” limitation of Claim 4 is definite

Petitioner argues in conclusory fashion without any analysis that Claim 4 is indefinite and lacks adequate written description—even though Petitioner does not identify a written description challenge to Claim 4—because “[i]t is not clear what is meant by a ‘previous wellbore tool’” yet immediately thereafter Petitioner acknowledges that a POSITA would understand that the “previous wellbore tool” recited by Claim 4 is simply “another wellbore tool.” Pet. at 53-54. Petitioner also alleges that the ’938 Patent “neither describes nor teaches the contact pin transferring an electrical signal as claimed.” *Id.* at 54. But the ’938 Patent specification describes

the dual spring pin connector assembly, which includes contact pins 126A and 126B, is “connected to the through wire 106 of the detonator assembly 26” (Ex. 1001, 8:37-39), where the through wire 106 “traverses from the top to the bottom of the perforating gun system 10, making a connection at each charge holder 16” (*id.*, 8:10-12). Based on this disclosure, a POSITA would understand that the contact pin is capable of transferring an electrical signal from a previous wellbore tool to the wireless signal-in connector. Ex. 2002 ¶203.

6. The “tandem limitations” of Claims 1 and 9 are definite and have adequate written description support

Petitioner improperly lumps together separable elements of Claims 1 and 9 as “tandem limitations” but fails to mount even a single coherent indefiniteness and/or written description argument against those limitations. For example, Petitioner argues that the tandem limitations of Claim 9 are indefinite and/or lack written description support because “[i]t is unclear whether the wireless ground contact connector is configured for making wireless electrical contact with the tandem seal adapter” but separately argues that the ’938 Patent fails to provide written description for the limitations because it “never describes a detonator that makes electrical contact with a bulkhead or tandem ‘*when* it is received within a gun assembly.’” Pet. at 72 (emphasis in original). And Petitioner does not make any new arguments regarding the indefiniteness and/or lack of written description support for

the tandem limitations in Claim 1, instead recycling the same “wireless” and “wireless electrical contact” arguments discussed above. Pet. at 71.

Petitioner itself demonstrates a POSITA’s understanding of the scope of the tandem limitations in Claims 1 and 9 based on the teachings of the ’938 Patent, underscoring that the Claims are not indefinite and/or lack written description. *Id.* at 71-73.

7. The “charge holder” limitations of Claims 1 and 13 have adequate written description support

Petitioner argues that the “written description indicates that the applicant did not have possession of a charge holder with multiple charges” because the ’938 Patent specification only describes a “single charge holder...holding a single shaped charge.” Pet. at 100. As a threshold matter, Petitioner has not identified even a single claim of the ’938 Patent that requires “a charge holder with multiple charges.” Nor can it, because no such claim exists. Instead, Petitioner apparently advocates contravening Federal Circuit precedent that “[u]se of the phrase ‘at least one’ means that there could be *only one* or more than one.” *Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed. Cir. 1999) (emphasis added) (citations omitted). A POSITA would understand that a charge holder with a single shaped charge—which is all that the claim requires—is supported by the ’938 Patent specification. Ex. 2002 ¶206; Ex. 1001, 5:40-42, 5:47-49.

Petitioner also states that there is allegedly inadequate written description support for a charge holder that “includes a detonating cord” but does not provide any supporting argument or evidence. Pet. at 100. Regardless, a POSITA would understand that the ’938 Patent specification clearly discloses that a “detonation cord 20 is connected to the top connector 14 and to each stackable charge holder 16.” Ex. 1001, 5:42-44; Ex. 2002 ¶207.

8. The “perforating gun” limitations of Claims 1, 9, and 13 are definite¹⁶

The portions of the specification cited by Petitioner (“each gun assembly unit having all the components of a gun assembly” and “assembling a plurality of the stackable charge holders in a predetermined phase to form a first gun assembly”) clearly refer to subsequent gun assemblies or gun assembly units (i.e., a first gun assembly and a second gun assembly), not the same gun assembly. Pet. at 87 (citing Ex. 1001, 2:59-60, 7:63-67, 9:47-48). Indeed, the ’938 specification discloses that “the top connector 14 and bulkhead 58 accommodate electrical and ballistic transfer to the charges of the next gun assembly for as many gun assembly units as required,

¹⁶ Petitioner purports to argue that the “perforating gun” limitations (which are actually the preambles) of Claims 1, 9, and 13 are indefinite but only argues indefiniteness for the “gun assembly” recited by Claim 9.

each gun assembly unit having all the components of a gun assembly.” Ex. 1001, 7:63-67 (emphasis added); *see also id.*, 6:60-63. Petitioner’s “best guess” regarding a POSITA’s interpretation of the “gun assembly” limitation confirms that the scope of the limitation is readily ascertainable based on the disclosure in the ’938 Patent. Pet. at 87; Ex. 2002 ¶208.

9. The “top connector” limitations in Claims 5 and 13 are definite

Petitioner claims that the “top connector” of Claims 5 and 13 is allegedly indefinite because it is “unclear as to whether a top connector must be a separate component or whether the limitation can be met by other claimed components.” Pet. at 111. Petitioner cites infringement contentions but fails to explain their relevance, let alone how they demonstrate indefiniteness. *Id.* at 112. A POSITA would understand that the top connector is a separate component and cannot be satisfied by other claimed components based on the ’938 Patent specification, which describes the top connector, charge holder, and detonator as separate and distinct components. *See, e.g.*, Ex. 1001, 5:59-67; Ex. 2002 ¶209.

Petitioner also argues that Claim 13 is indefinite “[b]ecause the Patent does not describe a channel in the top connector.” Pet. at 112. To the contrary, the ’938 Patent clearly describes that the top connector includes an “elongated opening...” Ex. 1001, 7:32-42. A POSITA would understand that the elongated opening 247

highlighted in yellow in Figure 11 below is the hollow channel that receives the detonator 26. *Id.*, Fig. 11 (annotated); Ex. 2002 ¶210.

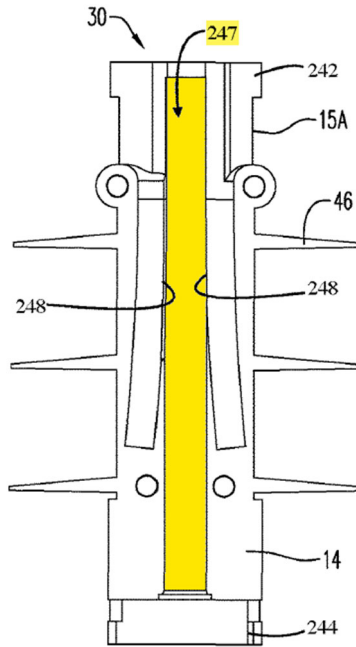


FIG. 11

10. The “detonator within the carrier” limitations in Claims 1 and 14 are definite and have adequate written description¹⁷

Petitioner states that Claim 14 is indefinite because “Claim 13 does not include inserting a detonator into the outer gun carrier for Claim 14 to modify.” Pet. at 125. Petitioner’s argument is contrary to a POSITA’s plain reading of the claims. Claim 13 recites the steps of (b) “inserting a top connector into the outer gun carrier

¹⁷ Petitioner actually does not argue that Claims 1 and 14 lack written description support, nor does Petitioner argue that Claim 1 is indefinite. Pet. at 125.

. . . the top connector comprising a hollow channel” and (c) “inserting a detonator into the hollow channel of the top connector.” A POSITA would readily understand, based on the claim language, that the detonator is inserted into the outer gun carrier when it is inserted into the hollow channel of the top connector in step (c) because the top connector has already been inserted into the outer gun carrier in step (b). Ex. 2002 ¶212. A POSITA would also understand that Claim 14 further limits the “inserting a detonator into the top connector” limitation of Claim 13, by requiring that the detonator not just be inserted into the outer gun carrier (via its insertion into the hollow channel of the top connector which has been inserted into the outer gun carrier) but be pushed into the gun carrier. *Id.* ¶212; Pet. at 125. There is no reasonable dispute that the scope of Claim 14 is readily ascertainable by a POSITA.

11. The “transporting elements” of Claims 13 and 17 are definite and have adequate written description support

Petitioner argues that Claim 13 is indefinite because it is unclear “[w]hat constitutes ‘the perforation gun system’ that is being transported.” Pet. at 145. The plain language of Claim 13 does not require that each of steps (a), (b), *and* (d) be performed before transporting the perforation gun system to the wellbore site. To the contrary, Claim 13 provides that *any one* of the products of steps (a), (b), **or** (d) are transported to the wellbore site. In other words, the perforation gun system being

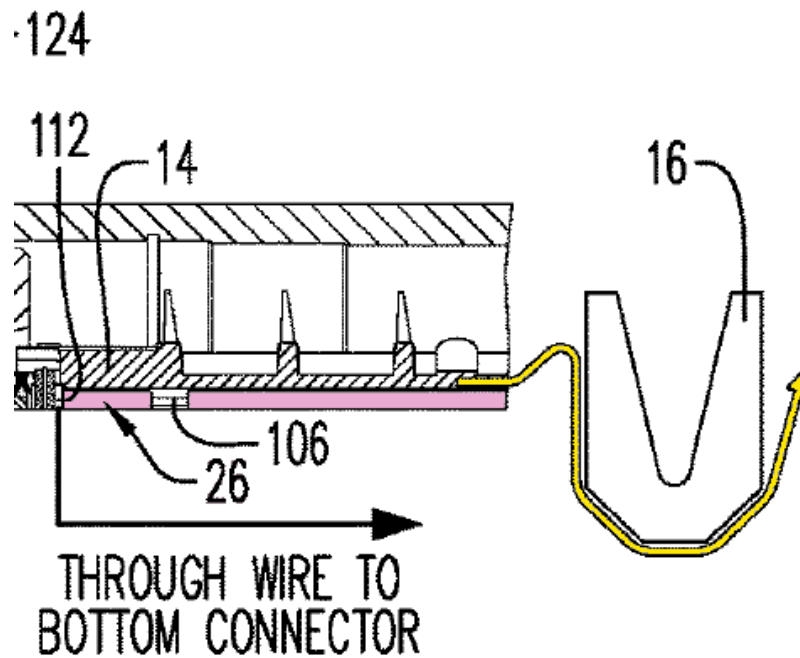
transported to the wellbore site is the product of steps (a), (b), *or* (d)—not the completed, fully assembled perforation gun system. Ex. 2002 ¶213.

Petitioner further argues that Claim 17 is indefinite because “Claim 13 appears to require that one of (a), (b), or (d) happen away from the wellbore site, while Claim 17 appears to require only that any of (a), (b), (d), *or* (e) happen away from ‘a wellbore site.’” Pet. at 145 (emphasis in original). It’s unclear whether Petitioner believes that Claim 17 is indefinite based on the number and ordering of claimed steps or the location of assembly. Regardless, Claim 17 further limits Claim 13 by providing that *one or more* of steps (a), (b), (d), or (e) are performed at a factory or a facility (i.e., at a site that is not the wellbore site). There is no ambiguity and a POSITA would readily understand the scope of Claims 13 and 17 based on the plain language of the claims. Ex. 2002 ¶214.

12. The “energetically coupling” limitations of Claims 10 and 13 have adequate written description support

Petitioner argues that Claim 13 lacks written description support because the only structure for providing energetic coupling between the detonator and the detonating cord in the specification is “side walls 248” and the detonating cord is on an opposite side of the electrical connections from the detonator. Pet. at 135. The ’938 Patent specification describes that it is the top connector 14—not the side walls 248—that provide the energetic coupling between the detonating cord and the

detonator. Ex. 1001, 7:34-36. As shown in Figure 35B below, the detonator 26 (highlighted in pink), is inserted into the central bore of top connector 14 and the detonation cord (unlabeled, highlighted in yellow) is energetically coupled to the detonator.



As illustrated in Figure 11 below, the detonator is inserted into the end of top connector 14 (specifically the elongated opening 247) as shown in pink. Upon insertion, the detonator 26 is “energetically coupled” to—i.e., capable of energetically and ballistically initiating—the detonation cord 20 which is pushed into either channel beside the central bore and aligned on either side of the detonator (shown in yellow) in the top connector 14. A POSITA would understand that the detonation cord would be inserted into one or other of the channels marked in yellow.

Thus, the detonator is positioned in a side-by-side arrangement with the detonation cord such that when the detonator is initiated, it will also initiate the detonation cord.

Ex. 2002 ¶216.

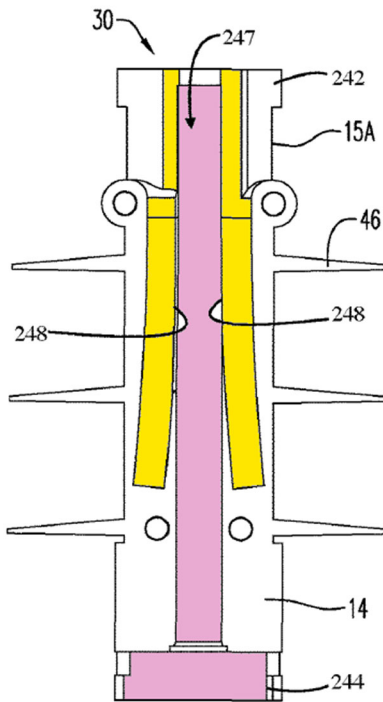


FIG. 11

Petitioner separately argues that Claim 10 is indefinite and lacks written description support because the '938 Patent “provides no discussion of a detonator with a detonating cord connecting portion, but rather describes only detonators that do not have any way to retain a detonating cord.” Pet. at 136. Petitioner cites DynaEnergetics’ infringement contentions but fails to explain their relevance, let alone how they demonstrate that Claim 10 is allegedly indefinite and/or lacks written description other than its conclusory statement that “Patent Owner has alleged

infringement of Claim 10 by a transfer puck.” *Id.* at 136-37. The ’938 specification describes that the “top connector 14 may be configured for providing energetic coupling between the detonator 26 and a detonation cord.” Ex. 1001, 7:34-36; 7:37-42. A POSITA would understand based on this disclosure in the specification that the elongated opening 247 channel of the top connector 14 is the so-called detonating cord connecting portion that is designed to retain the detonating cord 20 which is pushed into either channel beside the central bore and aligned on either side of the detonator (shown in yellow in Figure 11 below) in the top connector 14 to energetically couple the detonating cord to the detonator, as explained above. Ex. 2002 ¶217.

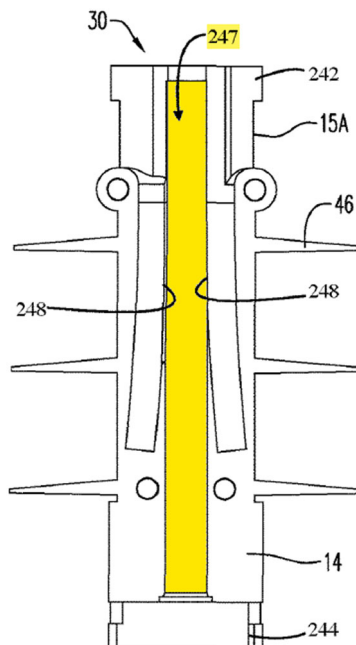


FIG. 11

VI. CONSTITUTIONAL ISSUES RAISED BY THE PETITION

The Petition also raises several constitutional issues. For example, the U.S. Supreme Court recently granted certiorari in a case involving the questions of whether PTAB Administrative Patent Judges (APJs) were properly appointed under the U.S. Constitution's Appointments Clause, and, if not, what is the proper remedy. *Arthrex, Inc. v. Smith & Nephew, Inc.*, No. 19-1458, 2020 WL 6037208, at *1 (U.S. Oct. 13, 2020); *Arthrex, Inc. v. Smith & Nephew, Inc.*, 941 F.3d 1320, 1325 (Fed. Cir. 2019). Those open questions also leave unresolved at least the question of whether PTAB APJs are vested with authority to institute a PGR. Thus, DynaEnergetics must, and does, reserve its right to make additional argument regarding the constitutionality of this proceeding and this panel's authority to render a decision pending further guidance from the Supreme Court. Specifically, DynaEnergetics respectfully contends that PTAB judges, including the judges of this panel, have not been properly appointed under the Constitution's Appointments Clause, U.S. Constitution, Article II, Section 2, Clause 2, and therefore are without authority to institute a PGR in this matter.

DynaEnergetics also respectfully submits that the Petition violates its due process right to have notice and opportunity to be heard regarding Petitioner's asserted grounds of invalidity. The lack of particularity in the Petition, combined with the voluminous and excessive grounds asserted by Petitioner, violates

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DynaEnergetics' due process rights. DynaEnergetics reserves its right to make these and other constitutional arguments should the Board institute post grant review.

VII. CONCLUSION

Patent Owner respectfully requests that the Board deny all grounds of challenge, dismiss the Petition, and decline to institute *post grant* review.

Respectfully submitted,

Dated: November 18, 2020

/Lisa J. Moyles/
Reg. No. 40,737

Lead Counsel for Patent Owner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that this Preliminary Response complies with the type-volume limitation of 37 C.F.R. § 42.24(b). The word count application of the word processing program used to prepare this Preliminary Response indicates that the Preliminary Response contains 18,687 words. There are approximately 375 words in the annotated figures, which have been added to the total word count of 18,687 words.

Dated: November 18, 2020

/Lisa J. Moyles/
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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e), I hereby certify that a true and correct copy of the foregoing Preliminary Response and all exhibits cited therein were served on Petitioner via electronic mail at the following:

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garnold@arnold-iplaw.com
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Dated: November 18, 2020

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