UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

IMPERATIVE CARE, INC.,
Petitioner,

v.

INARI MEDICAL, INC.,
Patent Owner.

Case No. IPR2025-01021
U.S. Patent No. 11,969,333

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

EXHIBIT LIST iv

I. INTRODUCTION 1

II. BACKGROUND 7

A. Overview of the '333 Patent 7

B. Prosecution History 15

C. Person of Ordinary Skill in the Art 20

D. Claim Construction 20

III. Petitioner's References 21

A. Garrison 21

B. Laub 28

C. Aklog 31

IV. CLAIMS 1-10, 13-29, AND 32-38 ARE NOT RENDERED OBVIOUS BY ANY OF THE COMBINATIONS OF LAUB OR AKLOG AND GARRISON (GROUNDS 1A, 2A, 3A, 4A) 34

A. Grounds 1A, 2A, 3A, & 4A: Neither Garrison, Laub, nor Aklog Disclose the Methods of Claims 1 or 20 Including the Buildup/Storage and Release of Vacuum Pressure in a Clot Canister Having a Filter 39

B. Grounds 1A & 2A: A POSA Would Not Have Been Motivated to Include Garrison's Valve in Laub or Aklog and Operate Those Modified Systems to Build Up Pressure in a Clot Canister to Treat PE/DVT 43

1. Petitioner's modifications would not "enable the maximum level of aspiration." 43

2. Petitioner's modifications would be incompatible with continuous aspiration and reinfusion of Laub and Aklog 46

3. The embodiments of Garrison relied on by petitioner are unsuitable for blood return, as disclosed by both Laub and Aklog. 49

4. Petitioner's modifications would introduce dangerous flow paths for air to be reinfused into the patient in Laub and Aklog. 52

5. Petitioner's modifications would needlessly complicate Laub's and Aklog's systems. 55

B. Grounds 3A & 4A: A POSA Would Not Have Modified Garrison's System to Treat PE or DVT Because Petitioner's References Teach that Such a System Would Endanger the Patient 56

V. CLAIMS 6-8, 11-12, 17, 25-27, 30-31, AND 36 ARE NOT RENDERED OBVIOUS BY ANY OF THE COMBINATIONS OF LAUB OR AKLOG AND GARRISON FURTHER IN VIEW OF GOFF, SCHAFFER, AND/OR HARTLEY (GROUNDS 1B-1D, 2B-2D, 3B-3D, 4B-4D) 64

VI. THERE IS NO GOOD CAUSE FOR A PRE-INSTITUTION REPLY 65

VII. CONCLUSION 65

TABLE OF AUTHORITIES

CASES

Adidas AG v. Nike, Inc.,
963 F.3d 1355 (Fed. Cir. 2020) 36

Aug. Tech. Corp. v. Camtek, Ltd.,
655 F.3d 1278 (Fed. Cir. 2011) 34

Axonics, Inc. v. Medtronic, Inc.,
73 F.4th 950 (Fed. Cir. 2023) 36

Innogenetics, N.V. v. Abbott Labs.,
512 F.3d 1363 (Fed. Cir. 2008) 36

Ontel Prods. Corp. v. Guy A. Shaked Invs. Ltd.,
IPR2020-01703, Paper 10 (Feb. 4, 2021) 66

Plas-Pak Indus. V. Sulzer MixPak AG,
600 Fed.App'x. 755 (Fed. Cir. 2015) 36

STATUTES

35 U.S.C. § 103 ....15, 16

EXHIBIT LIST

	Petitioner's Exhibits
Exhibit	**Description**
EX1001	U.S. Patent No. 11,974,333 ("the '333 patent")
EX1002	'333 Patent Prosecution History
EX1003	Expert Declaration of Troy Thornton
EX1004	Resume of Troy Thornton
EX1005	U.S. Patent No. 8,734,374 B2 to Aklog et al. ("Aklog")
EX1006	U.S. Patent Publication No. 2015/0173782 A1 to Garrison et al. ("Garrison")
EX1007	WIPO Publication No. WO 2006/124307 A2 to Goff et al. ("Goff")
EX1008	U.S. Patent Publication No. 2003/0116731 A1 to Hartley ("Hartley")
EX1009	U.S. Patent No. 6,776,770 B2 to Trerotola ("Trerotola")
EX1010	U.S. Patent Publication No. 2010/0042118 A1 to Garrison et al.
EX1011	U.S. Patent No. 8,535,283 B2 to Heaton et al. ("Heaton")
EX1012	U.S. Patent Publication No. 2017/0043066 A1 to Laub ("Laub")
EX1013	U.S. Patent Publication US 2003/0225379 A1 to Schaffer et al. ("Schaffer")
EX1014	U.S. Patent No. 5,938,645 to Gordon ("Gordon")
EX1015	U.S. Patent Publication No. 2014/0296868 A1 to Garrison et al.
EX1016	U.S. Patent No. 7,998,104 B2 to Chang ("Chang")
EX1017	U.S. Patent No. 8,157,760 B2 to Criado et al. ("Criado")
EX1018	U.S. Patent No. 6,481,439 B1 to Lewis et al.
EX1019	U.S. Patent No. 8,075,510 B2 to Aklog et al.

	Petitioner's Exhibits
Exhibit	**Description**
EX1020	WIPO Publication No. WO 2018/019829 A1 to Brady et al. ("Brady")
EX1021	U.S. Patent Application No. 16/117,519 (the "519 application")
EX1022	Expert Declaration of Dr. Aquilla S. Turk, III, DO
EX1023	Resume of Dr. Aquilla Turk, III, D.O.
EX1024	Shani, Jacob M.D., et al., Mechanical Manipulation of Thrombus: Coronary Thrombectomy, Intracoronary Clot Displacement, and Transcatheter Aspiration, 72 Am. J. Cardiol. 116G-118G (1993)
EX1025	Bose, A et al., The Penumbra System: A Mechanical Device for the Treatment of Acute Stroke due to Thromboembolism, 29 Am. J. Neuroradiol. 1409-1413 (Aug. 2008)
EX1026	Turk, Aquilla S. et al., Initial clinical experience with the ADAPT technique: A direct aspiration first pass technique for stroke thrombectomy, 6 J. NeuroIntervent. Surg. 231-237 (2014)
EX1027	Turk, Aquilla S. et al., ADAPT FAST study: a direct aspiration first pass technique for acute stroke thrombectomy, 6 J. NeuroIntervent. Surg. 260-264 (2014)
EX1028	April 24, 2024 Letter from Inari to Imperative Care
EX1029	Turk, Aquilla S. et al., Aspiration thrombectomy versus stent retriever thrombectomy as first-line approach for large vessel occlusion (COMPASS): a multicentre, randomized, open label, blinded outcome, non-inferiority trial, 393 Lancet 998-1008 (March 2019)
EX1030	Save, Jeffrey L., Time is Brain – Quantified, American Heart Association Journals, available at http://www.stokeaha.org (2005).
EX1031	U.S. Patent No. 9,980,813 B1 to Eller ("Eller")
EX1032	US 2018/0064453 Al ("Garrison II")
EX1033	US 2005/0054995 Al ("Barzell")

	Petitioner's Exhibits
Exhibit	**Description**
EX1034	Decision Granting Institution of *Inter Partes* Review for U.S. Patent No. 11,697,011 (Paper 7) in *Imperative Care, Inc. v. Inari Medical, Inc.,* IPR2024-01157 (P.T.A.B. Jan. 23, 2025)
EX1035	Decision Granting Institution of *Inter Partes* Review for U.S. Patent No. 11,697,012 (Paper 6) in *Imperative Care, Inc. v. Inari Medical, Inc.,* IPR2025-00156 (P.T.A.B. Apr. 22, 2025)
EX1036	U.S. Patent No. 12,109,384 B2 to Merritt et al.
EX1037	Patent Owner's Exhibit 2002 filed in *Imperative Care, Inc. v. Inari Medical, Inc.,* IPR2025-00289 (P.T.A.B.)
EX1038	Indigo Aspiration System-Penumbra Engine Pump and Canister, 510(k) No. K180105 (Mar. 8, 2018) ("Indigo Aspiration System")
EX1039	AXS Universal Aspiration Set Brochure (2017)
EX1040	VacLok Negative Pressure Syringe Brochure
EX1041	O. Nikoubashman et al., Under Pressure: Comparison of Aspiration Techniques for Endovascular Mechanical Thrombectomy, 39 Am. J. Neuroradiol. 905-909 (May 2018) ("Nikoubashman")
EX1042	Inari's Supplemental Infringement Contentions (without claim charts) from *Inari Medical, Inc. v. Imperative Care, Inc.,* No. 24- cv-3117 (N.D. Cal.) (served February 7, 2025)
EX1043	Inari's Notice of Motion and Motion for Leave to File Third Amended Complaint (Dkt. #88) in *Inari Medical, Inc. v. Imperative Care, Inc.,* 24-cv-03117-EKL (N.D. Cal.) (filed March 5, 2025)
EX1044	Case Management & Scheduling Order (Dkt. #54) in *Inari Medical, Inc. v. Imperative Care, Inc.,* 24-cv-03117-EKL (N.D. Cal.) (issued December 19, 2024)
EX1045	Decision Denying Institution of *Inter Partes* Review for U.S. Patent No. 11,744,691 (Paper 10) in *Imperative Care, Inc. v. Inari Medical, Inc.,* IPR2024-01257 (P.T.A.B. Feb. 7, 2025)

	Petitioner's Exhibits
Exhibit	**Description**
EX1046	U.S. Patent No. 7,984,730 B2 to Ziv et al.
EX1047	Imperative Care's Opposition to Inari's Motion for Leave to File Third Amended Complaint (Dkt. #98) in *Inari Medical, Inc. v. Imperative Care, Inc.,* 24-cv-03117-EKL (N.D. Cal.) (filed March 26, 2025)
EX1048	Imperative Care's Notice of Motion and Motion to Stay Pending *Inter Partes* Review (Dkt. #100) in *Inari Medical, Inc. v. Imperative Care, Inc.,* 24-cv-03117-EKL (N.D. Cal.) (filed April 2, 2025)
EX1049	Ahmed Pasha et al., Successful Management of Acute Massive Pulmonary Embolism Using Angiovac Suction Catheter Technique in a Hemodynamically Unstable Patient, 15 Cardiovasc. Revasc. Med. 240-243 (2014)
EX1050	Certified File History of U.S. Patent Application 10/371,190 (Schaffer File History)
EX1051	Maureen Kohi, Catheter Directed Interventions for Acute Deep Vein Thrombosis, 6 Cardiovasc. Diagn. Ther. 599-611 (2016)

	Patent Owner's Exhibits
Exhibit	**Description**
EX2001	U.S. Patent Application Publication No. 2017/0274180 to Garrison et al.
EX2002	U.S. Patent Application Publication No. 2013/0035628 to Garrison et al.
EX2003	U.S. Patent Application Publication No. 2018/0042623 to Batiste ("Batiste")

	Patent Owner's Exhibits
Exhibit	**Description**
EX2004	U.S. Patent No. 6,059,745 to Gelbfish ("Gelbfish")
EX2005	Declaration of Brian Brown

I. INTRODUCTION

Petitioner has failed to demonstrate a reasonable likelihood that any of Claims 1-12, 14-31, and 33-38 ("the Claims") of the '333 Patent are unpatentable.[1] The Claims are directed to innovations pioneered by Patent Owner that are not disclosed or obvious in view of the prior art, and the Patent Office agreed—expressly finding the Claims patentable over Petitioner's only reference for all grounds, Garrison, in the Notice of Allowance. EX1002, pp.46-47.

The '333 Patent is directed to improved clot treatment systems and methods for removing clot material, and specifically pulmonary embolism ("PE") and deep vein thrombosis ("DVT), from the vasculature of a human patient. EX1001, 4:17-19; EX2005, ¶37. Both DVT and PE are particularly dangerous types of venous thromboembolism caused by blood clot formation in the veins of the body. EX2005, ¶31. DVT is a type of blood clot (thrombus) that typically forms in the deep veins of a limb, such as the leg. EX1001, 1:46-51; EX2005, ¶32. PE is a life-threatening condition that occurs when a clot becomes lodged in the arteries of the lungs, blocking the oxygenation of blood necessary to sustain the entire body. EX1001, 1:57-67; EX2005, ¶32.

The methods for treating PE and DVT in the '333 Patent generate and build

---

[1] The Petition does not assert that claims 13 and 32 are unpatentable.

up (e.g., pre-charge and store) vacuum pressure before applying the built-up vacuum to an aspiration catheter positioned near the PE/DVT in a patient's vasculature to generate large suction forces (and corresponding fluid flow velocities) needed to effectively aspirate and remove the PE from the patient. EX1001, 4:34-50; EX2005, ¶37. The suction forces generated and corresponding fluid flow velocities due to the pre-charged vacuum are greater than conventional systems allowing the aspiration system to more effectively remove PE/DVT, even when the PE/DVT is strongly lodged or attached within the blood vessel (e.g., chronic). EX1001, 4:42-47, 10:14-27; EX2005, ¶37.

That buildup and subsequent application of stored vacuum pressure is integral to the Claims of the '333 Patent, which includes two independent claims that recite the same method but for "treating a pulmonary embolism" (Claim 1) and "treating a deep vein thrombosis" (Claim 20). EX1001, cls.1, 20. The method includes "advancing an aspiration catheter at least partially through the vasculature of the patient such that a distal end portion of the aspiration catheter is positioned proximate to the" pulmonary embolism or deep vein thrombosis. *Id*. A "lumen of the aspiration catheter is fluidly coupled along a fluid path to a clot canister and an aspiration source proximal to the clot canister." *Id*. The claimed methods further include "generating vacuum pressure within the clot canister via the aspiration source while a valve positioned along the fluid path between the aspiration catheter and the clot canister is in a first position that inhibits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister" and "moving the valve from the first position to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter such that at least a portion of the pulmonary embolism [or deep vein thrombosis] and blood are aspirated into the clot canister, wherein in the second position the valve permits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister, and wherein the clot canister includes a filter configured to filter the blood from the portion of the pulmonary embolism [or deep vein thrombosis]." *Id*.

Here, Petitioner asserts four different grounds for independent Claims 1 and 20 of the '333: (ground 1A) Laub in combination with Garrison, (ground 2A) Aklog in combination with Garrison, (ground 3A) Garrison in combination with Laub, and (ground 4A) Garrison in combination with Aklog. Petition, p.16. Petitioner fails to demonstrate a reasonable likelihood that the Claims are obvious over any of those combinations.

Petitioner relies on Garrison alone for disclosing the "valve" and the buildup of and subsequent application of vacuum pressure recited in the Claims. Petition, pp.36-41. But Garrison does not disclose those features, so all grounds fail. The valve 3325 in Figure 34 of Garrison is not used to build up vacuum pressure as Petitioner alleges, but is instead used to control the connection of two different catheters to the same pressure source. EX1006, ¶[0132]. Because of that deficiency, Petitioner relies on a different embodiment of Garrison set forth in paragraph [0134] to allegedly show the claimed buildup and release of vacuum pressure. Petition, pp.36-38. But that disclosure is for generating vacuum pressure with a syringe rather than with a peristaltic pump as shown in Figure 34 of Garrison, and that syringe is "attached" directly to a flow controller rather than a filter and a check valve like the peristaltic pump in Figure 34. Accordingly, Garrison does not disclose generating vacuum pressure in a clot canister having a filter while a valve is closed using a peristaltic pump as shown in Figure 34 of Garrison relied on by Petitioner.

Grounds 1A, 2A, 3A, and 4A also fail because a POSA would not have been motivated to make any of Petitioner's combinations for several reasons. In particular, regarding grounds 1A and 2A, a POSA would not have been motivated to include Garrison's valve in Laub or Aklog and use that valve in a method to build up pressure in a clot canister to treat PE/DVT.

First, that modification would not "enable the maximum level of aspiration," Petitioner's purported motivation to combine. Petition, pp.38-41. Instead, a POSA would understand the "maximum level of aspiration" using a pump as in Figure 34 of Garrison, Laub, and Aklog is controlled by the operational speed of the pump unlike a syringe. EX2005, ¶¶82-87. And Laub discloses that to achieve the "maximum level of aspiration" the system is operated continuously—which is the opposite of Petitioner's proposed combinations adding a valve that is closed to build up vacuum before subsequently being opened. *Id*.; EX1012, ¶[0045].

Second, that modification would be incompatible with Laub's and Aklog's systems that continuously aspirate and reinfuse blood so that large clots, which PE and DVT are, can be removed without endangering the patient with excessive blood loss. EX1012, ¶[0045]; EX1005, 5:19-23; EX2005, ¶88-90. Incorporating Garrison's valve and then operating those systems to close the valve to build up vacuum pressure and open the valve to apply that vacuum pressure as recited in the Claims of the '333 Patent would prevent the continuous/simultaneous aspiration and reinfusion disclosed by Laub or Aklog when the valve is closed.

Third, Garrison discloses that the embodiments relied on by Petitioner are unsuitable for blood return, but the references that Petitioner relies on as disclosing the treatment of PE and DVT, Laub and Aklog, emphasize the necessity of blood return for treating large clots in large vessels, like PE and DVT. EX1012, ¶[0045]; EX1005, 5:19-23; EX2005, ¶¶91-94. Without blood return, Laub and Aklog disclose that the patient will exsanguinate (bleed out) and/or go into shock. *Id*. A POSA therefore would not have combined Laub or Aklog with Garrison in a manner that Garrison discloses is incompatible with blood return, thereby endangering the patient.

Fourth, in Petitioner's combination, Garrison's valve 3325 (a 3-way or 4-way stopcock) would provide dangerous flow paths for sucking air into the Laub's and Aklog's systems through the unconnected port of that valve that could be reinfused into the patient to cause an air embolism. EX2005, ¶¶95-99. A POSA would therefore not have added such a valve to those systems.

Fifth, Petitioner's modification to include Garrison's valve in Laub or Aklog would needlessly complicate the systems of Laub and Aklog in which the surgeon controls the procedure simply by controlling the pump. *Id*. at ¶¶100-101. Petitioner's combination would require the surgeon to manually actuate the valve in addition to controlling the pump to control aspiration.

And, regarding grounds 3A and 4A, a POSA would not have used Petitioner's modified system or any of the embodiments of Garrison relied on by Petitioner to treat large clots like PE or DVT—even if the catheter were "upsized"—because Petitioner's references recognize the criticality of blood reintroduction to patient health and safety when treating such large clots, and Garrison expressly discloses that the embodiments relied on by Petitioner are not suitable for blood reintroduction. EX1006, ¶[0135]; EX2005, ¶¶108-121. A POSA would not have made those modifications to Garrison just like the Patent Office expressly found. EX1002, pp.46-47; *infra* §II.C.

Accordingly, for those reasons and the reasons set forth below, grounds 1A, 2A, 3A, and 4A fail because independent Claims 1 and 20 are not rendered obvious by any combination of Laub or Aklog and Garrison or Garrison and Laub or Aklog. Grounds 1B-1D, 2B-2D, 3B-3D, and 4B-4D pertain only to additional limitations of the dependent claims, and fail for the same reasons as grounds 1A, 2A, 3A, and 4A. Petitioner has therefore failed to demonstrate that any of the Claims are unpatentable under any of grounds 1A-4D.

II. BACKGROUND

A. Overview of the '333 Patent

Patent Owner is the world's leading developer of aspiration-based mechanical thrombectomy devices that treat PE. For example, Patent Owner's FlowTriever line of products that have been and are currently offered by Patent Owner to treat at-risk patients were the first FDA-approved aspiration-based mechanical thrombectomy systems for treating PE.[2]

The '333 Patent is directed to improved clot methods for treating pulmonary embolism ("PE") and deep vein thrombosis ("DVT") from the vasculature of a patient. EX1001, 4:17-19; EX2005, ¶37. PE and DVT are types of venous thromboembolism ("VTE"), a disease caused by blood clot formation in the veins of the body that is, unfortunately, a leading cause of both death and disease worldwide. EX1001, 1:45-67; EX2005, ¶31. PE and DVT are common and particularly

---

[2] *See* https://www.inarimedical.com/flowtriever-system.

dangerous types of VTE. EX2005, ¶31. DVT is a type of blood clot that typically forms in the deep veins of a limb, such as the leg, and can develop into PE if portions of the clot break off and migrate to the pulmonary system. *Id*. at ¶32. PE is a life-threatening condition that occurs when a clot, often a DVT or a portion of a DVT, breaks free and becomes lodged in the arteries of the lungs, blocking the oxygenation of blood necessary to sustain the entire body. *Id*.

VTE has traditionally been treated with drugs (thrombolytic agents) or invasive surgeries. EX10015, 2:1-33; EX2005, ¶33. However, these approaches have their drawbacks. For example, thrombolytic agents do not always work, take hours or even days to be successful, can cause hemorrhage of the blood vessel, and in many patients thrombolytic agents cannot be used at all. EX1001, 2:28-33; EX2005, ¶34. Invasive surgical procedures involve exposing a patient to surgery and may be traumatic to the patient. EX1001, 2:10-12; EX2005, ¶36. Even today, most commercially available treatment systems do not use the methods described in the '333 Patent, instead employing a multitude of alternative solutions that have varying disadvantages. EX2005, ¶37.

The '333 Patent discloses aspiration systems that build up (e.g., pre-charge) and store vacuum pressure before applying that built-up vacuum pressure to an aspiration catheter positioned near clot material (e.g., PE or DVT) in a blood vessel to rapidly generate large suction forces (and corresponding fluid flow velocities) needed to effectively aspirate and remove the clot material from the patient. EX1001, 4:34-50; EX2005, ¶37. The generated suction forces and corresponding fluid flow velocities are greater than conventional systems, more effectively removing clot material, even clot material that is strongly lodged or attached within the blood vessel, such as chronic clots. EX1001, 4:42-47, 10:14-27; EX2005, ¶37.

That buildup and subsequent application of vacuum pressure is integral to the Claims of the '333 Patent, specifically to the two independent claims that recite identical steps for "treating a pulmonary embolism" (Claim 1) and "treating a deep vein thrombosis" (Claim 20). EX1001, cls.1, 20. Each method includes "advancing an aspiration catheter at least partially through the vasculature of the patient such that a distal end portion of the aspiration catheter is positioned proximate to the" pulmonary embolism or deep vein thrombosis. *Id*. A "lumen of the aspiration catheter is fluidly coupled along a fluid path to a clot canister and an aspiration source proximal to the clot canister." *Id*. The claimed method steps further include "generating vacuum pressure within the clot canister via the aspiration source while a valve positioned along the fluid path between the aspiration catheter and the clot canister is in a first position that inhibits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister" and "moving the valve from the first position to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter such that at least a portion of the pulmonary embolism [or deep vein thrombosis] and blood are aspirated into the clot canister, wherein in the second position the valve permits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister, and wherein the clot canister includes a filter configured to filter the blood from the portion of the pulmonary embolism [or deep vein thrombosis]." *Id*.

Accordingly, the Claims of the '333 Patent generally relate to methods that include building up vacuum pressure in a clot canister (e.g., a chamber) having a filter using an aspiration source while a valve inhibits fluid flow from the aspiration catheter to the aspiration source, and then moving that valve to apply the vacuum pressure to the aspiration catheter to aspirate PE or DVT and blood therethrough. EX2005, ¶40. The filter in the clot canister filters the PE or DVT from the blood. *Id*.

Figure 1 of the '333 Patent illustrates one example of a system that can be used to perform methods for treating PE/DVT. *Id*. at ¶41. Figure 1 illustrates an aspiration assembly 10 comprising an aspiration catheter 102 fluidly coupled to a pressure source 140 via a valve 126 (e.g., a stopcock or other fluid control valve):

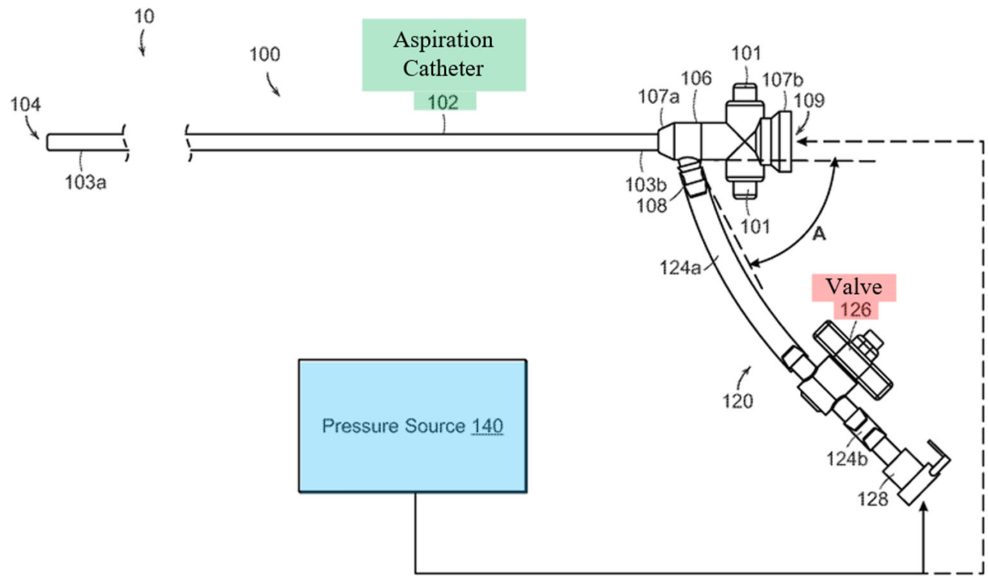


FIG. 1

EX1001, 5:25-7:23; EX2005, ¶41. The '333 Patent describes various embodiments of the pressure source 140, including that it may have a filter in a chamber in which vacuum pressure is generated when the valve 126 shown in Figure 1 is closed. EX2005, ¶41; EX1001, FIGS.19–20E, 31:9-50, 31:51-33:6.

The '333 Patent explains that the aspiration source can either be a pump, or alternatively a different pressure source such as a syringe: "the pressure source can be a pump (e.g., an electric pump coupled to a vacuum chamber) while, in other embodiments, the pressure source can include one or more syringes that can be actuated or otherwise activated by a user … to generate and store a vacuum therein." EX1001, 7:36-41. Therefore, in different embodiments, the aspiration source is either a pump or a syringe. EX2005, ¶42.

Figure 8 of the '333 Patent is a flow chart demonstrating various steps of the methods for treating PE or DVT recited in the claims and, some of those steps are illustrated with respect to the system of Figure 1 in Figures 9A-10B. EX1001, 16:33-56. For example, Figure 10A shows a distal portion of the aspiration catheter after being advanced through the vasculature such that a distal portion of the catheter is positioned proximate to a PE or DVT:

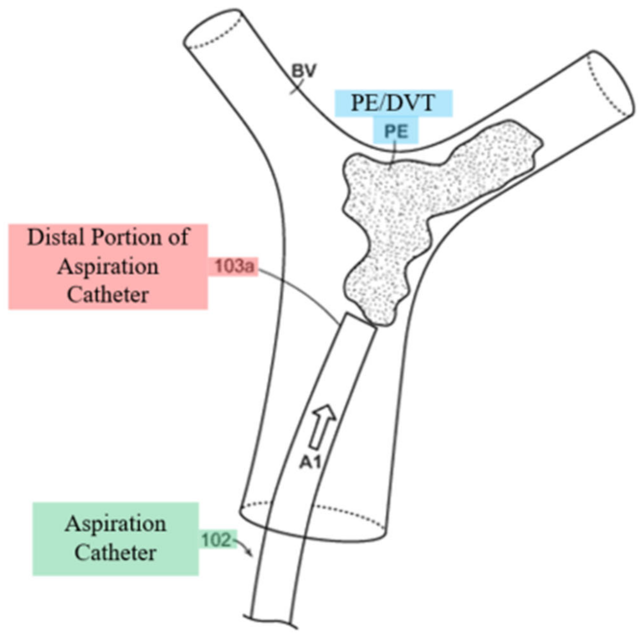


FIG. 10A

EX1001, 16:57-17:9; EX2005, ¶43. Next, as shown in Figure 9B, the aspiration source is used to generate and build up (e.g., pre-charge) vacuum pressure while the valve is closed:

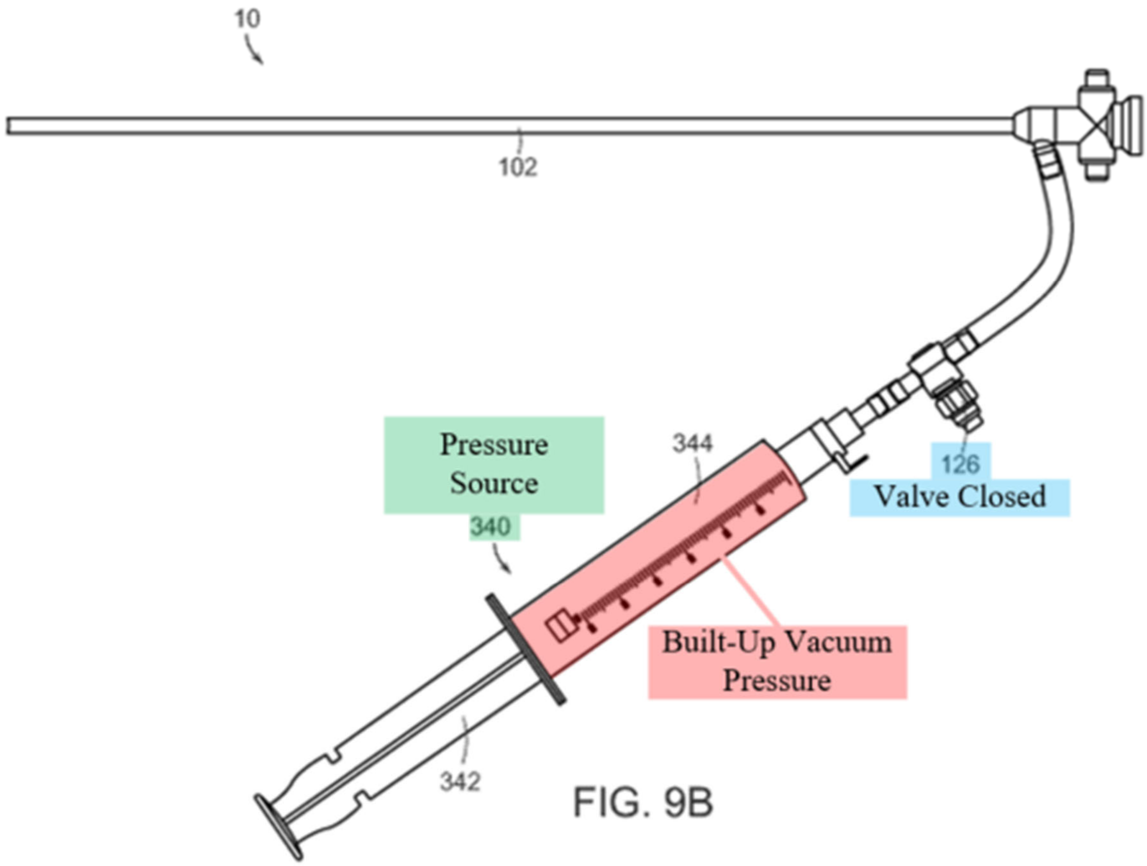


FIG. 9B

EX1001, 18:11-41; EX2005, ¶43. While Figure 9B illustrates a syringe without a filter, a POSA would understand that the filtering embodiments of Figures 19-20E, or other filtering embodiments described in the '333 Patent, could be substituted for or used with the pressure source 340. EX2005, ¶43.

After building up the vacuum pressure, that pressure is then applied to the catheter to aspirate the PE/DVT by opening the valve as shown in Figures 9C and 10B:

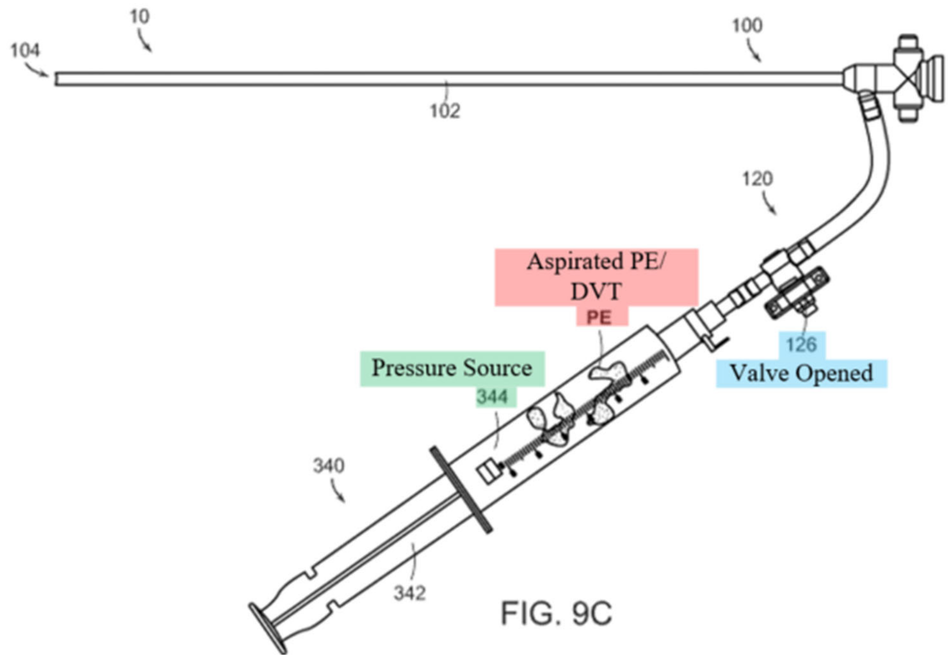


FIG. 9C

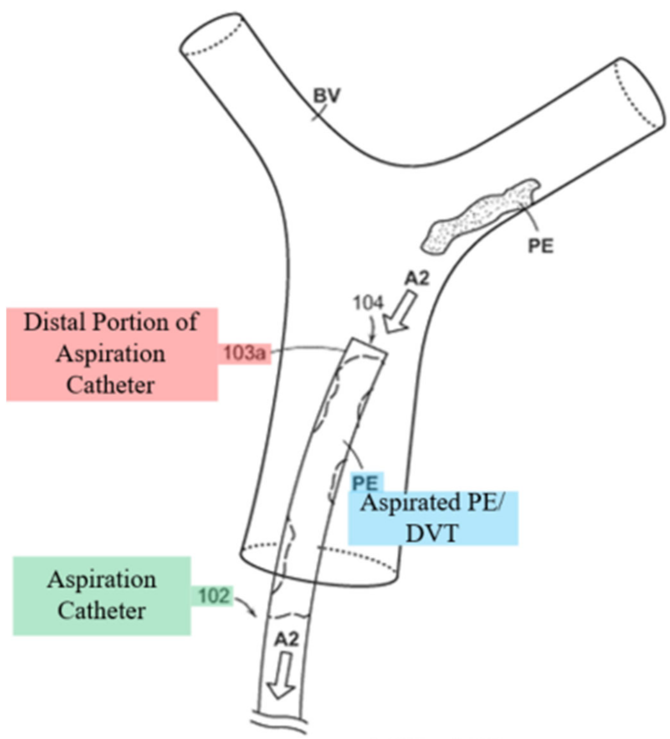


FIG. 10B

EX1001, 18:43-19:9; EX2005, ¶44.

B. Prosecution History

Petitioner's reference for all grounds—Garrison—was substantively considered by the Patent Office and overcome. In the sole non-final Office action mailed October 30, 2023, the Examiner rejected then-pending claims under 35 U.S.C. § 103 over a combination of Garrison II (EX1032), Barzell (EX1033), and Heaton (EX1011). EX1002, pp.154-176. Garrison II is different than Garrison applied by Petitioner here, but shares common inventors and assignee. EX1006, p.1; EX1032, p.1. And, both Garrison and Garrison II are directed to catheter systems for treating neurovascular clots (e.g., acute ischemic stroke), each stating that "[t]he present disclosure relates generally to medical methods and devices for the treatment of acute ischemic stroke." EX1006, ¶[0002]; EX1032, ¶[0003]; EX2005, ¶45.

In response to that Office action, Patent Owner canceled the then-pending claims and added new claims 23-60 that matured into Claims 1-38 of the '333 Patent. EX1002, pp.109-119. Before filing the response, Patent Owner conducted a videoconference interview with the Examiner, his supervisor, and an inventor of the '333 Patent, Dr. Thomas Tu, on January 25, 2024. During that interview, Patent Owner discussed the proposed new independent claims and also specifically called attention to the disclosure of Garrison relied on by Petitioner here. For example, in the Examiner Interview Summary Record mailed January 31, 2024, the Examiner attached an agenda for discussion submitted by Patent Owner as an Office action appendix. *Id.* at pp.101-104. That agenda included discussion points for the proposed new claims, the Section 103 rejection over the combination of Garrison II, Barzell, and Heaton, and further noted for discussion at listed items (3)(a) and (3)(b) of the agenda:

> (3) Discussion of additional prior art of record.
>
> > (a) U.S. Patent Application Publication No. 2017/0274180 ("Garrison"). *See*, e.g., Figure 34 and paragraphs [0132]-[0134] and [0162]-[0l72].
> >
> > (b) U.S. Patent Application Publication No. 2013/0035628 ("Garrison"). *See*, e.g., Figure 16 and paragraph [0085].

Id. at p.104. U.S. Patent Application Publication No. 2017/0274180 (EX2001) identified by Patent Owner to the Examiner is a direct continuation of Garrison and, as such, contains identical disclosure to Garrison relied on by Petitioner here. EX2001, p.1. U.S. Patent Application Publication No. 2013/0035628 (EX2002) identified by Patent Owner to the Examiner also contains some disclosure identical to that of Garrison extensively relied on by Petitioner, including Figures 15-17 identical to Figures 32-34 of Garrison and related description, including paragraph [0085] identical to paragraph [0134] of Garrison. *See*, e.g., Petition, pp.6, 7, 21-23, 35, 37-39, 42, 63-64.

Patent Owner's response to the Office action further summarizes discussions of Garrison with the Examiner:

> Additionally, during the January 25th videoconference interview, the parties discussed proposed new independent claims 23 and 42 in view of U.S. Patent Application Publication No. 2017/0274180 ("Garrison II") and U.S. Patent Application Publication No. 2013/0035628 ("Garrison III"). For example, FIG. 15 and Paragraph [0085] of Garrison III were specifically discussed with respect to claims 23 and 42. At that time, the Examiner and his supervisor provisionally agreed that new independent claims 23 and 42 also patentably distinguish over Garrison II and Garrison III.

EX1002, p.117. Accordingly, Patent Owner specifically brought the relevant disclosure of Garrison to the Examiner's attention despite Garrison not being cited in the sole Office action.

Following that amendment, the Examiner allowed the claims and further explained why the claims are patentable over the various Garrison references in the Notice of Allowance:

> Claim 23 and 42 are allowable for reciting, *inter alia*, "a method of treating a *pulmonary embolism* within a vasculature …" and "applying the vacuum pressure to the lumen of the aspiration catheter such that at least a portion of the pulmonary embolism and blood are aspirated into the clot canister.["]
>
> Garrison, Barzell, and Heaton teaches an aspiration catheter, as described in Non-Final Rejection filed on 10/30/2023. However,

> modified Garrison does not teach an aspiration catheter configured to aspirate pulmonary embolism or deep vein thrombosis. The aspiration catheter of modified Garrison is configured for smaller neurovascular anatomy (see Abstract) and not configured for larger clot/embolisms. As explained by inventor during the interview on 1/25/2024, and further supported by photographic evidence during the interview, a pulmonary embolism or a deep vein thrombosis presents significant different structures and physiological responses as compared to neurovascular clots, and therefore one skilled in the art would not have looked to use the Garrison device for the current methods.
>
> Prior art like Batiste (US 20180042623 Al) teaches an aspiration catheter (see Abstract) used for deep vein thrombosis or pulmonary embolisms (see Paragraph [0004]). However, it would not be reasonable to combine modified Garrison with the device of Batiste because Garrison specifically teaches the aspiration catheter being used for neurovascular procedures. Therefore the device of Garrison would be not be combinable with the device of Garrison to teach a method of treating pulmonary embolisms or deep vein thrombosis. There is no prior art that reads on the combination of limitations of claim 23 or 42. **Claims 24-41** are allowable for depending on claim 23. **Claims 43-60** are allowable for de pending on claim 42.

EX1002, pp.46-47. In summary, in allowing the Claims challenged here, the Examiner considered the disclosure of Garrison and found that a POSA would not have modified Garrison to treat PE or DVT, and also found that there is no prior art that reads on the Claims including in view of Batiste which the Examiner described as teaching an aspiration catheter used to treat deep vein thrombosis and pulmonary embolism (just like Petitioner relies on Laub and Aklog for here).

Accordingly, Garrison was considered in detail during prosecution. Garrison's disclosure was specifically brought to the Examiner's attention by Patent Owner, and the Examiner considered Garrison and expressly explained that the Claims were patentable over Garrison in the Notice of Allowance.

And, although Aklog itself was not cited in an information disclosure statement ("IDS"), Aklog's parent (EX1019) was considered and includes disclosure that is identical to the only portions of Aklog relied upon in the Petition. EX1002, pp.186, 366 (IDS identifying Aklog's parent, EX1019). Aklog is a continuation-in-part of Aklog's parent. EX1005, p.1. The only additional disclosure in Aklog over Aklog's parent is found in column 18, line 56 to column 20, line 27 of Aklog. This portion of Aklog describes using the system already disclosed in Aklog's parent to capture vegetative growths disrupted during another procedure, such as the removal of a pacemaker lead. That disclosure is not related to the claims of the '333 Patent and is not cited or relied upon in the Petition.

While Laub was not cited during prosecution, as explained below, Laub's system is substantively the same as Aklog and Aklog's parent (which was cited).

C. Person of Ordinary Skill in the Art

Petitioner asserts that a POSA has "an undergraduate degree in mechanical engineering or a related engineering discipline and 2-4 years of catheter design experience and, where necessary, would have consulted with a physician regarding the methods of treatment." Petition, p.13. This is insufficient to qualify as a POSA. EX2005, ¶52. Nevertheless, Patent Owner applies Petitioner's definition herein as, even under this definition, Petitioner has failed to meet its burden.

D. Claim Construction

Petitioner proposes a claim construction for a single term, "filament," recited in dependent Claims 11-12 and 30-31. Petition, pp.13-15. This claim construction issue is not germane to Patent Owner's arguments here, and it is therefore not necessary at this time to analyze that claim term. Patent Owner reserves the right to construe "filament" or any other term according to its plain and ordinary meaning during the trial phase, if needed.[3]

---

[3] Petitioner has proposed the same construction for the term "filament" here as it did in IPR2025-00289 (Paper 10 for related U.S. Patent No. 11,554,005). The construction of the term there mattered to the arguments presented in opposition to the Petition there, so Patent Owner provided its views on the proper construction of this term in IPR2025-00289 (Paper 16).

III. Petitioner's References

A. Garrison

Garrison is directed to systems for treating acute ischemic stroke caused by small cerebral clots in the cerebral arterial vasculature rather than, for example, treating large clots in the venous vasculature (e.g., PE or DVT) that is much larger in diameter than the cerebral vessels, as described in the '333 Patent. EX1006, ¶[0002]; EX2005, ¶54. For example, Figure 33 (annotated below) of Garrison shows an arterial access device 2010 that provides access to the common carotid artery (CCA), and a smaller catheter 2030 inserted (e.g., telescoped) through the arterial access device 2010 such that a distal tip of the catheter 2030 is positioned in the middle cerebral artery (MCA) where the clot to be treated is located. EX1006, ¶[0131]; EX2005, ¶54. The arterial access device 2010 is connected to a flow line 2025, which can be connected in series to a filter 3418, a check valve 3419, a source of aspiration 3125 (a peristaltic pump), and a receptacle 3100, respectively. *Id*. The smaller inner catheter 2030 is similarly connected to a flow line 2045, a filter 3418, a check valve 3419, a source of aspiration 3425 (a peristaltic pump), and a receptacle 3105. *Id*.

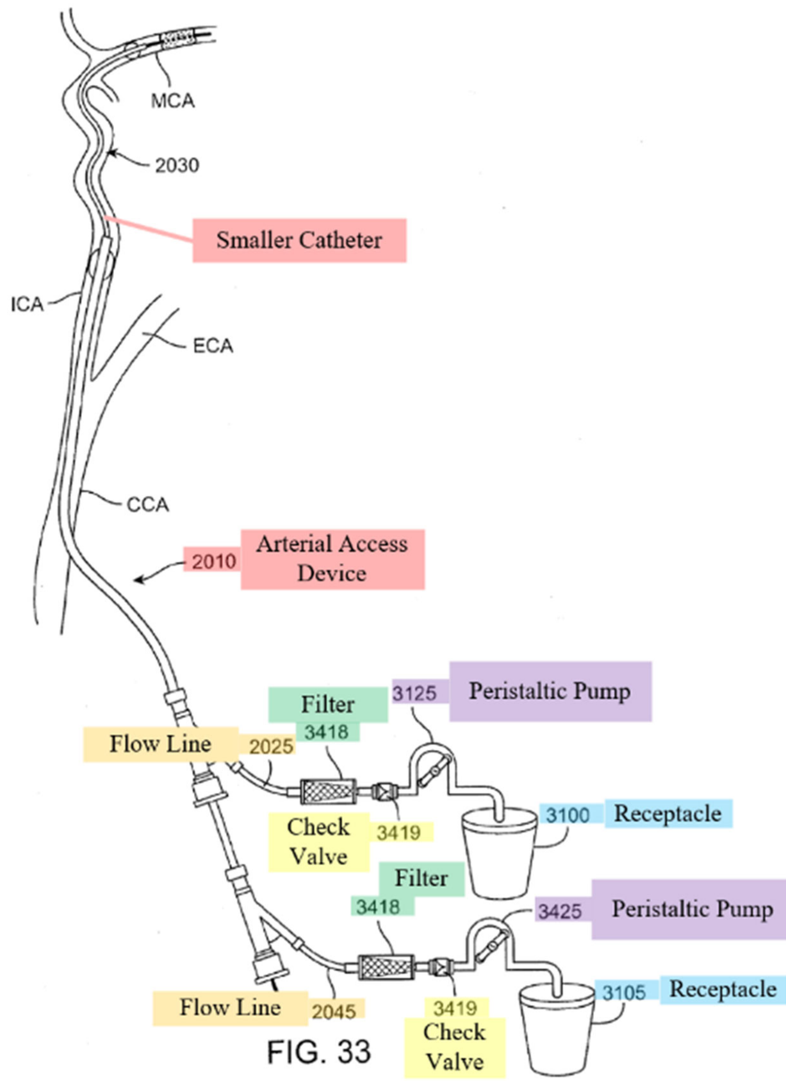


FIG. 33

EX2005, ¶54.

Figure 34 of Garrison (annotated below) shows a similar system in which "both the arterial access device 2010 and catheter 2030 are connected to the same aspiration source 3430 via flow lines 2025 and 2045, respectively." *Id.* at ¶[0132]; EX2005, ¶55. A "valve 3325 controls which device is connected to the aspiration source 3430 … [t]he valve may enable one device, the other device, both devices, or neither device to be connected to the aspiration source at any given time." *Id.*

Downstream of the aspiration source 3430 is a receptacle. EX2005, ¶55.

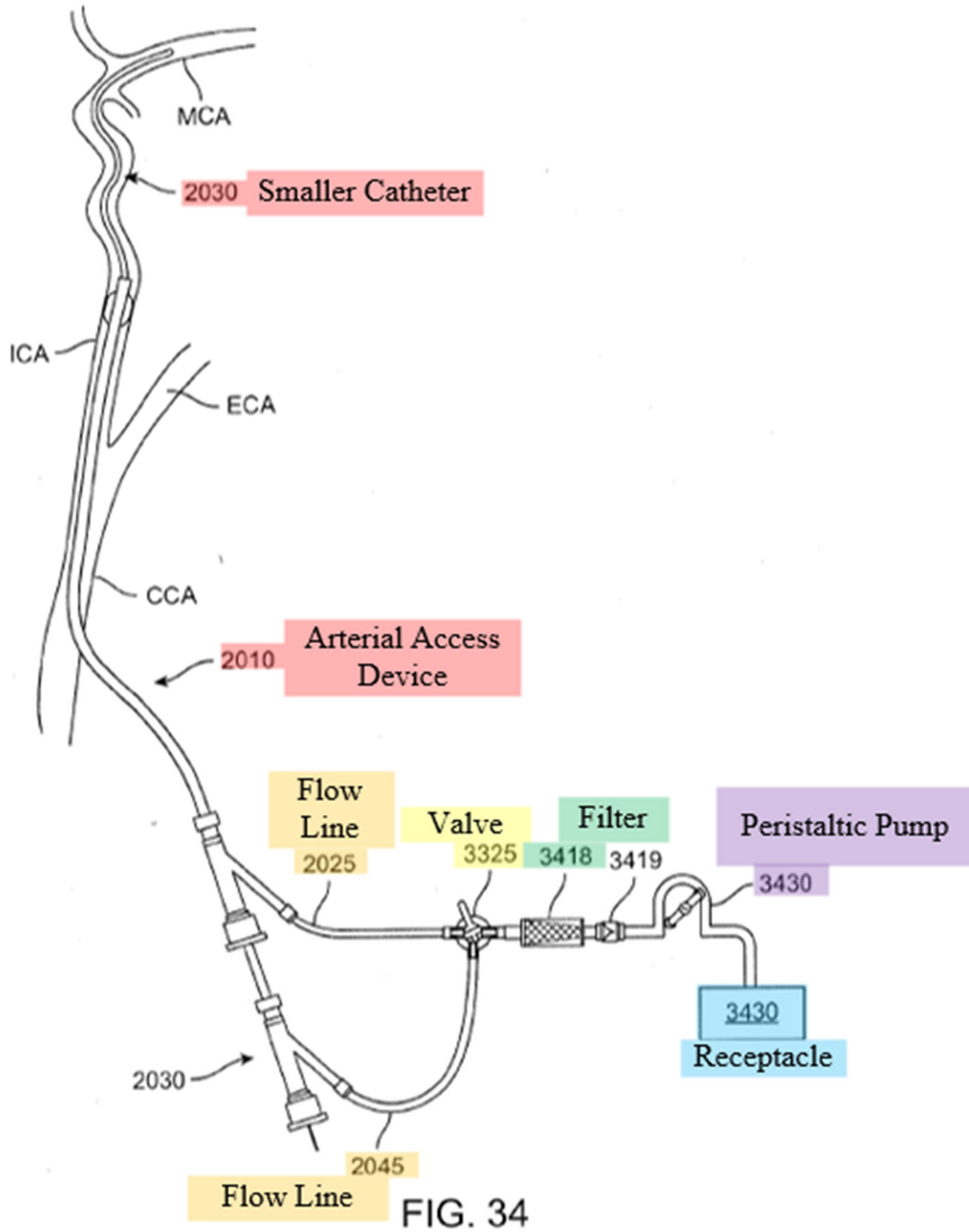


FIG. 34

Id.

The aspiration sources 3125/3425 in Figures 33 and 34 are peristaltic pumps based on their depiction including compressible tubing and a rotatable shaft connected to a rotor that carries multiple rollers for compressing the tubing:

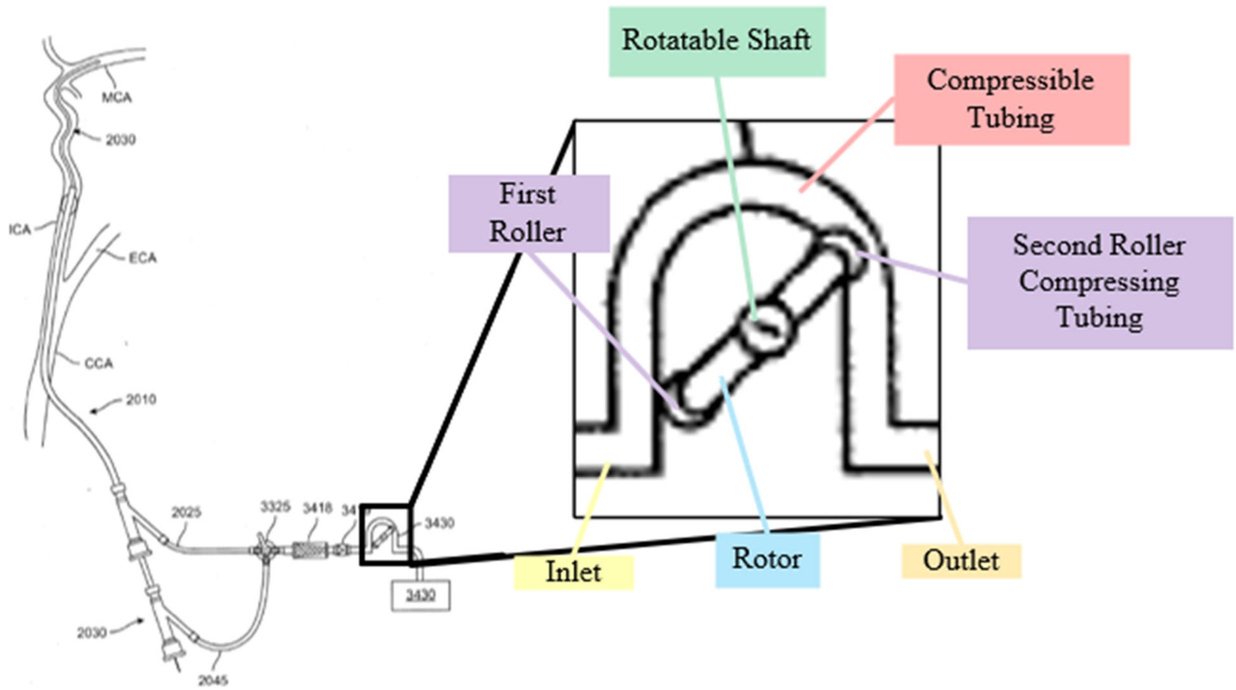


FIG. 34

EX2005, ¶56. A POSA would understand that each of the peristaltic pumps are a positive displacement pump that operates by rotating the shaft to rotate the rotor such that the rollers compress and seal the tubing during passes along the length of the tubing, alternating the compression and relaxation of the tubing, and drawing content in and propelling product away from the pump to: (1) generate negative pressure to draw fluid through one or both of the flow lines 2025/2045 through the inlet of the pump, (2) transport the fluid through the pump, and (3) expel the fluid through the outlet of the pump for delivery to the receptacle 3430. *Id.*

Garrison discloses a different embodiment ("one embodiment") of a syringe-based system in which "a locking syringe (for example a VacLok Syringe) is attached to the flow controller and the plunger is pulled back into a locked position by the user while the connection to the flow line is closed prior to the thrombectomy step of the procedure." EX1006, ¶[0134]; EX2005, ¶57. When the syringe is used in that one embodiment, the syringe is attached directly to the flow controller (e.g., valve) rather than, for example, indirectly via a check valve and filter like shown in Figure 34. EX2005, ¶57. Then, "[d]uring the procedure when the tip of the aspiration device … is near or at the face of the occlusion, the user may open the connection to the aspiration syringe … [t]his would enable the maximum level of aspiration in a rapid fashion with one user." EX1006, ¶[0134]. In that embodiment, the locking syringe is actuated with the connection to the flow line closed such that vacuum is generated in the syringe. EX2005, ¶57.

Garrison also discloses the drawbacks of the systems illustrated in Figures 33-34 and the different locking syringe embodiment disclosed (but not illustrated) in paragraph [0134], including that these embodiments are unsuitable for use with blood return:

> One disadvantage of current sources of aspiration is that the as-pirated blood is received into an external reservoir or syringe. This blood is generally discarded at the end of the procedure, and as such represents blood loss from the patient. In addition, pumps such as centrifugal or peristaltic pumps are known to cause damage to blood cells. Although it is possible to return blood from the external reservoir to the patient,

> the blood has been exposed to air or has been static for a period of time, and there is risk of thrombus formation or damage to the blood cells. Usually, aspirated blood is not returned to the patient to avoid risk of thromboembolism.

EX1006, ¶[0135]. That is, when blood is pumped to a downstream receptacle as shown in Figures 33 and 34, or directly collected in a syringe as described in paragraph [0134], Garrison teaches against blood return because the blood is not suitable for reinfusion to the patient because the blood remains static and is exposed to air such that it is damaged, for example, by clotting. EX2005, ¶58.

To address that disadvantage, Garrison discloses a separate, but incompatible, system in Figure 36 "which is configured not to harm blood cells and which may be configured to return blood to the central venous system in real time during the procedure, so there is no reservoir in which the blood remains static." *Id*. at ¶[0136]. Figure 36 illustrates a pump device 3250 connected to either or both of the flow lines of the arterial access device or smaller inner catheter:

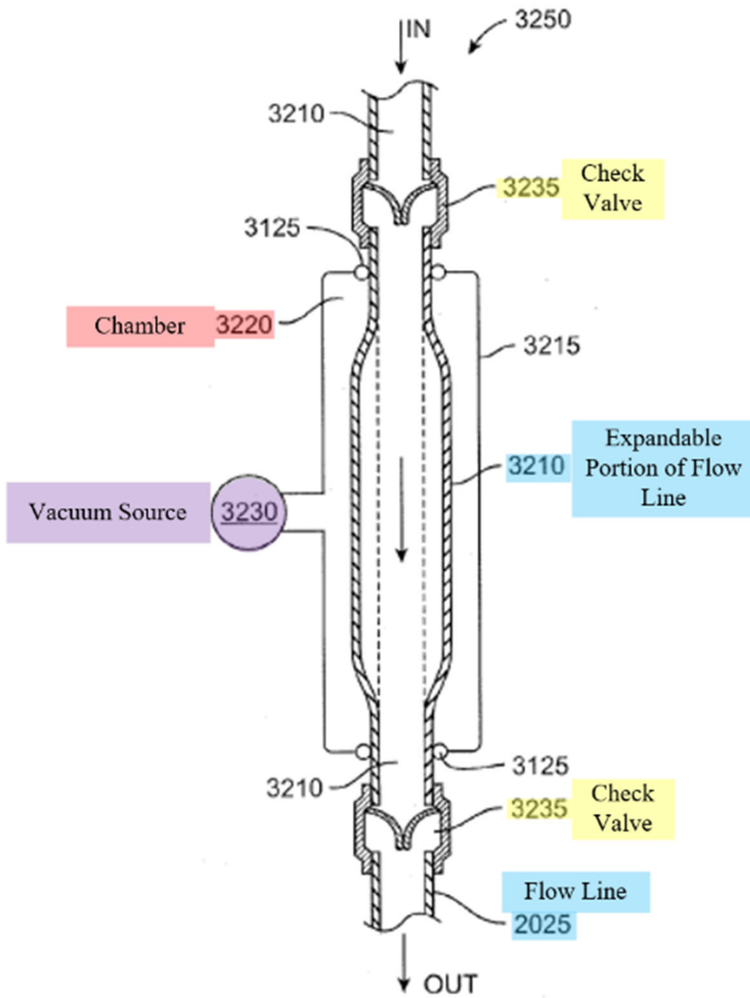


FIG. 36

EX1006, ¶[0136]; EX2005, ¶59.

The chamber 3220 is connected to a vacuum source 3230, which is configured to generate (1) negative pressure in the chamber 3220 to cause the expandable portion 3210 of the flow line 2025 to expand to draw blood into the expandable portion 3210 through the upstream one-way check valve 3235 and (2) subsequent normalized pressure in the chamber 3220 to permit the expandable portion 3210 to contract to expel blood from the expandable portion 3210 through the downstream one-way check valve 3235. EX1006, ¶¶[0136]-[0137]; EX2005, ¶60. Therefore, the pump device in Figure 36 operates to pull blood through an inlet and subsequently expel blood through an outlet. EX2005, ¶60. The pump device is "configured to return blood to the central venous system in real time during the procedure, so there is no reservoir in which the blood remains static" by operating the vacuum source so as to oscillate the expandable portion between the expanded and retracted states to, together with the one-way check valves, thereby drive fluid through the flow line. EX1006, ¶¶[0136]-[0137]; EX2005, ¶60. A POSA would understand that the pump device 3250 is designed to operate continuously (in "real time") to shuttle blood into the inlet and out of the outlet without delay and that it would not be used with the embodiments in Figures 33-34 and the distinct and also incompatible syringe embodiment. EX2005, ¶60.

B. Laub

Laub discloses a "system for removing thrombi and other unwanted material from the body of a patient, particularly from the patient's vasculature." EX1012, ¶[0005]. The embodiment of Laub relied on by Petitioner is shown in Figure 1A below and includes an aspiration catheter 200 in fluid communication with a filter 300, a pump 400, and a return catheter 500:

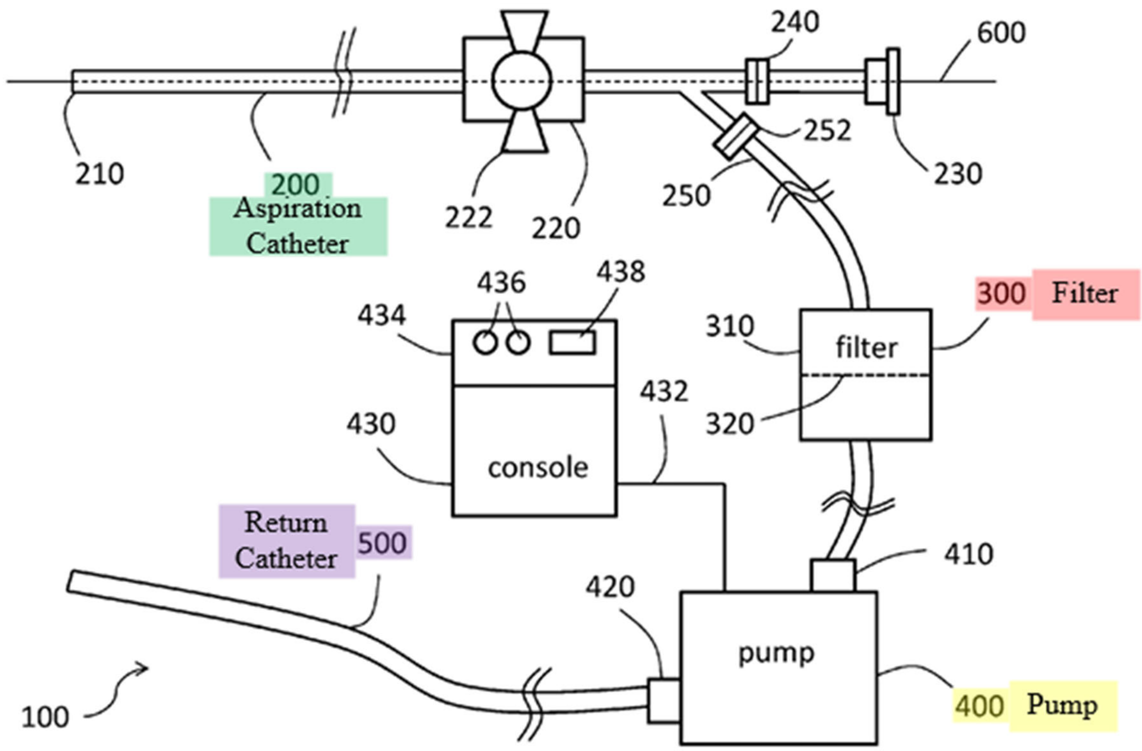


FIG. 1A

EX1012, ¶[0024]; EX2005, ¶61. The system includes no valve or fluid control device in the flow path and the pump 400 operates to continuously suction blood and thrombi through the aspiration catheter 200 and the filter 300 and then drive the filtered blood through the return catheter 500 back into the patient. *Id*. Accordingly, Laub discloses that "[i]n preferred embodiments, pump 400 is a centrifugal pump" while "[i]n other embodiments, pump 400 may be a rotary pump, peristaltic pump, roller pump, or other form of pump known in the art." EX1012, ¶[0041]; EX2005, ¶61.

Laub discloses that the aspiration catheter 200 can have a wide range of sizes, but that "[i]n certain preferred embodiments, aspiration catheter has a French size of equal to or greater than 10 Fr to allow for aspiration of large thrombi and/or other solid materials from the patient." EX1012, ¶[0028]. A POSA would understand that PE and DVT are large clots. EX2005, ¶62. Laub also discloses a wide range of flow rates including flow rates up to 6 liters per minute. EX2005, ¶¶[0043]-[0044].

Because of those large flow rates using large catheters, Laub correctly recognizes the necessity of blood reinfusion: "[w]ithout returning the blood back to the patient, such high flow rates could quickly result in exsanguination of the patient." EX1012, ¶[0045]. That is, Laub recognizes that when treating large clots like PE and DVT as claimed in the '333 Patent, the patient will bleed out and die if the blood is not returned. EX2005, ¶63. Laub addresses that critical concern "[b]y returning the aspirated blood back to the patient, embodiments of the present system 100 allows for aspiration while minimizing the blood loss of the patient." EX1012, ¶[0045]. Laub also discloses that "reinfusing the patient's blood continuously during aspiration allows for greater suction pressure and/or flow rates (e.g., 2-4 L/min) which can assist in dislodging and removing larger clots and/or tumors than would otherwise be possible." *Id*. Accordingly, a POSA would understand that Laub's system is intended to be operated to continuously aspirate (rather than build up and store vacuum pressure) and return blood at a high flow rate so that large clots, such as PE and DVT, can be removed. EX2005, ¶63. Laub's system would endanger the patient if blood were not returned. *Id.*

C. Aklog

A POSA would understand Aklog's system to be substantially the same as Laub's, as Petitioner recognizes. EX2005, ¶64; Petition, p.4 (after describing the disclosure of Laub, stating "**Aklog** … also discloses an aspiration system for removing PEs and DVTs from blood vessels" and "Aklog also discloses ways to optimize aspiration systems to treat PE and DVT, including returning the aspirated blood to the patient to reduce blood loss."). Indeed, like Laub, the embodiments of Aklog relied on in the Petition shown in Figures 1, 6, and 7 of Aklog (Figure 1 annotated below) include an aspiration catheter (cannula) 10 in fluid communication with a filter device 14, a pump 15, and a reinfusion catheter (cannula) 16:

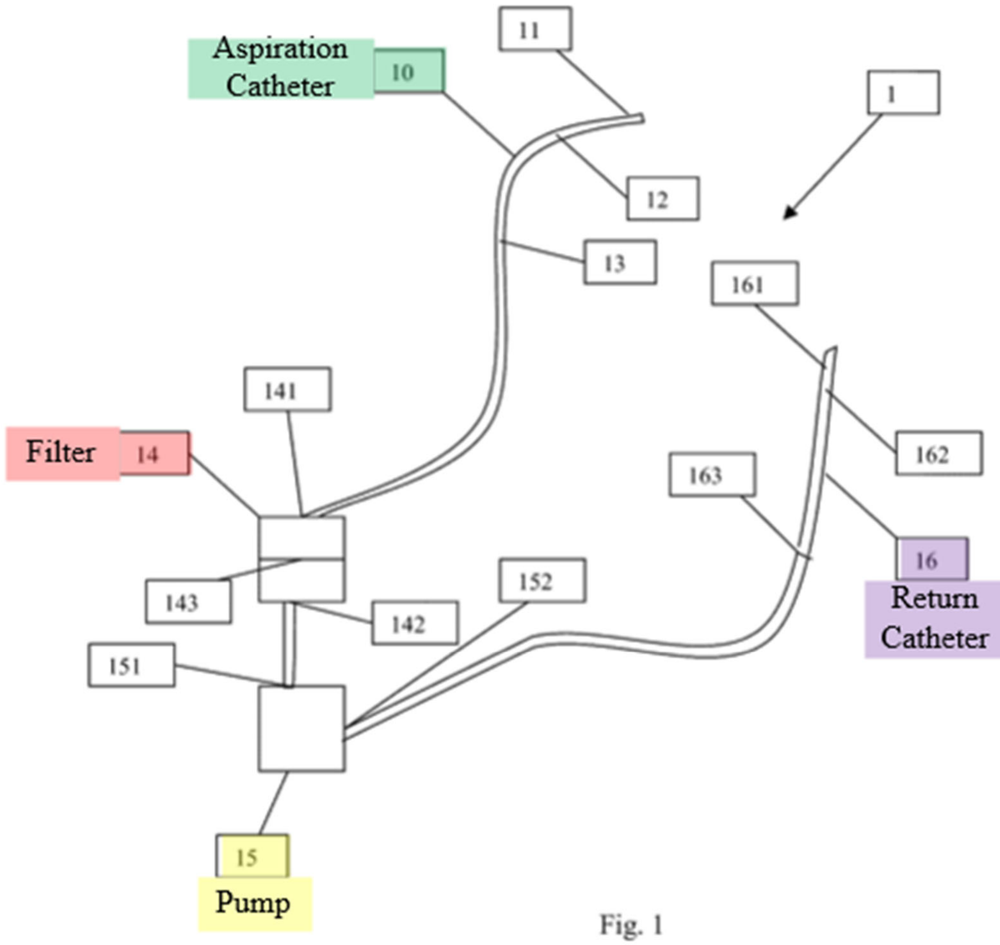


Fig. 1

EX1005, 11:24-12:34; EX2005, ¶64. Just like Laub, Aklog's system includes no valve or fluid control device in the flow path such that the pump 15 operates to suction blood and thrombi through the aspiration catheter 10 and the filter device 14 and then drive the filtered blood through the reinfusion catheter 16 into the patient. *Id*.

Aklog discloses that the aspiration catheter 10 "may be of any sufficient size, so long as it can be accommodated within a predetermined vessel, such as a medium to large size blood vessel." EX1005, 11:12-15. For example, "the suction cannula 10 may be designed to remove at least 10 cm^3 of undesirable material substantially en bloc." *Id*. at 11:18-20. A POSA would understand that a clot of 10 cm^3 is much larger than neurovascular clots and likely the size of a PE or DVT. EX2005, ¶65. And, "[b]ecause the normal rate of blood flow through the heart and large blood vessels can be significant, suction cannula 11 and reinfusion cannula 16, when used around the heart and other large vessels, may displace a relatively large volume of fluid into and out of the patient's circulatory system." EX1005, 19:57-62.

Given the large clots positioned in large vessels that Aklog is designed to treat, Aklog correctly recognizes that "[i]f the catheter is enlarged to accommodate the larger structure and material, such a catheter may aspirate an unacceptable volume of blood, resulting in excessive fluid loss and/or shock in the patient." EX1005, 7:23-26; EX2005, ¶66. That is, the patient will be harmed due to excessive blood loss if the blood removed from the patient is not returned to the patient. EX2005, ¶66. To address this, Aklog's system "simultaneously reinfuse[s] aspirated (i.e., removed) and filtered fluid, such as blood, back into the patient on a substantially continuous basis to minimize any occurrences of fluid loss and/or shock." EX1005, 5:19-23; EX2005, ¶66. Aklog further teaches that the "suction and reinfusion of blood can occur, in an embodiment, continuously for a desired duration to minimize fluid loss in the patient." EX1005, 6:9-11. Accordingly, like Laub, a POSA would understand that Aklog's system is intended to be operated to continuously aspirate (rather than build up vacuum pressure and apply that vacuum pressure) and then return blood so that large clots, such as PE or DVT, can be removed. EX2005, ¶66. Aklog's system would endanger the patient if blood were not returned, and a POSA would understand the necessity of blood return based on Aklog's disclosure. *Id*.

IV. CLAIMS 1-10, 13-29, AND 32-38 ARE NOT RENDERED OBVIOUS BY ANY OF THE COMBINATIONS OF LAUB OR AKLOG AND GARRISON (GROUNDS 1A, 2A, 3A, 4A)

Petitioner asserts four different grounds for the two independent Claims 1 and 20 of the '333 Patent based on Laub or Aklog in combination with Garrison and, specifically, that Claims 1 and 20 (and dependent Claims 2-9, 13-19, 21-29, and 32-38) are rendered obvious by: (1A) Laub in combination with Garrison, (2A) Aklog in combination with Garrison, (3A) Garrison in combination with Laub, and (4A) Garrison in combination with Aklog. Petition, p.16. Here, Petitioner fails to demonstrate a reasonable likelihood that Claims 1-10, 13-29, and 32-38 are obvious over any of those combinations of Laub or Aklog in combination with Garrison or the reverse combinations.

A claim is not obvious if a limitation of the claim is missing in the cited art. *See Aug. Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1290 (Fed. Cir. 2011) (finding that asserted claims are not rendered obvious in view of the cited prior art because they do not supply the missing element for purposes of obviousness analysis). Here, each of grounds 1A, 2A, 3A, and 4A fail because none of Petitioner's references disclose a method that includes steps of building up vacuum pressure, much less in a clot canister, and then applying that stored vacuum pressure using a valve to aspirate a PE or DVT as recited in Independent Claims 1 and 20. EX1001, cls.1, 20 ("generating vacuum pressure within the clot canister via the aspiration source while a valve positioned along the fluid path between the aspiration catheter and the clot canister is in a first position that inhibits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister" and "moving the valve from the first position to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter … wherein the clot canister includes a filter configured to filter the blood from the portion" of the "pulmonary embolism" (Claim 1) or "deep vein thrombosis" (Claim 20)).

Petitioner relies on Garrison alone for disclosing the foregoing features of the Claims. Petition, pp.36-41. But Garrison does not disclose those features. The valve 3325 in Figure 34 of Garrison is not used to build up vacuum pressure as Petitioner alleges, but instead used to control the connection of two different catheters to the same pressure source. EX1006, ¶[0132]. Because of that deficiency, Petitioner attempts to bring in a different embodiment of Garrison described in paragraph [0134] to allegedly show the claimed build up and release of vacuum pressure. Petition, pp.36-38. But that disclosure relates to generating vacuum pressure with a syringe rather than with the peristaltic pump as in Garrison's Figure 34, and in that embodiment the syringe is "attached" to a flow controller rather than to a filter and a check valve like the peristaltic pump in Figure 34. Accordingly, Garrison does not disclose generating vacuum pressure in a clot canister having a filter while a valve is closed using a peristaltic pump as shown in Figure 34 of Garrison and relied on by Petitioner.

Moreover, to demonstrate obviousness, Petitioner must provide a reason why a POSA would have been motivated to modify/combine the prior art to achieve the claimed invention. *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 (Fed. Cir. 2008); see also *Axonics, Inc. v. Medtronic, Inc.*, 73 F.4th 950, 957 (Fed. Cir. 2023) ("When an obviousness challenge asserts a combination of identified prior art, the motivation-to-combine portion of the inquiry is 'whether a 'skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention.'"). There is no motivation to modify a reference or combine prior art references where the modification/combination would alter the principle of operation or render the prior art inoperable for its intended purpose. *See Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1358-59 (Fed. Cir. 2020) (affirming lack of motivation to combine references where the proposed modification would "require the alteration of the principle of operation of [the primary reference] or would render [the primary reference] inoperable for its intended purpose."); *Plas-Pak Indus. V. Sulzer MixPak*

AG, 600 Fed.App'x. 755, 758 (Fed. Cir. 2015) (rejecting obviousness findings where the necessary alterations to a first reference would fundamentally change its "principle of operation").

Grounds 1A, 2A, 3A, and 4A also fail because a POSA would not have been motivated to make any of Petitioner's combinations for several reasons. In particular, regarding grounds 1A and 2A, a POSA would not have been motivated to include Garrison's valve in Laub or Aklog and use that valve in a method to build up pressure in a clot canister to treat PE/DVT.

First, that modification would not "enable the maximum level of aspiration," Petitioner's purported motivation to combine. Petition, pp.38-41. Instead, a POSA would understand the "maximum level of aspiration" using a pump as in Figure 34 of Garrison, Laub, and Aklog to be controlled by the operational speed of the pump unlike a syringe. EX2005, ¶¶81-86. And, Laub discloses that discloses that to achieve the "maximum level of aspiration" the system is operated continuously—which is the opposite of Petitioner's proposed combinations adding a valve that is closed to build up vacuum before subsequently being opened. *Id*.; EX1012, ¶[0045].

Second, that modification would be incompatible with Laub's and Aklog's systems that continuously aspirate and reinfuse blood so that large clots, such as PE and DVT, can be removed without endangering the patient with excessive blood loss. EX1012, ¶[0045]; EX1005, 5:19-23; EX2005, ¶88-90. Incorporating

Garrison's valve and then operating those systems to close the valve to build up vacuum pressure and open the valve to apply that vacuum pressure would prevent the continuous/simultaneous aspiration and reinfusion disclosed by Laub or Aklog when the valve is closed.

Third, Garrison discloses that the embodiments relied on by Petitioner are unsuitable for blood return, and Laub and Aklog emphasize the criticality of blood return when treating large clots in large vessels, like PE and DVT, using large catheters. EX1012, ¶[0045]; EX1005, 5:19-23; EX2005, ¶¶91-94. A POSA therefore would not have made combined Laub or Aklog with Garrison in a manner that would make them incompatible with blood return.

Fourth, in Petitioner's combination Garrison's valve 3325 (a 3-way or 4-way stopcock) would provide dangerous flow paths for sucking air into the Laub's and Aklog's systems through the unconnected port of valve that could be reinfused into the patient to cause an air embolism. EX2005, ¶¶95-99.

Fifth, Petitioner's modification to include Garrison's valve in Laub or Aklog, would needlessly complicate the systems of Laub and Aklog in which the surgeon controls the procedure simply by controlling the pump. *Id*. at ¶¶100-101. Petitioner's combination would require the surgeon to manually actuate the valve in addition to controlling the pump to control aspiration.

And, regarding grounds 3A and 4A, a POSA would not have used Petitioner's modified system or any of the embodiments of Garrison relied on by Petitioner to treat large clots like PE or DVT—even if the catheter were "upsized"—because Petitioner's references recognize the criticality of blood reintroduction to patient health and safety when treating such large clots, and Garrison expressly discloses that the embodiments relied on by Petitioner are not suitable for blood reintroduction. EX1006, ¶[0135]; EX2005, ¶¶108-121. A POSA would not have made those modifications to Garrison just like the Patent Office expressly found. EX1002, pp.46-47; *supra* §II.C.

Accordingly, for those reasons and the reasons set forth below, independent Claims 1 and 20 are not rendered obvious by any combination of Laub or Aklog and Garrison or Garrison and Laub or Aklog. Dependent Claims 2-10 and 13-19 depend from independent Claim 1, and dependent Claims 21-29 and 32-38 depend from independent Claim 20. Therefore, these claims are also not rendered obvious by any combination of Laub or Aklog and Garrison or Garrison and Laub or Aklog because they incorporate all the features of their respective independent Claims 1 or 20.

A. Grounds 1A, 2A, 3A, & 4A: Neither Garrison, Laub, nor Aklog Disclose the Methods of Claims 1 or 20 Including the Buildup/Storage and Release of Vacuum Pressure in a Clot Canister Having a Filter

Independent Claims 1 and 20 of the '333 Patent recite methods including "generating vacuum pressure within the clot canister via the aspiration source while a valve positioned along the fluid path between the aspiration catheter and the clot canister is in a first position that inhibits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister" and "moving the valve from the first position to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter … wherein the clot canister includes a filter configured to filter the blood from the portion" of the "pulmonary embolism" (Claim 1) or "deep vein thrombosis" (Claim 20).

Petitioner does not allege that Laub or Aklog disclose such methods of building up vacuum pressure in a clot canister having a filter and then applying that vacuum pressure to aspirate using a valve. Instead, Petitioner relies on Garrison for allegedly disclosing those features for each of grounds 1A, 2A, 3A, and 4A. Petition, pp.36-42, 63.

But, Garrison does not disclose a method of operating the system of Figure 34 relied on by Petitioner to build up and subsequently release vacuum pressure in a clot canister having a filter as recited in the Claims of the '333. Petition, p.37. Instead, in Figure 34, "both the arterial access device 2010 and the catheter 2030 are connected to the same aspiration source 3430" and the "valve 3325 controls which device is connected to the aspiration source 3430 [t]he valve may enable one device, the other device, both devices, or neither device to be connected to the aspiration source at any given time." EX1006, ¶[0132]. That is, because the arterial access device 2010 and the catheter 2030 are connected to the same pressure source 3430 (a peristaltic pump), the valve 3325 ("a 3-way or 4-way stopcock" or "flow controller") is used to control the connection of those catheters to the peristaltic pump 3430. *Id*.; EX2005, ¶78.

Because of that deficiency in Figure 34, Petitioner relies on a different embodiment of Garrison described in paragraph [0134] as allegedly disclosing the buildup and release of pressure:

> In one embodiment, a locking syringe (for example a VacLok Syringe) is attached to the flow controller and the plunger is pulled back into a locked position by the user while the connection to the flow line is closed prior to the thrombectomy step of the procedure. During the procedure when the tip of the aspiration device (either the arterial access device or the catheter) is near or at the face of the occlusion, the user may open the connection to the aspiration syringe. This would enable the maximum level of aspiration in a rapid fashion with one user.

EX1006, ¶[0134]; Petition, pp.36-38. But that disclosure in paragraph [0134] is about generating vacuum pressure with a ***syringe*** rather than with the peristaltic pump in Figure 34. Garrison also discloses that the syringe is "attached" directly to the flow controller rather than to a valve indirectly via a filter 3418 and a check valve 3419 like the peristaltic pump in Figure 34. EX2005, ¶¶79, 107.

Petitioner conflates the embodiments in Figure 34 and paragraph [0134] of

Garrison, stating that "[b]ecause the valve (e.g., stopcock 3325) is distal to the filter, the vacuum pressure builds up in the filter canister via the pressure source" in Figure 34. Petition, p.38. But Garrison does not disclose building up pressure in the filter 3419 in Figure 34 using the peristaltic pump shown there. EX2005, ¶¶80, 107. In the arrangement with the syringe Garrison's discloses in paragraph [0134] in which pressure is built up therein, the syringe is "attached" to the flow controller not a filter 3418 and a check valve 3419 like shown in Figure 34. *Id*.

In sum, Garrison discloses that the valve 3325 in Figure 34 is simply used to switch between different catheter connections and not to build up vacuum pressure in any clot canister. *Id*. at ¶81. So, that embodiment does not disclose the methods of Claims 1 and 20 including "generating vacuum pressure within the clot canister … while a valve positioned along the fluid path between the aspiration catheter and the clot canister is in a first position" and "moving the valve from the first position to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter." *Id*. And the embodiment in paragraph [0134] is a completely different arrangement than that in Figure 34—including a syringe instead of a peristaltic pump and that does not include any clot canister in the flow path because the syringe is attached directly to a flow controller, such that vacuum cannot be generated in any clot canister as recited in Claims 1 and 20. *Id*.

Because Garrison does not disclose those features of Claims 1 and 20 relied on by Petitioner for each of grounds 1A, 2A, 3A, and 4A, those grounds fail.

B. Grounds 1A & 2A: A POSA Would Not Have Been Motivated to Include Garrison's Valve in Laub or Aklog and Operate Those Modified Systems to Build Up Pressure in a Clot Canister to Treat PE/DVT

1. Petitioner's modifications would not "enable the maximum level of aspiration."

Petitioner's assertions that a "POSITA would have been motivated to incorporate Garrison's valve 3325 (e.g., multi-way stopcock) and method of generating pressure while the valve is closed into Laub's or Aklog's aspiration systems" to "enable the maximum level of aspiration in a rapid fashion with one user" and to "improve Laub's or Aklog's temporary aspiration power to aspirate PE's more quickly, making Laub's and Aklog's systems safer and more effective" ignores the fundamental difference between a syringe and a peristaltic pump. Petition, pp.38-41; EX1006, ¶[0134].

As set forth in §IV.A. above, Garrison's only disclosure of building up pressure with a valve closed is the "one embodiment" in paragraph [0134] including a syringe. There, Garrison discloses that withdrawing the syringe plunger with the flow controller closed "would enable the maximum level of aspiration." EX1006, ¶[0134]. A POSA would understand that a syringe includes a barrel in which vacuum pressure is generated when a plunger is withdrawn. EX1006, ¶[0134]; EX2005, ¶83. That barrel has a fixed volume to generate the vacuum pressure for aspiration, and that volume sets and thus limits the "maximum level of aspiration." EX2005, ¶83. Therefore, when the syringe plunger is withdrawn with the flow controller closed as described in paragraph [0134] of Garrison, the maximum level of vacuum in the syringe is achieved because the full barrel is evacuated. *Id*.

In contrast, the peristaltic pump in Figure 34 of Garrison does not have a fixed volume that limits the "maximum level of aspiration" but instead includes a rotor rotated by a shaft such that rollers compress and seal tubing, and rotate to push material along, alternating the compression and relaxation of the tubing to draw material into the pump through an inlet and propel that material away from the pump through an outlet:

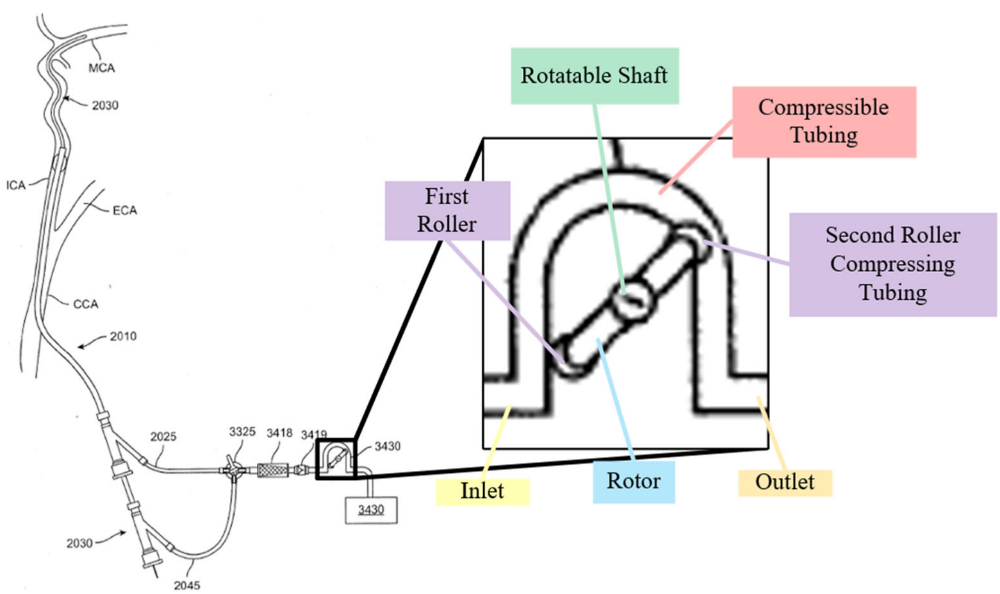


FIG. 34

EX2005, ¶84. Accordingly, a POSA would understand that there is no fixed volume of the peristaltic pump that can be evacuated like the fixed barrel volume of a syringe to store vacuum pressure if a valve were closed to generate a "maximum level of aspiration." *Id*. The "maximum level of aspiration" is dictated by the speed of the pump—i.e., how quickly the rotor rotates to drive material through the pump—and there is not a fixed volume in the peristaltic pump like a syringe that would be evacuated to generate vacuum if a valve were included and closed. *Id*.

Like Figure 34 of Garrison, Laub and Aklog both utilize a positive displacement pump (rather than syringe) that pulls fluid through an inlet and discharges it through an outlet to generate vacuum. *Id*. at ¶85, *supra* §§III.B-D. For example, Laub discloses that "[i]n preferred embodiments, pump 400 is a centrifugal pump" while "[i]n other embodiments, pump 400 may be a rotary pump, peristaltic pump, roller pump, or other form of pump known in the art." EX1012, ¶[0041]. Likewise, the pump 15 of Aklog "may be any commercially available pump, including those for medical applications and those capable of pumping fluids, such as blood. Examples of such a pump includes a kinetic pump, such as a centrifugal pump, and an active displacement pump, such as a rollerhead pump." EX1005, 12:9-14.

Laub confirms that when using pumps rather than syringes, the pump is controlled to generate different negative pressures and flow rates. EX1012, ¶¶[0042]-[0044]; EX2005, ¶86. In fact, Laub discloses that in the context of treating large clots (which PE and DVT are), "**reinfusing the patient's blood continuously**

during aspiration allows for greater suction pressure and/or flow rates (e.g., 2-4 L/min) which can assist in dislodging and removing larger clots and/or tumors than would otherwise be possible." EX1012, ¶[0045] (emphasis added). That is, Laub discloses that to achieve the "maximum level of aspiration" the system is operated "continuously"—which is the opposite of Petitioner's proposed combinations of Laub or Akog and Garrison that add a valve that is closed to build up vacuum before subsequently being opened, necessarily stopping the continuous aspiration/reinfusion. EX2005, ¶86.

For those reasons, a POSA would not have added Garrison's valve 3325 into Laub or Aklog as Petitioner proposes to "enable the maximum level of aspiration" using their pump. *Id*. at 87. Instead, a POSA would have simply increased the operational speed of the pumps or operated the system continuously (like Laub discloses) and not with valves closing and opening to increase or maximize the level of aspiration, if desired. *Id*. That is, Laub discloses that a valve would not maximize the level of aspiration in those systems.

2. Petitioner's modifications would be incompatible with continuous aspiration and reinfusion of Laub and Aklog.

Because neither Laub or Aklog disclose a "valve" that controls flow as recited in the Claims, their systems operate to continuously aspirate blood and clot material from a patient through an aspiration catheter and then reinfuse that blood into the patient. EX2005, ¶88; *supra* §§III.B-C. That is, aspiration and reinfusion occur simultaneously in both Aklog and Laub. EX2005, ¶88. Both Laub and Aklog disclose the importance of that continuous aspiration and reinfusion to patient health and safety and clot aspiration efficiency. For example, Laub discloses:

> By returning the aspirated blood back to the patient, embodiments of the present system 100 allows for aspiration while minimizing the blood loss of the patient. In certain embodiments, reinfusing the patient's blood continuously during aspiration allows for greater suction pressure and/or flow rates (e.g., 2-4 L/min) which can assist in dislodging and removing larger clots and/or tumors than would otherwise be possible. Without returning the blood back to the patient, such high flow rates could quickly result in exsanguination of the patient.

EX1012, ¶[0045]. Based on that disclosure, a POSA would understand that Laub's system operates by continuously aspirating clot and blood and returning that blood without the clots to the patient at a high flow rate so that large clots, which PE and DVT are, can be removed without subjecting the patient to dangerous excessive blood loss (exsanguination). EX2005, ¶88.

Like Laub, Aklog recognizes that when aspirating large clots, which PE and DVT are, that aspiration may subject the patient to dangerous blood loss: "[i]f the catheter is enlarged to accommodate the larger structure and material, such a catheter may aspirate an unacceptable volume of blood, resulting in excessive fluid loss and/or shock in the patient." EX1005, 7:23-26; EX2005, ¶89. To address that blood loss, Aklog "**simultaneously** reinfuse[s] aspirated (i.e., removed) and filtered fluid, such as blood, back into the patient on a substantially **continuous** basis to minimize any occurrences of fluid loss and/or shock." EX1005, 5:19-23 (emphasis added), 6:9-11 ("suction and reinfusion of blood can occur, in an embodiment, continuously for a desired duration to minimize fluid loss in the patient"). Based on that disclosure, a POSA would understand that, like Laub, Aklog's system operates to continuously/simultaneously aspirate and return blood so that large clots, which PE and DVT are, can be removed without endangering the patient without subjecting the patient to dangerous excessive blood loss. EX2005, ¶89.

Adding Garrison's valve 3325 in Figure 34 to Laub or Aklog, and then further operating those modified systems to close the valve to build up vacuum pressure and open the valve to release that vacuum pressure as Petitioner asserts, would prevent the continuous/simultaneous reinfusion that Laub and Aklog disclose to be (i) more effective for treating large clots and (ii) critical to patient safety. *Id*. at ¶90. Specifically, when the valve is closed, the pump in either modified system could operate to reinfuse but not aspirate—rendering these operations discontinuous. *Id*. Additionally, when the valve is closed, aspirated blood may remain in the system distal to the valve where it could not be reinfused until the valve is subsequently opened. *Id*. Accordingly, a POSA would not have modified Laub's or Aklog's system and further operated them to perform a method that made those systems more dangerous to the patient by rendering aspiration and reinfusion discontinuous. *Id*.

3. The embodiments of Garrison relied on by petitioner are unsuitable for blood return, as disclosed by both Laub and Aklog.

As set forth in §§III.B-C and § IV.C. above, both Laub and Aklog emphasize the critical nature of blood return to patient health and safety when treating large clots, which PE and DVT are. For example, omitting substantially continuous blood return "could quickly result in exsanguination of the patient" (EX1012, ¶[0045]) and/or lead to "occurrences of fluid loss and/or shock" (EX1005, 5:19-23).

But, Garrison itself discloses that the very embodiments relied on by Petitioner in Figure 34 and paragraph [0134] (the syringe embodiment) are not suitable for returning blood:

> One disadvantage of current sources of aspiration is that the as-pirated blood is received into an external reservoir or syringe. This blood is generally discarded at the end of the procedure, and as such represents blood loss from the patient. In addition, pumps such as centrifugal or peristaltic pumps are known to cause damage to blood cells.

EX1006, ¶[0135]. In Figure 34 of Garrison relied on by Petitioner for disclosing a "fluid control device," blood is pumped to the receptacle 3430 (an "external reservoir") where it remains "static" and is "exposed to air" such that it is not suitable for blood return. Petition, pp.36-41; EX2005, ¶92. In the locking syringe embodiment disclosed in paragraph [0134] of Garrison and relied on by Petitioner for disclosing the buildup and subsequent release of vacuum pressure, blood is aspirated into the syringe where it remains "static" and is "exposed to air" such that it is not suitable for blood return. *Id*.

Accordingly, a POSA would not have modified Laub or Aklog based on those embodiments of Garrison because a POSA would have understood them to be unsuitable for and incompatible with blood return which is critical to both the system of Laub and the system of Aklog. EX2005, ¶93. For example, adding the valve 3325 shown in Figure 34 of Garrison into Laub as Petitioner proposes would cause blood to remain static in Laub's system when the valve is closed:

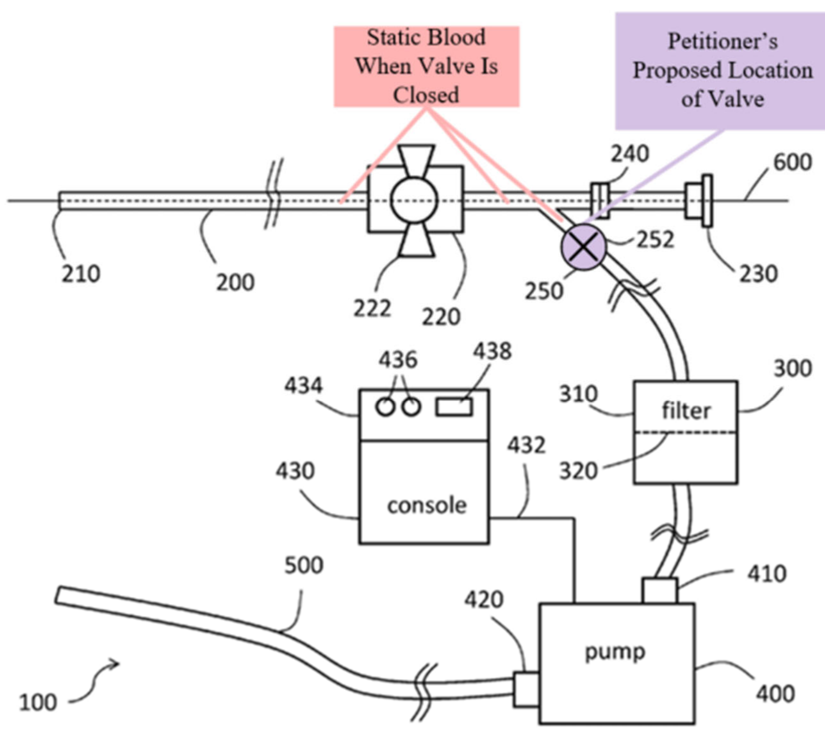


FIG. 1A

Id.; Petition, pp.38-40. Likewise, adding the valve 3325 shown in Figure 34 of Garrison into Aklog as Petitioner proposes would cause blood to remain static in Aklog's system when the valve is closed:

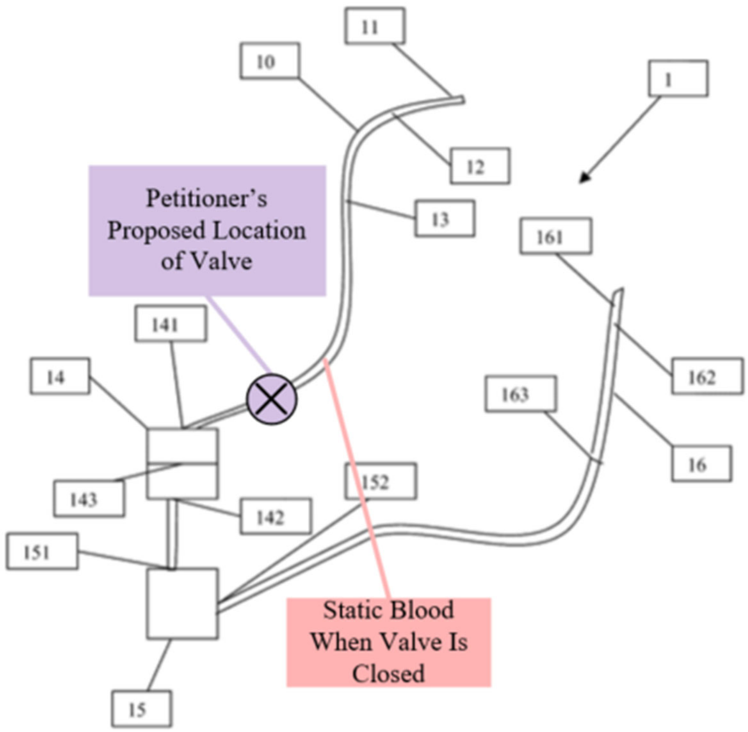


Fig. 1

EX2005, ¶93; Petition, p.41.

A POSA would understand the risk, as Garrison discloses that when "the blood … has been static for a period of time, and there is risk of thrombus formation or damage to the blood cells" such that the blood is "[u]sually … not returned to the patient to avoid risk of thromboembolism." EX1006, ¶[0135]; EX2005, ¶94. Because Laub and Aklog both disclose the criticality of blood return to patient health and safety when treating PE, a POSA would not have included the valve 3325 of

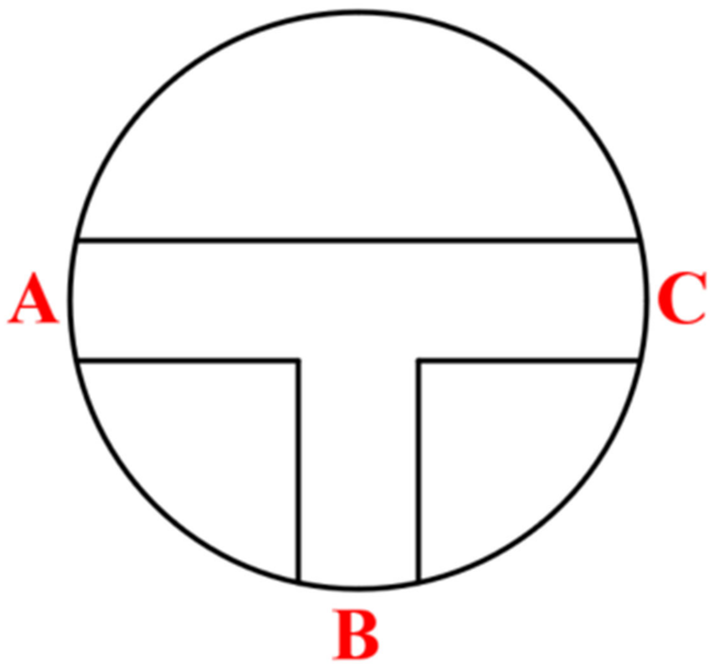
Garrison in those systems to "avoid the risk of thromboembolism" from static blood that may make the blood unsuitable for return to the patient. EX2005, ¶94.

4. Petitioner's modifications would introduce dangerous flow paths for air to be reinfused into the patient in Laub and Aklog.

Petitioner asserts that a "POSITA would have been motivated to incorporate **Garrison's valve 3325**" into "Laub's device at the connector [252] to help control the fluid flow" and "into Aklog's flow path between the catheter and filter/clot canister." Petition, pp.38-41 (emphasis added). But, a POSA (even if they were somehow motivated to include any valve) would not have included Garrison's valve 3325, which Garrison discloses as a "3-way or 4-way stopcock" or a "flow controller." EX1006, ¶[0132]; EX2005, ¶95. Garrison's valve 3325 is a 3-way or 4-way stopcock to "enable one device, the other device, both devices, or neither device to be connected to the aspiration source at any given time." EX1006, ¶[0132]. Like the 3-way or 4-way stopcock, Garrison's flow controller has a "simple actuation which selects the configuration as described above," that is, one of the four functional connections of the 3-way or 4-way stopcock. *Id.*; EX2005, ¶95.

A POSA would understand based on that disclosure that Garrison's valve 3325 is attached to ***three*** separate tubing sections (i.e., the flow line 2025 to the arterial access device 2010, the flow line 2045 to the catheter 2030, and tubing to the filter 3418) and thus includes at least ***three*** different ports to connect to those tubing sections. *Id*. at ¶96. But, in Petitioner's combinations each valve is attached only to two tubes—that is the two tubing sections on either side of the connector 252 in Laub and two different tubing sections of the aspiration catheter 10 in Aklog. *Id*.; Petition, pp.40-41.

More specifically, Patent Owner's expert prepared the schematic below illustrating the different ports of the valve 3325 in Figure 34 based on its described functionality:



EX2005, ¶97. Port A connects to the flow line 2025 to the arterial access device 2010, port B connects to the flow line 2045 to the catheter 2030, and port C connects to the tubing to the filter 3418 and the aspiration source 3430. When the valve "enable[s] one device … to be connected to the aspiration source" it connects only port A to port C to fluidly connect the aspiration source 3430 to the arterial access device 2010. EX1006, ¶[0132]; EX2005, ¶97. When the valve "enable[s] … the other device … to be connected to the aspiration source" it connects only port B to port C to fluidly connect the aspiration source 3430 to the catheter 2030. *Id.* When the valve "enable[s] … both devices … to be connected to the aspiration source" it connects both ports A and B to port C to fluidly connect the aspiration source 3430 to the arterial access device 2010 and the catheter 2030. *Id*. When the valve "enable[s] … neither device … to be connected to the aspiration source" it connects neither port A nor port B to port C. *Id*. In Petitioner's proposed arrangement in which the valve 3325 is connected to only two tubes rather than three, one of port A or port B would not be connected to anything and thus open to the surrounding environment. EX2005, ¶97.

A POSA would not have included such a valve with a non-connected port in the system of either Laub or Aklog first because it would complicate those systems and second because it would potentially endanger the patient. Specifically, if the valve 3325 were actuated to connect the non-connected port to the aspiration source in Petitioner's modification to Laub, the system would continuously suck air through that port and the pump 400 and drive that air through the return catheter 500 into the patient. *Id*. at ¶ 98. Likewise, if the valve were actuated to connect the non-connected port to the aspiration source in Petitioner's modification to Aklog, the system would continuously suck air through that port and the pump 15 and drive that air through the reinfusion catheter 16 into the patient. *Id*. This would occur in two states of the valve: when both ports A and B are connected to the aspiration source via port C, and when the unconnected one of ports A and B is individually connected to the aspiration source via port C. *Id*.

But a POSA would have understood the grave danger of potentially reinfusing air into the patient and therefore would not have added Garrison's valve 3325 to either Laub or Aklog as Petitioner proposes. *Id*. at ¶99. Namely, if Garrison's valve were actuated to connect Laub's pump 400 or Aklog's pump 15 to the unconnected port of Garrison's multiway valve 3325 to suck air into the system, that air would be reinfused into the patient in real-time leading to a dangerous and potentially deadly air embolism. *Id*.

5. Petitioner's modifications would needlessly complicate Laub's and Aklog's systems.

A POSA would understand that in both of Laub's and Aklog's systems, the surgeon controls the system only and simply by interacting with the pump to control aspiration. EX2005, ¶100. For example, in Laub, a "console 430 may be operated by the user (e.g., surgeon) to adjust the speed, pressure, or other attributes of pump 400 during use." EX1012, ¶[0041]. Similarly in Aklog, the pump 15 is controlled to "generate negative pressure, so as to create a necessary suction force through cannula 10 to pull any undesirable material from the site of interest" and "generate the positive pressure, so as to create a necessary driving force to direct fluid through exit port 152 and downstream of system 1 for reinfusion of fluid removed from the site of interest back into the body." EX1005, 11:62-12:14.

In Petitioner's purported combinations of Laub or Aklog with Garrison, Garrison's valve 3325 is "user-actuated" such that the valve must be manually operated by the surgeon to close and open the valve to build up vacuum pressure and then apply that vacuum pressure. Petition, p.37 ("User-actuated valve"), p.41 ("User-Actuated Valve"). Accordingly, in Petitioner's combinations, the surgeon must not only control the pump as disclosed in Laub and Aklog but ***also manually control*** the closing and opening of the added valve from Garrison to effectuate aspiration. EX2005, ¶101. A POSA would not have included the valve 3325 in Laub or Aklog because it would complicate the aspiration methods of Laub and Aklog by requiring that additional manual surgeon interaction when those references disclose that controlling the pump is all that is needed to effectuate aspiration and reinfusion. *Id*.

B. Grounds 3A & 4A: A POSA Would Not Have Modified Garrison's System to Treat PE or DVT Because Petitioner's References Teach that Such a System Would Endanger the Patient

Claim 1 requires a "method of treating a ***pulmonary embolism*** within a vasculature of a patient" including "advancing an aspiration catheter at least partially through the vasculature of the patient such that a distal end portion of the aspiration catheter is positioned proximate to the ***pulmonary embolism***" and "moving the valve from the first position to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter such that at least a portion of the ***pulmonary embolism*** and blood are aspirated into the clot canister." Claim 20 recites those same steps for treating "***deep vein thrombosis***."

Petitioner does not contend that Garrison discloses methods for treating PE or DVT, correctly stating that "Garrison focuses on the 'treatment of cerebral occlusions.'" Petition, p.21. Indeed, Garrison discloses "methods and systems for transcarotid access of the cerebral arterial vasculature and treatment of cerebral occlusions." EX1006, ¶[0002]. Petitioner then asserts that a "POSITA would have found it obvious to use, or optimize, Garrison's clot treatment system to treat PE based on Laub or Aklog" and that a "POSITA would have found it obvious to use or optimize Garrison's aspiration system to treat DVT based on Laub or Aklog." Petition, pp.21-30, 64.

But a POSA would not have modified Garrison as Petitioner asserts to treat either PE or DVT because Petitioner's references recognize the criticality of blood reintroduction to patient health and safety when treating large clots like PE or DVT in large vessels with high blood flow volumes, and Garrison expressly discloses that the embodiments relied on by Petitioner are not suitable for blood reintroduction.

EX2005, ¶110.

For example, as detailed in §§IV.B.2-3. above, omitting substantially continuous blood return "could quickly result in exsanguination of the patient" (EX1012, ¶[0045]) and/or lead to "occurrences of fluid loss and/or shock" (EX1005, 5:19-23). EX2005, ¶¶111-114. And, as detailed in §IV.B.3. above, the embodiments of Garrison relied on by Petitioner in Figure 34 and paragraph [0134] (the syringe embodiment) are not suitable for returning blood. EX2005, ¶115; EX1006, ¶[0135] ("One disadvantage of current sources of aspiration is that the aspirated blood is received into an external reservoir or syringe. This blood is generally discarded at the end of the procedure, and as such represents blood loss from the patient."). In particular, blood is pumped to a receptable 3420 in Figure 34 or received in a syringe in paragraph [0134] and, in both cases, remains "static" and/or is "exposed to air" such that it is not suitable for blood return. *Id*.

Accordingly, a POSA would understand based on Garrison's express disclosure that in each embodiment of Garrison relied on by Petitioner the aspirated blood is not suitable for blood return and should be "discarded at the end of the procedure." EX1006, ¶[0135]; EX2005, ¶116. For that reason, a POSA would not have found it obvious to modify Garrison in the first instance let alone use that modified Garrison to treat PE or DVT because Laub and Aklog each emphasize the critical nature of blood return for patient health when treating large clots in large vessels like PE and DVT—and the embodiments of Garrison relied on by Petitioner are not suitable for reintroducing blood to a patient. EX2005, ¶116. As such, a POSA would not have optimized Garrison's system to treat PE/DVT in a manner not disclosed by Garrison and in a manner discouraged by Garrison and both Laub and Aklog. *Id.*

After Garrison discloses the blood return deficiencies of the embodiments relied on by Petitioner, Garrison discloses a different and incompatible embodiment in Figure 36 "which is configured not to harm blood cells and which may be configured to return blood to the central venous system **in real time** during the procedure, so there is no reservoir in which the blood remains static." EX1006, ¶[0136] (emphasis added). Figure 36 of Garrison illustrates a pump device 3250 connected to either or both of the flow lines of the arterial access device or smaller inner catheter and having a chamber 3220 connected to a vacuum source 3230, which is configured to generate (1) negative pressure in the chamber 3220 to cause the expandable portion 3210 of the flow line 2025 to expand to draw blood into the expandable portion 3210 through the upstream one-way check valve 3235 and (2) subsequent normalized pressure in the chamber 3220 to permit the expandable portion 3210 to contract to expel blood from the expandable portion 3210 through the downstream one-way check valve 3235:

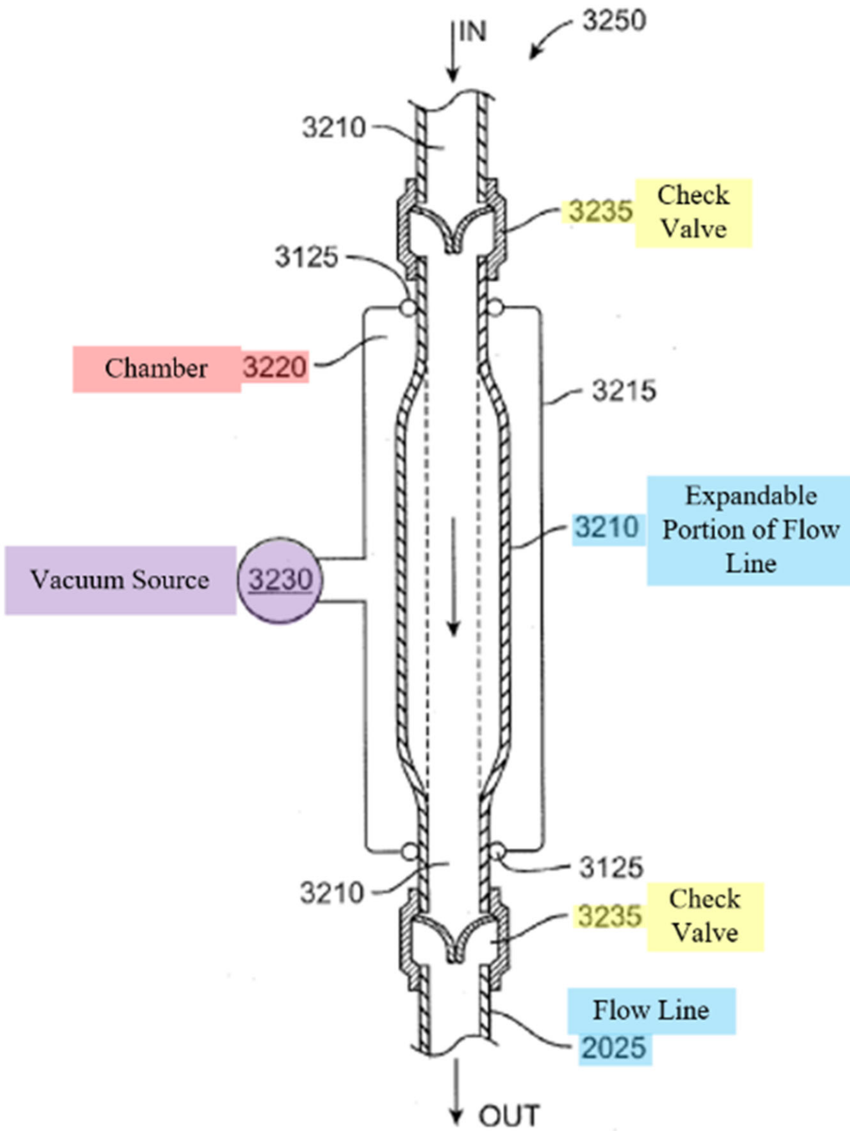


FIG. 36

EX2005, ¶117; EX1006, ¶¶[0136]-[0137]. That is, in this different embodiment of Garrison, the pump device operates to "return blood to the central venous system in real time" by operating the vacuum source so as to oscillate the expandable portion between the expanded and retracted states to, together with the one-way check valves, thereby drive fluid through the flow line. *Id*.

A POSA would understand that the pump device in Figure 36 of Garrison is to be used in a system without any "fluid control device" unlike the embodiment shown in Figure 34, because blood is continuously aspirated and reinfused in ***real time*** to prevent the blood from remaining static so it can be returned to the patient. EX2005, ¶118. Blood return would not be continuous/real time and blood would remain static if a "fluid control device" were included in the system and closed when vacuum was generated, as recited in Claims 1 and 20 of the '333 Patent. *Id*.

Indeed, the system Garrison discloses in Figure 36 is akin to the systems of Laub and Aklog, which also disclose continuous aspiration/blood return as described in detail in §VB.2. above. EX2005, ¶118; EX1012, ¶[0045] ("reinfusing the patient's blood continuously during aspiration allows for greater suction pressure and/or flow rates (e.g., 2-4 L/min) which can assist in dislodging and removing larger clots and/or tumors than would otherwise be possible"); EX1005, 5:19-23 (Aklog's system "simultaneously reinfuse[s] aspirated (i.e., removed) and filtered fluid, such as blood, back into the patient on a substantially continuous basis to minimize any occurrences of fluid loss and/or shock"). Thus, each of Garrison, Laub, and Aklog disclose continuous aspiration and reinfusion when blood is returned to the patient without "generating vacuum pressure within the clot canister via the aspiration source while a valve positioned along the fluid path between the aspiration catheter" as claimed. EX2005, ¶118. A POSA would understand such continuous systems to be incompatible with the Claims of '333 patent including methods of treating PE and DVT by building up and subsequently releasing vacuum pressure by moving a valve between different positions (i.e., "generating vacuum pressure within the clot canister via the aspiration source while a valve positioned along the fluid path between the aspiration catheter and the clot canister is in a first position that inhibits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister" and moving the valve from the first position to a second position thereby applying the vacuum pressure to the lumen of the aspiration catheter … wherein in the second position the valve permits fluid flow along the fluid path from the lumen of the aspiration catheter to the clot canister"). *Id*. at ¶119.

Petitioner simply asserts that "Garrison already accounts for one challenge POSITAs encountered when moving from smaller to larger aspiration catheters – a larger catheter 'may aspirate an unacceptable volume of blood, resulting in excessive fluid loss and/or shock in the patient'" based on the embodiment in Figure 36 of Garrison. Petition, pp.29-30. But, as set forth above, the embodiment of Figure 36 is fundamentally different than the embodiments in Figure 34 and paragraph [0134] of Garrison relied on by Petitioner where blood is unsuitable to be returned, and a POSA would understand the embodiment in Figure 36 not to include any "valve" as recited in Claims 1 and 20 to enable continuous aspiration and reinfusion. EX2005, ¶120.

Indeed, the Patent Office has already found that a POSA would not have modified Garrison to treat PE or DVT, even in view of other references identified by the Office that did teach aspiration of those types of clots:

> Claim 23 and 42 are allowable for reciting, *inter alia*, "a method of treating a *pulmonary embolism* within a vasculature …" and "applying the vacuum pressure to the lumen of the aspiration catheter such that at least a portion of the pulmonary embolism and blood are aspirated into the clot canister.["]
>
> Garrison, Barzell, and Heaton teaches an aspiration catheter, as described in Non-Final Rejection filed on 10/30/2023. However, modified Garrison does not teach an aspiration catheter configured to aspirate pulmonary embolism or deep vein thrombosis. The aspiration catheter of modified Garrison is configured for smaller neurovascular anatomy (see Abstract) and not configured for larger clot/embolisms. As explained by inventor during the interview on 1/25/2024, and further supported by photographic evidence during the interview, a pulmonary embolism or a deep vein thrombosis presents significant different structures and physiological responses as compared to neurovascular clots, and therefore one skilled in the art would not have looked to use the Garrison device for the current methods.
>
> Prior art like Batiste (US 20180042623 Al) teaches an aspiration catheter (see Abstract) used for deep vein thrombosis or pulmonary embolisms (see Paragraph [0004]). However, it would not be reasonable to combine modified Garrison with the device of Batiste

> because Garrison specifically teaches the aspiration catheter being used for neurovascular procedures. Therefore the device of Garrison would be not be combinable with the device of Garrison to teach a method of treating pulmonary embolisms or deep vein thrombosis. There is no prior art that reads on the combination of limitations of claim 23 or 42. **Claims 24-41** are allowable for depending on claim 23. **Claims 43-60** are allowable for de pending on claim 42.

EX1002, pp.46-47. That is, in allowing the Claims challenged here, the Examiner considered the disclosure of Garrison and found that a POSA would not have modified Garrison to treat PE or DVT, and also found that there is no prior art that reads on the Claims including in view of Batiste which the Examiner described as teaching an aspiration catheter used to treat DVT and PE (just like Petitioner relies on Laub and Aklog for here). EX2005, ¶121.

V. CLAIMS 6-8, 11-12, 17, 25-27, 30-31, AND 36 ARE NOT RENDERED OBVIOUS BY ANY OF THE COMBINATIONS OF LAUB OR AKLOG AND GARRISON FURTHER IN VIEW OF GOFF, SCHAFFER, AND/OR HARTLEY (GROUNDS 1B-1D, 2B-2D, 3B-3D, 4B-4D)

As set forth in §IV. above, independent Claims 1 and 20 are not rendered obvious by Laub or Aklog in combination with Garrison or Garrison in combination with Laub or Aklog. Dependent Claims 6-8, 11-12, and 17 depend from independent Claim 1, and dependent Claims 25-27, 30-31, and 36 depend from independent Claim 20. Petitioner does not allege that Goff (grounds 1B, 2B, 3B, and 4B; Claims 6-8, 17, 25-27, and 36), Schaffer (grounds 1C, 2C, 3C, and 4C; Claims 11-12 and

30-31), or Schaffer and Hartley (grounds 1D, 2D, 3D, and 4D; Claims 11-12 and 30-31) disclose any of the features of independent Claims 1 or 20. Therefore, those dependent Claims are also not rendered obvious by Petitioner's combinations because they incorporate all the features of their respective independent Claims 1 or 20.

VI. THERE IS NO GOOD CAUSE FOR A PRE-INSTITUTION REPLY

In view of the deficiencies in the petition discussed above, Petitioner might seek to file a pre-institution reply. There would be no good cause for a pre-institution reply, however. All of Patent Owner's arguments above address the merits of the petition, and Petitioner could have—and should have—addressed these issues in the petition itself. *See, e.g., Ontel Prods. Corp. v. Guy A. Shaked Invs. Ltd.*, IPR2020-01703, Paper 10, p.2 (Feb. 4, 2021) (denying reply for "subjects that Petitioner should have developed in its Petition").

VII. CONCLUSION

For all the above reasons, Patent Owner respectfully requests that the Board deny institution.

Respectfully submitted,

Dated: Sept. 16, 2025 By: / Joseph P. Hamilton /
Joseph Hamilton
Reg. No. 51,770
Lead Counsel for Patent Owner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), I, Joseph Hamilton, certify that **PATENT OWNER'S PRELIMINARY RESPONSE** contains 13,222 words, excluding those portions identified in 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

Dated: Sept. 16, 2025

By: / Joseph P. Hamilton /
Joseph Hamilton
Reg. No. 51,770

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on September 16, 2025, a copy of **PATENT OWNER'S PRELIMINARY RESPONSE, and EXHIBIT 2005** was served upon the below-listed counsel by electronic mail:

Joshua J. Stowell
2JYS@knobbe.com
Joseph R. Re
2jrr@knobbe.com
Brian C. Barnes
2BCB@knobbe.com
BoxImperative333@knobbe.com

Dated: Sept. 16, 2025 By: */ Kate Rose /*
Kate Rose