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Paper 7
Date: September 11, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTUITIVE SURGICAL, INC.,
Petitioner,

v.

P TECH, LLC,
Patent Owner.

IPR2020-00650
Patent 9,149,281 B2

Before SHERIDAN K. SNEDDEN, MICHELLE N. WORMMEESTER, and CYNTHIA M. HARDMAN, *Administrative Patent Judges.*

SNEDDEN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. Background and Summary

Intuitive Surgical, Inc. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1–20 of U.S. Patent No. 9,149,281 B2 ("the '281 patent," Ex. 1001). Paper 2 ("Pet."). P Tech, LLC ("Patent Owner") filed a Preliminary Response to the Petition. Paper 6 ("Prelim. Resp.").

To institute an *inter partes* review, we must determine that the information presented in the Petition shows "a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). The Supreme Court has held that a decision to institute under 35 U.S.C. § 314 may not institute on less than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018). After considering the evidence and arguments presented in the Petition, we determine that Petitioner has demonstrated a reasonable likelihood of success in proving that at least 1 claim of the '281 patent is unpatentable. Accordingly, an *inter partes* review of all of the claims and all of the grounds presented in the Petition is hereby instituted.

This Decision is not a final decision as to the patentability of claims for which *inter partes* review is instituted. Our final decision will be based on the record as fully developed during trial.

B. Real Parties in Interest

Petitioner Intuitive Surgical, Inc. and Patent Owner P Tech, LLC each asserts it alone is the real party in interest. Pet. 2; Paper 4, 2.

C. Related Matters

Petitioner has filed a petition for *inter partes* review in IPR2020-00649 for U.S. Patent No. 9,192,395. The parties indicate the '281 patent

and U.S. Patent No. 9,192,395 have been asserted against Petitioner in Civil Action No. 1:19-cv-525-RGA in the District of Delaware. Pet. 2; Paper 4, 2.

D. The '281 Patent (Ex. 1001)

The '281 patent discloses "[a]n improved apparatus and method of securing body tissue may be performed with a robotic mechanism." Ex. 1001, Abstract. The body tissue may be secured with a fastener such as a suture, staple, or screw. *Id.* at 1:36–37.

Figure 1, reproduced below, shows an "apparatus **30** for use in securing tissue in a patient's body." *Id.* at 4:56–57.

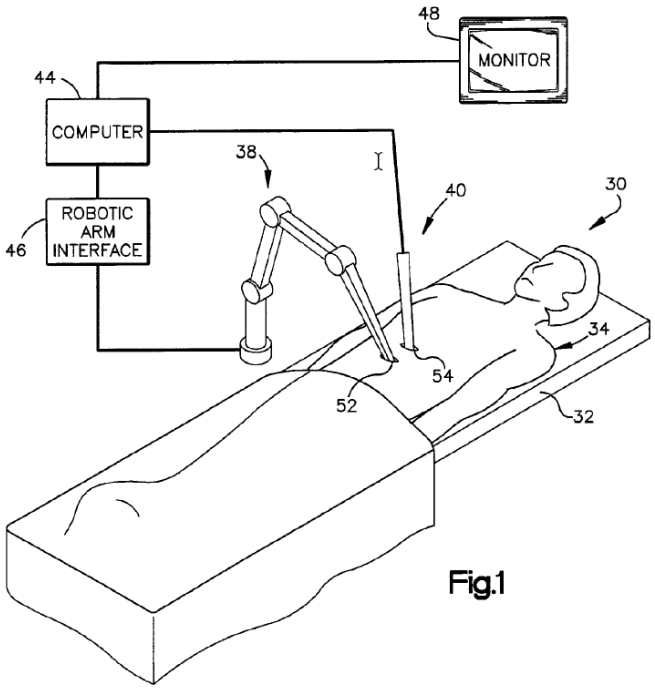

Figure 1 "is a schematic illustration depicting the manner in which a robotic mechanism and an imaging device are positioned relative to a patient's body." *Id.* at 2:39–41. The apparatus includes an operating table **32**, robotic mechanism **38** "to position a tissue securing device, fastener, or other apparatus at a desired location within the patient during performance of a surgical procedure," and imaging device **40**. *Id.* at 5:4–5:7. The robotic

mechanism "is guided by automatic controls which include the computer **44** and robotic arm interface **46**," and "may have manually operable controls which provide for interaction between the surgeon and the robotic mechanism." *Id.* at 5:18–28.

Figure 22 of the '281 patent is reproduced below.

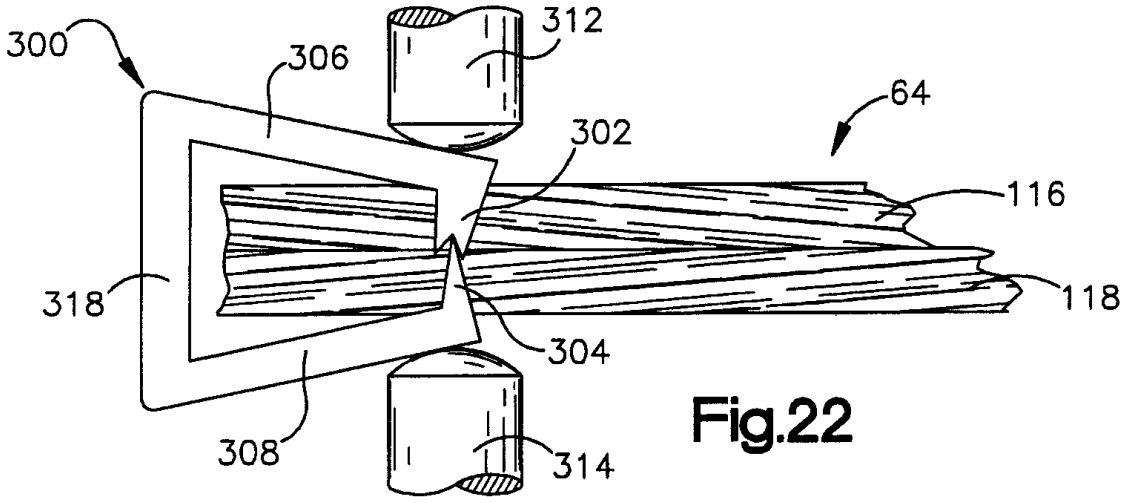

Fig.22

Figure 22 is a schematic illustration depicting the manner in which legs of a staple **306**, **308** are bent and "end portions of the staple are bonded together by the robotic mechanism" of Figure 1. *Id.* at 3:56–59. Specifically, the '281 patent describes the elements of Figure 22 as follows:

> When the staple **300** is utilized to secure the body tissue, end portions **302** and **304** of legs **306** of the staple are moved into engagement (FIG. 22) and bonded together. By bonding the end portions **302** and **304** of the legs **306** and **308** of the staple **300** together, the staple is locked into the tissue **64**. Any tendency for the resilient legs **306** and **308** to spring back to their original positions . . . is prevented by the interconnected the end portions **302** and **304** of the legs.

Id. at 26:65–27:5.

Figure 26 of the ’281 patent is reproduced below.

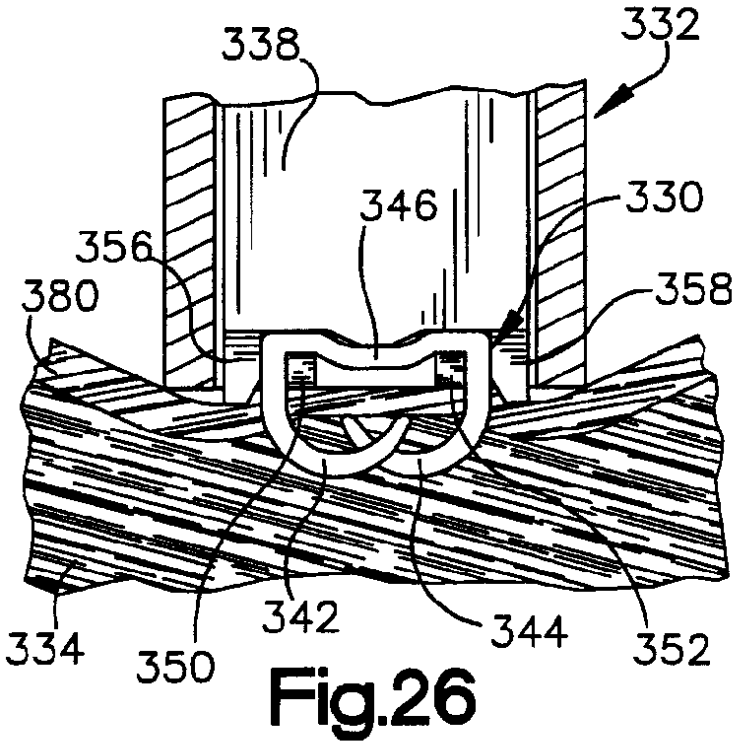

Fig.26

Figure 26 “is a schematic illustration depicting the manner in which [staple **346** is inserted into body tissue and] is bent and legs of the staple are bonded together by operation of the robotic mechanism of FIG. 1.” *Id.* at 4:5–8.

The ’281 patent describes the elements of Figure 26 as follows:

> Continued downward movement of the pusher plate **338** causes force transmitting members or lands **356** and **358** connected to the pusher plate **338** to press against the connector or bight portion **346** of the staple **330** . . . . As the pusher plate **338** continues to be advanced or lowered to the position shown in FIG. 26, the lands or force transmitting members **356** and **358** deflect or bend the legs **342** and **344** to the gripping position illustrated in FIG. 26, to dispose a portion of the body tissue **334** between the legs **342** and **344** and the connector or bight portion **346** of the staple **330** (FIG. 26). . . .

> Once the staple **330** has been bent or deformed to grip the body tissue **334** in the manner illustrated schematically in FIG. 26, the legs **342** and **344** of the staple are bonded together. . . .
>
> Once the legs **342** and **344** of the staple have been bonded together, the staple is released or disengaged from the anvils **350** and **352** by an injector spring **362** having legs **364** and **366** (FIG. 23) which are pressed against the staple **330**. This force separates the staple from the anvils **350** and **352**.

Id. at 29:60–30:46.

In one embodiment, the robotic mechanism **38** is used to secure body tissue with a threaded fastener **440**. Figure 34 of the ’281 patent is reproduced below:

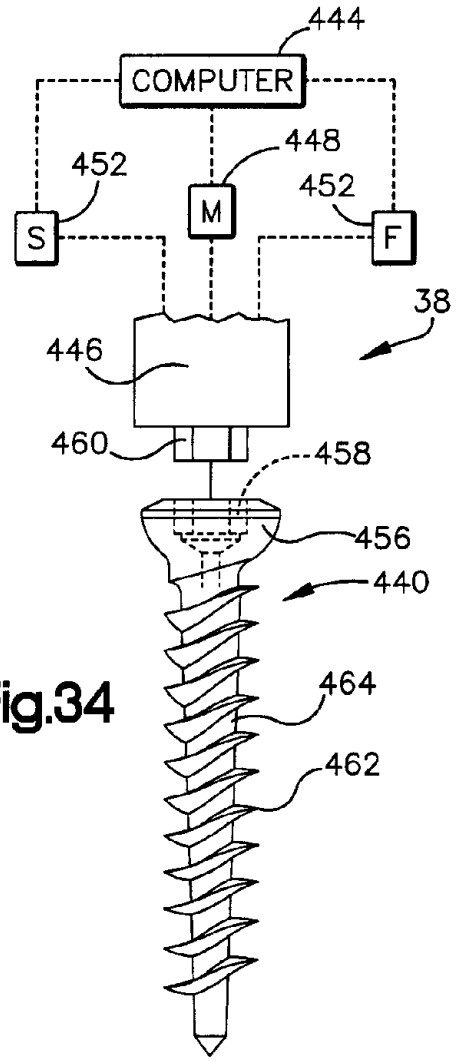

Fig.34

Figure 34 "is a schematic illustration depicting the manner in which the robotic mechanism of FIG. 1 is utilized to position a threaded fastener in body tissue." *Id.* at 4:33–35. The '281 patent discloses position sensor **452** in the context of the embodiment shown in Figure 34. The '281 patent provides the following description of Figure 34:

> The robotic mechanism **38** includes a programmable computer **444** (FIG. 34) which is connected with a fastener drive member **446** by a motor **448**. In addition to the motor **448**, a force measurement assembly **450** is connected with fastener drive member **446** and computer **444**. The force measurement assembly **450** has an output to the computer **444** indicating the

> magnitude of resistance encountered by the fastener drive member **446** to rotation of the fastener **440**. A position sensor **452** is connected with fastener drive member **446** and the computer **444**. The position sensor **452** has an output which is indicative of the position of the fastener drive member **446**. The output from the position sensor **452** indicates the depth or distance to which the threaded fastener is moved into body tissue by operation of the motor **448** to rotate the fastener drive member **446**.
>
> . . .
>
> By utilizing the robotic mechanism **38** to manipulate the fastener **440**, the fastener can be accurately positioned relative to body tissue. The output from the force measurement assembly **450** to a computer **444** enables the force, that is resistance to rotation on the threaded fastener **440**, to be controlled during rotation of the fastener. This prevents the application of excessive force to the body tissue. In addition, the position sensor **452** enables the distance to which the fastener **440** is moved into the body tissue to be accurately controlled.

Id. at 36:38–37:13.

E. Illustrative Claims

Independent claims 1, 10 and 18, reproduced below, are illustrative of the claimed subject matter of the '281 patent.

> 1. A robotic system for engaging a fastener with a body tissue, the system comprising:
>
> a robotic mechanism including an adaptive arm, the robotic mechanism configured to position a fastener relative to the body tissue, the robotic mechanism having first and second force transmitting portions configured to apply *at least one of an axial force and a transverse force relative to the fastener*;
>
> a computer configured to control the robotic mechanism; and
>
> an adaptive arm interface coupled to the adaptive arm and the computer, the adaptive arm interface configured to operate the computer, *wherein a magnitude of the*

at least one axial force and transverse force applied to the fastener is limited by the computer.

10. A robotic system for engaging a fastener with a body tissue, the system comprising:

a robotic mechanism including an adaptive arm, the robotic mechanism configured to position the fastener having first and second legs, the robotic mechanism having first and second force transmitting portions configured to apply *at least one of an axial force and a transverse force to move the first and second legs toward each other*;

a computer configured to control the robotic mechanism and limit a magnitude of the at least one axial force and transverse force; and

an adaptive arm interface coupled to the adaptive arm and the computer, the adaptive arm interface configured to operate the computer,

wherein the first and second legs are configured to engage the fastener with the body tissue.

18. A robotic system for engaging a fastener with first and second body tissue sections, the system comprising:

a robotic mechanism including an adaptive arm, the robotic mechanism configured to position the fastener relative to first and second body tissue sections, the robotic mechanism having first and second force transmitting portions configured to apply at least one of an axial force and a transverse force to urge the first and second body tissue sections together;

a computer configured to control the robotic mechanism and limit a magnitude of the at least one axial force and transverse force; and

an adaptive arm interface coupled to the adaptive arm and the computer, the adaptive arm interface configured to operate the computer.

Ex. 1001, 44:44–46:32 (emphasis added).

Claims 2–9 depend from independent claim 1. *Id.* Claims 11–17 depend from independent claim 10. *Id.* Claims 19 and 20 depend from independent claim 18. *Id.*

F. Evidence

Petitioner relies upon information that includes the following.

Ex. 1004, Tierney et al., US 6,331,181 B1, issued Dec. 18, 2001 ("Tierney").

Ex. 1005, McGarry et al., US 5,289,963, issued Mar. 1, 1994 ("McGarry").

Ex. 1007, Hooven, US 5,518,163, issued May 21, 1996 ("Hooven").

Ex. 1009, Madhani et al., US 5,792,135, issued Aug. 11, 1998 ("Madhani").

Ex. 1010, Cooper et al., WO 98/25666, published June 18, 1998 ("Cooper").

Ex. 1020, Gardiner et al., US 6,149,658, issued Nov. 21, 2000 ("Gardiner").

Petitioner also relies upon the Declaration of Dr. Gregory Fischer (Ex. 1003) to support its contentions.

Patent Owner relies upon the declaration of Dr. Cameron Riviere (Ex. 2001) to support its contentions.

G. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–20 would have been unpatentable on the following grounds:

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1	1–3, 8–12, 16–20	103(a)	Tierney, McGarry

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
2	4–8, 13–15	103(a)	Tierney, McGarry, Hooven
3	1–20	103(a)	Tierney, Hooven
4	1–20	103(a)	Tierney, McGarry, Gardiner
5	1–20	103(a)	Tierney, Hooven, Gardiner

II. ANALYSIS

A. Claim Construction

We interpret a claim "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b)." 37 C.F.R. § 42.100(b) (2019). Under this standard, we construe the claim "in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." *Id.*

Petitioner contends that two claim terms require construction: "at least one of an axial force and a transverse forces" and "first and second force transmitting portions." Pet. 12–15. Patent Owner opposes Petitioner's proposed claim constructions. Prelim. Resp. 30–36. For the purposes of this decision, we find it useful to address the parties' proposed constructions for "at least one of an axial force and a transverse force." *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co*., 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy.'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc*., 200 F.3d 795, 803 (Fed. Cir. 1999))). To the extent further discussion of the meaning of any claim term is necessary to our

decision, we provide that discussion below in our analysis of the asserted grounds of unpatentability.

1. "at least one of an axial force and a transverse force"

Claim 1 recites "at least one of an axial force and a transverse force relative to the fastener." Claim 10 recites "at least one of an axial force and a transverse force to move the first and second legs toward each other." Claim 18 recites "at least one of an axial force and a transverse force to urge the first and second body tissue sections together."

Petitioner contends that "at least one of an axial force and a transverse force" means the conjunctive phrase "at least one of an axial force and at least one of a transverse force." Pet. 12 (citing *SuperGuide Corp. v. DirecTV Enters., Inc*., 358 F.3d 870 (Fed. Cir. 2004)).

Patent Owner contends that Petitioner's construction does not reflect the plain and ordinary meaning of the term. Prelim. Resp. 34. Patent Owner contends that

> The language of the claim requires that the force transmitting portions together are configured to apply an axial force and a transverse force relative to the fastener. It does not require that the force transmitting portions individually are each configured to apply both forces. A [person of ordinary skill in the art] would understand this claim element to require that the first and second force transmitting portions must, in combination, apply an axial force and a transverse force to their target.

Id. (citing Ex. 2001 ¶¶ 56–59).

We have considered the parties' positions on claim construction; however, at this stage of the proceeding, cannot discern any meaningful difference between them. We understand the claims to require that a first and second force transmitting portions must, in combination, apply an axial force and a transverse force to their target. We note, however, that the

Specification supports various combination of forces. For example, Figures 23–26 of the Specification illustrate one embodiment showing force transmitting portions 356, 358 that initially exert an axial force, and then a transverse force once the bight portion 346 of the staple 330 comes into contact with anvils 350 and 352. *See* Section I.D. Figure 22 of the Specification, however, shows another embodiment where it appears force transmitting portions 312, 314 exert a transverse force relative to the stapler, but not an axial force. *Id.* Accordingly, at this stage of the proceeding, we determine that the phrase "at least one of an axial force and a transverse force" recited in each of claims 1, 10 and 18 encompasses the embodiments disclosed in the Specification and depicted in Figures 22 and Figures 23–26. Ex. 1001, 27:30–31:33. To the extent an explicit construction facilitates solidification of the parties' respective position, we welcome further discussion of the construction of this term at the appropriate time during the pendency of the *inter partes* review.

B. Summary of Cited Prior Art

1. Summary of Tierney (Ex. 1004), Madhani (Ex. 1009), and Cooper (Ex. 1010)

Petitioner's obviousness challenges rely on Tierney, which incorporates by reference Madhani and Cooper. Pet. 4; Ex. 1004, 1:60–66, 8:4–7.

Tierney relates to "surgical tools having improved mechanical and/or data interface capabilities to enhance the safety, accuracy, and speed of minimally invasive and other robotically enhanced surgical procedures." Ex. 1004, 1:12–15. Tierney describes that

> Robotic surgery will generally involve the use of multiple robotic arms. One or more of the robotic arms will often support a

> surgical tool which may be articulated (such as jaws, scissors, graspers, needle holders, microdissectors, staple appliers, tackers, suction/irrigation tools, clip appliers, or the like) or non-articulated (such as cutting blades, cautery probes, irrigators, catheters, suction orifices, or the like).

Id. at 6:20–28. Tierney's

> robotic surgical system **10** generally includes master controller **150** and a robotic arm slave cart **50**. Master controller **150** generally includes master controllers (not shown) which are grasped by the surgeon and manipulated in space while the surgeon views the procedure views [sic] a stereo display. The master controllers are manual input devices which preferably move with six degrees of freedom, and which often further have an actuatable handle for actuating tools (for example, for closing grasping saws, applying an electrical potential to an electrode, or the like).

Id. at 6:61–7:4. Figure 2 of Tierney is reproduced below.

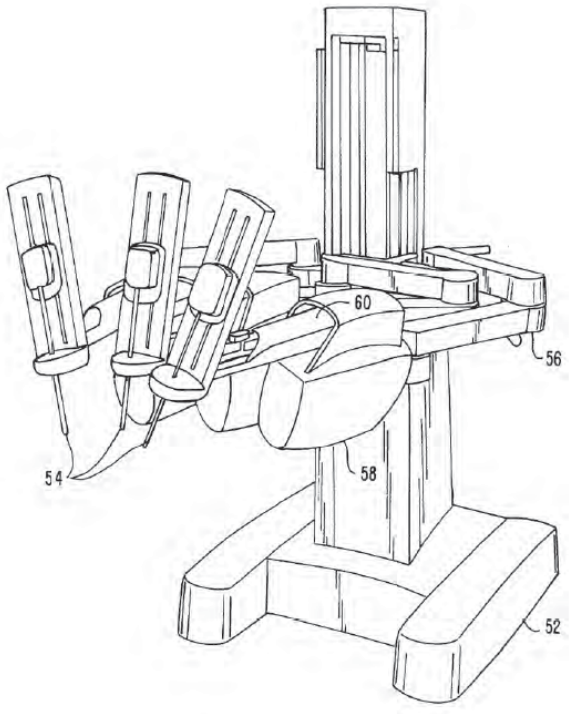

Figure 2 "is a perspective view of a robotic surgical arm cart system [**50**] in which a series of passive set-up joints support robotically actuated

manipulators." *Id.* at 5:29–31. The cart "includes a base **52** from which three surgical tools **54** are supported. More specifically, tools **54** are each supported by a series of manually articulatable linkages, generally referred to as set-up joints **56**, and a robotic manipulator **58**." *Id.* at 7:16–21. In the cart, "robotic manipulators **58** preferably include a linkage **62** that constrains movement of tool **54**," and "linkage **62** includes rigid links coupled together by rotational joints in a parallelogram arrangement so that tool **54** rotates around a point in space **64**." *Id.* at 7:41–48. Manipulator **58** may include a cannula **72**. *Id.* at 8:9–10.

Figure 2A of Tierney is reproduced below:

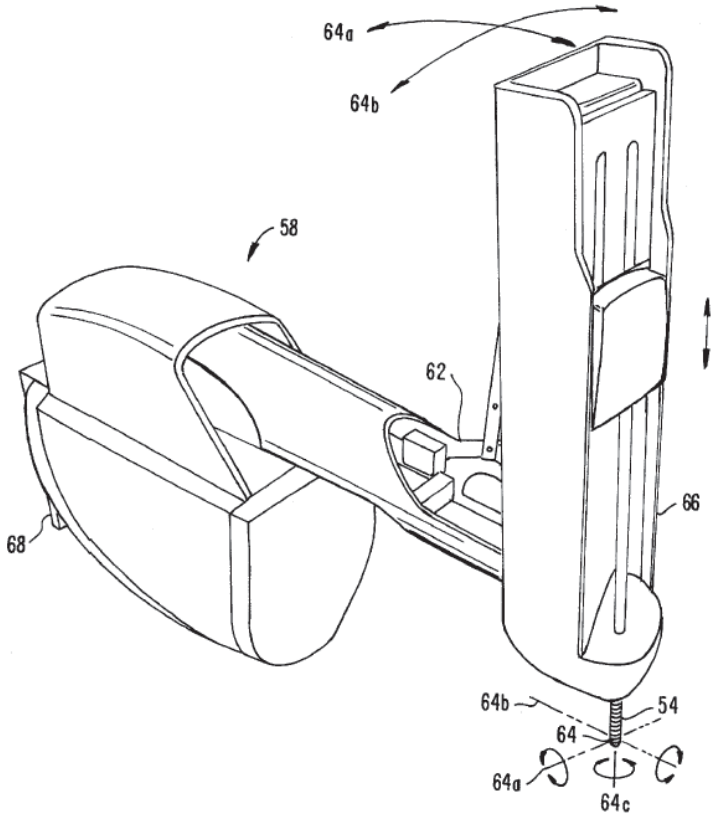

FIG. 2A.

Figure 2A is a perspective view of a robotic surgical manipulator **58** for use in the cart system of Figure 2. Tierney discloses that:

> Linkage **62** of manipulator **58** is driven by a series of motors **70**. These motors actively move linkage **62** in response to commands from a processor. Motors **70** are further coupled to tool **54** so as to rotate the tool about axis **66**, and often to articulate a wrist at the distal end of the tool about at least one, and often two, degrees of freedom. Additionally, motors **70** can be used to actuate an articulatable end effector of the tool for grasping tissues in the jaws of a forceps or the like. Motors **70** may be coupled to at least some of the joints of tool **54** using cables, *as more fully described in [Madhani], the full disclosure of which is also incorporated herein by reference*. As described in that reference, the manipulator will often include flexible members for transferring motion from the drive components to the surgical tool. For endoscopic procedures, manipulator **58** will often include a cannula **72**. Cannula **72** supports tool **54**, allowing the tool to rotate and move axially through the central bore of the cannula.

Id. at 7:63–8:13 (emphasis added).

Turning to Madhani, Madhani discloses a telesurgery system for laparoscopic surgery that "allows a surgeon at one location to perform surgery on a patient at another location." Ex. 1009, 5:8–10. The system includes an "articulated surgical instrument for minimally invasive surgery which provides a high degree of dexterity, low friction, low inertia and good force reflection." *Id.* at 1:15–19. The instrument is provided with a "unique cable and pulley drive system [that] operates to reduce friction and enhance force reflection" and a "unique wrist mechanism [that] operates to enhance surgical dexterity compared to standard laparoscopic instruments." *Id.* at Abstract. According to Madhani, "laparoscopic surgical instruments generally include a laparoscope for viewing the surgical field, and working tools such as clamps, graspers, scissors, staplers, and needle holders." *Id.* at 1:51–55.

Figure 3 of Madhani is reproduced below.

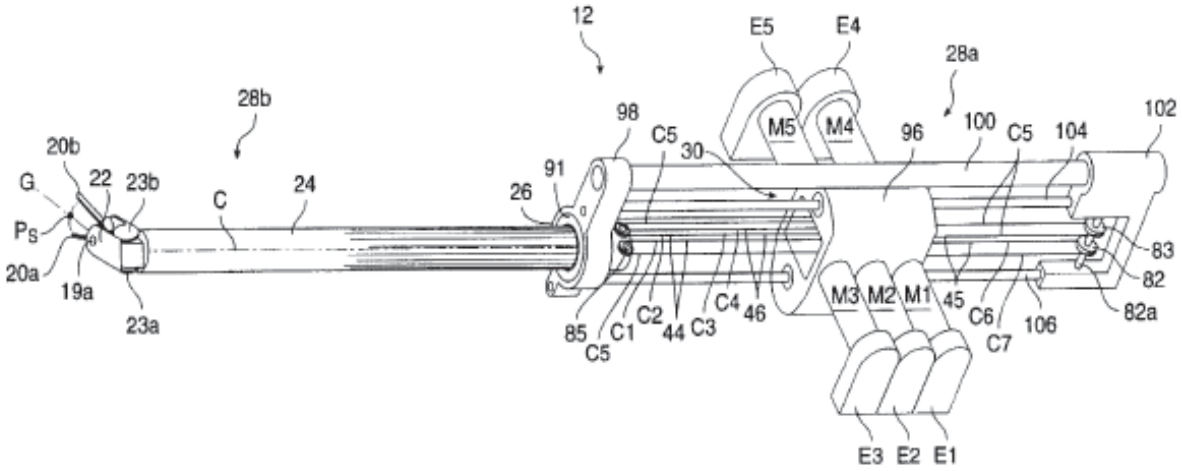

FIG. 3

Figure 3 is a perspective view of a force-reflecting surgical instrument **12** disclosed in Madhani. *Id.* at 48–49. Instrument **12** is controlled by a computer and a master device that is manipulated by a surgeon at a remote location. *Id.* at 5:13–16. Madhani's system "has two opposed pivoting jaws and a pivoting wrist member [**22**]," and "is adapted to be coupled via a servomechanism to a master control operated by a surgeon." *Id.* at 3:26–32. Instrument **12** is driven by drive motors M1, M2, M3, M4, M5, M6 and M7 (FIGS. 3, 4, 6 and 7a-b) in conjunction with a series of cables and pulleys. *Id.* at 5:16–19.

Madhani discloses that

> Once instrument **12** is in the proper position, . . . the surgeon can perform the necessary surgical procedures on the patient with instrument **12**. Forces experienced by instrument **12** are reflected back to the surgeon by master device **150** [not shown]. The reflected forces may be scaled up in order to allow the surgeon to better "feel" the surgical procedures. As a result, the surgeon can feel instrument **12** engaging types of tissue that do not provide much resistance. In addition, movements of master device **150** [not shown] relative to instrument **12** may be scaled

> down so that the precision and dexterity of instrument 12 can be increased.

Id. at 7:20–32.

Madhani discloses that

> Drive motors **M1**, **M2**, **M3**, **M4** and **M5** are mounted to sliding bracket **96** and drive respective cables **C1**[,] **C2**, **C3**[,] **C4** and **C5**. Sliding bracket **96** supports each of the drive motors. During operation sliding bracket **96** is connected to positioning mechanism **14** by mounting bracket **36**. When instrument **12** is mounted on positioning mechanism **14**, the drive motors operate to move distal portion **28*b*** relative to sliding bracket **96**. Sliding bracket **96** thus forms the support bracket of the surgical instrument. Each drive motor **M1**, **M2**, **M3**, **M4** and **M5** includes a respective encoder **E1**, **E2**, **E3**, **E4** and **E5** for providing computer **11** with the rotational position of their respective drive shafts.

Id. at 8:28–39.

Tierney incorporates Cooper, citing Cooper's disclosure of a Multicomponent Telepresence System and methods that improve the safety and speed with which robotic surgical tools can be removed and replaced during a surgical procedure. Ex. 1004, 1:60–2:11. Specifically, Cooper "relates to robotically-assisted surgical manipulators and more particularly to systems and methods for performing telerobotic surgical procedures on a patient while providing the surgeon with the sensation of physical presence at the surgical site." Ex. 1010, 1:17–21. Cooper describes design goals for its invention to include "easy sterilization so that they can be reused after the components have been contaminated during an operation," and "to minimize instrument exchange time during the surgical procedure." *Id.* at 3:4–8.

2. Summary of McGarry (Ex. 1005)

McGarry "relates to a staple applier particularly adapted for attaching surgical mesh to body tissue to reinforce a surgical repair of the body tissue, as in hernia repair" (Ex. 1005, 1:10–13), and is "particularly adapted for endoscopic application of surgical staples to attach surgical mesh to body tissue during hernia repair" (*id.* at 8:47–50). Figure 21 is reproduced below, in an annotated version supplied by Petitioner. Pet. 22.

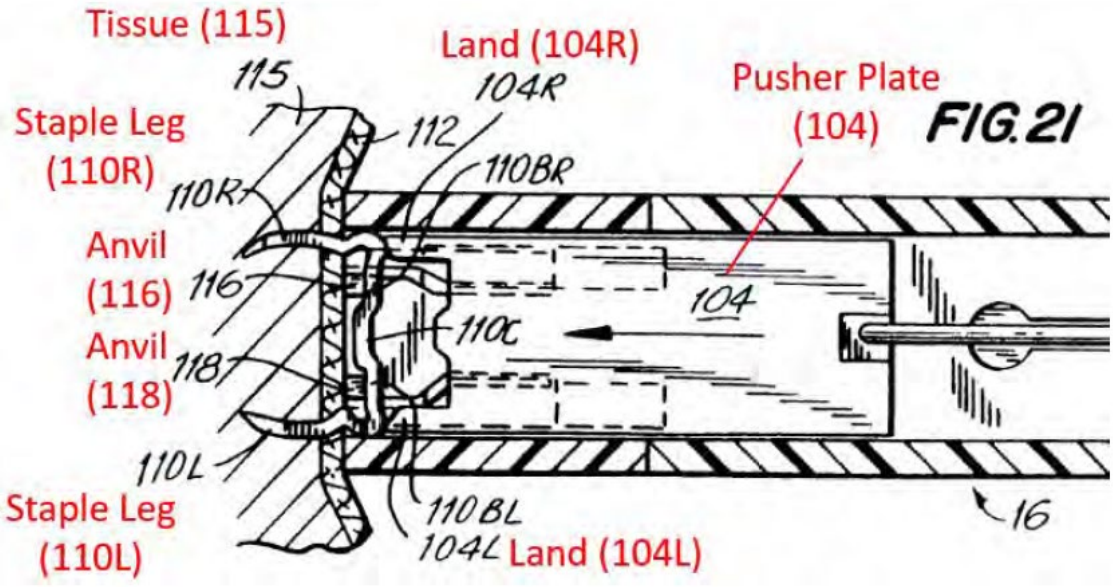

Figure 21 illustrates a view of a staple advancing and closing system, where "the pusher plate 104 has now advanced distally sufficient to cause the staple to penetrate the surgical mesh 112 and the body tissue 115," and "anvil members 116 and 118 are positioned for engagement by the straight sections of bridge portions 110BR and 110BL of the back rib of the staple 110L, such that engagement of the staple by pusher plate 104 with the arcuate end corner portions of the staple as shown will cause the staple to deform." Ex. 1005, 17:28–60.

3. Summary of Hooven (Ex. 1007)

Hooven discloses an endoscopic stapling and cutting instrument, interconnected with a controller and a video display monitor. Ex. 1007, 4:6–8. Hooven's device "will place down plural parallel rows of staples with the staples offset in the rows. The instrument will also operate a knife to pass between two adjacent parallel rows of staples. Such an instrument staples tissue together and cuts that tissue between the stapled portions." *Id.* at 4:34–40. Figures 1 and 3, annotated by Petitioner and reproduced below, illustrate several components of Hooven's system.

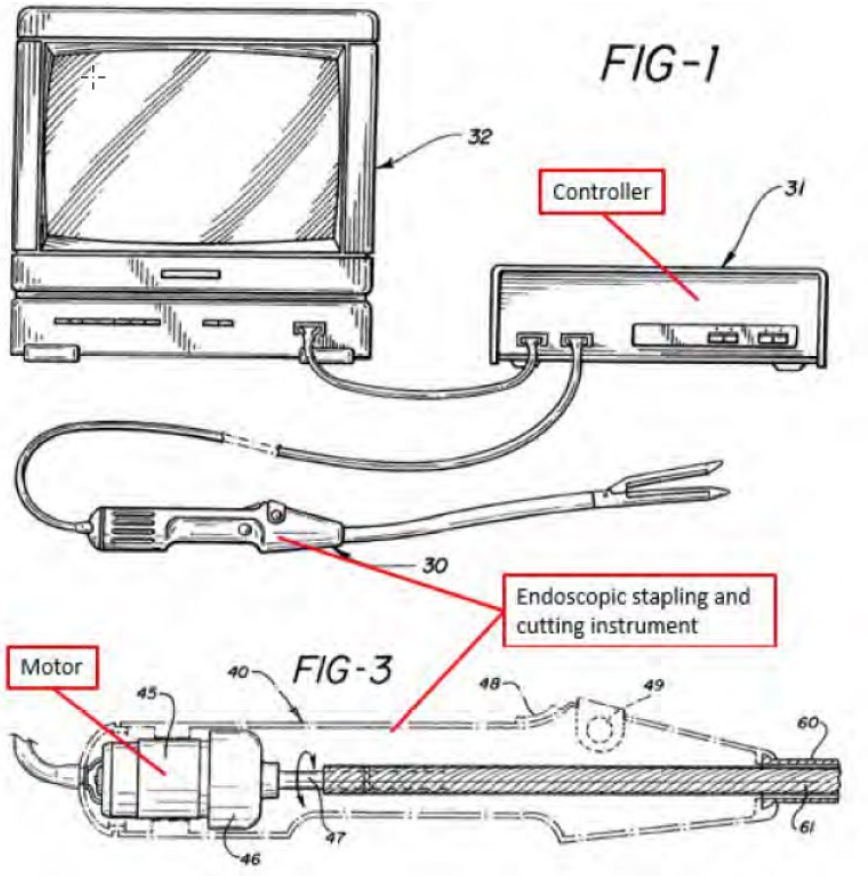

Figure 1 "is a schematic view of an endoscopic surgical system of the present invention interconnected with a microprocessor/controller and a video display screen." *Id.* at 3:14–16. Figure 3 "is a longitudinal cross-

sectional view of the handle portion of one embodiment of an endoscopic stapling and cutting system of the present invention." *Id.* at 3:30–31.

4. Summary of Gardiner (Ex. 1020)

Gardiner relates to "arterial replacement or bypass grafting by minimally invasive (or endoscopic) peripheral vascular and cardiovascular surgery." Ex. 1020, 1:23–26. Gardiner introduces "a sutured staple surgical fastener for fastening together an artery and a graft, and methods and apparatus for applying the fastener," which "may be applied by a remotely controlled robotic mechanism." *Id.* at 5:54–66. Figure 4A, reproduced below, illustrates an embodiment of the Gardiner invention.

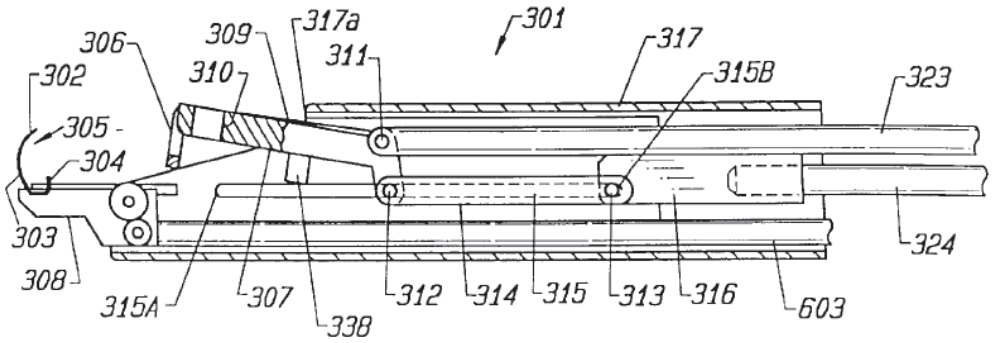

Figure 4A shows staple 305, the needle removal member 307, needle holder 308, and staple forming member 309. *Id.* at 13:37–46.

C. Petitioner's Asserted Grounds of Patentability

1. Ground 1: Obviousness of Claims 1–3, 8–12, and 16–20 over the Combination of Tierney and McGarry

a. Petitioner's Contentions

Petitioner contends claims 1–3, 8–12, and 16–20 would have been obvious over the combination of Tierney and McGarry. Pet. 23–51. In support of its contention, Petitioner provides a detailed discussion explaining

how each claim limitation is disclosed in the combination of Tierney and McGarry. *Id.*

In particular, Petitioner references Figure 22 of McGarry and contends that McGarry's lands 104R, 104L are first and second force transmitting portions that are configured to apply an axial force and a transverse force relative to the fastener (staple 110). *Id.* at 29 (citing Ex. 1003 ¶ 70). Petitioner further contends that McGarry's lands 104R, 104L perform the claimed function of applying an axial force and a transverse force relative to the fastener in substantially the same way as the '281 patent's lands 356, 358—that is, "physically contacting the legs of the staple and moving axially to initially apply an axial force and then a transverse force as the staple bends around the anvil" to achieve substantially the same result of closing the staple. Pet. 27–28 (citing Ex. 1003 ¶¶ 69–70; Ex. 1001, Figs. 25 and 26).

Petitioner contends that

> A [person of ordinary skill in the art] would have been motivated to combine McGarry's stapler applier with Tierney's robotic system for several reasons. *Id.* First, a POSITA would have recognized that Tierney contemplates use of its robotic system with "stapler appliers." Tierney, 6:20–27. And Tierney confirms that "[i]t should be understood that a wide variety of alternative end effectors for differing tool-types may be provided, and that … the tools of [Tierney's] invention may incorporate any … end effector which is useful for surgery, particularly at an internal surgical site." *Id.*, 10:5–11. A POSITA therefore would have turned to McGarry for details on how to implement a robotic tool with a surgical stapler applier to increase the number of uses for Tierney's robotic system. Fischer, ¶¶ 71–90.

Pet. 29–30 (emphasis omitted).

Alternatively, Petitioner contends that "a [person of ordinary skill in the art] would have been motivated to modify McGarry's stapler for use

with Tierney's robotic system to obtain the safety benefits of Tierney's force limitation mechanism." *Id.* at 32. Here, Petitioner notes that Tierney's tool memory 148 is a force limitation mechanism that stores "the maximum force to be applied via driven element 118," and that Tierney further discloses a safety monitoring controller via its incorporation of Cooper. *Id.*

Regarding whether a person of ordinary skill in the art would have had a reasonable expectation of success by combining the teachings of Tierney and McGarry to achieve the claimed device, Petitioner contends that

> it would have been merely the application of a known technique (use of a surgical stapler end effector) with a known system (Tierney surgical robot) in a common field of endeavor (the development of surgical instruments). [Ex. 1003 ¶ 87; [*KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 417 (2007)] . . . . And, in the Tierney/McGarry system, Tierney's robotic system and McGarry's stapling mechanism both continue to work as they always have. [Ex. 1003] ¶¶ 87–90. Thus, each element merely performs the same predictable function as it does separately, without significantly altering or hindering the functions performed by McGarry's stapler (stapling) or Tierney's robotic system (positioning the tool, providing mechanical controls to the tool, and receiving feedback signals from the tool). *Id*.

Pet. 32–33.

b. Patent Owner's Contentions

Patent Owner sets forth several arguments to support its position that Petitioner fails to establish a reasonable likelihood that challenged claims 1–3, 8–12, and 16–20 of the '281 patent would have been obvious over the combination of Tierney and McGarry. Prelim. Resp. 61–68. To begin, Patent Owner contends that the combination of Tierney and McGarry fails to show a computer that limits the axial and transverse forces applied to a fastener. *Id.* at 67–68. Patent Owner acknowledges that Tierney discloses

that tool-specific information transmitted from tool memory to Tierney's processor can include the "maximum force to be applied via driven elements 118." *Id*. at 54 (citing Ex. 1004, 15:59-16:4). Patent Owner contends, however, that the "maximum force" disclosed in Tierney "is merely a rating for the tool, not a system for controlling or limiting the force applied via the driven elements." Prelim. Resp. 54 (Ex. 2001 ¶ 128). Thus, according to Patent Owner, the proposed Tierney/McGarry system "would not have resulted in the claimed robotic system having a magnitude of axial and transverse forces limited by a computer." *Id.* at 55 (citing Ex. 2001 ¶ 129).

Patent Owner contends also that a"[person of ordinary skill in the art] would **not** have been motivated to attach the rigid staple applier of McGarry to the cable and pulley driven system of Intuitive's Tierney reference." *Id.* at 37. Specifically, Patent Owner contends that

> Madhani is directed to an intricate cable and pulley system designed to "reduce the number of actuators required and thus produce a fully functional articulated instrument of minimum size." Ex. 1009 at Abstract. The resulting system provides multiple degrees of freedom and a high degree of dexterity. *Id.*

Id. at 38 (citing Ex. 2001 ¶¶ 69–72). Patent Owner further contends that

> A [person of ordinary skill in the art] would have recognized that the actuation mechanism described by Tierney is designed specifically for articulable end-effectors involving axes of rotation to achieve their function (cutting, grasping, applying a clip, etc.) and that McGarry's stapler is **not** such an end-effector.

Id. at 39–40 (citing Ex. 2001 ¶ 99).

Additionally, Patent Owner contends that

> Tierney's cable and pulley system is not what a [person of ordinary skill in the art] would use to provide "pushing" forces to an object. Ex. 2001 at ¶ 100. Rather, a cable and pulley system

> is designed to apply "pulling" forces or to articulate joints as described in Madhani. *Id.*
>
> In addition, a [person of ordinary skill in the art] would have known that the force needed to fire the stapler pusher assembly of McGarry would have been significantly greater than the control forces described in the cable and pulley system of Tierney and Madhani. *Id*. at ¶ 101. Despite this, Petitioner proposes that "at least one of Tierney's drive motors" could be used to drive McGarry's stapler, and that "multiple motors may be used to increase the power to the staple applier." Petition at 39-40. However, adding extra power would affect the other control functions provided by the other cables since they are all interrelated. *Id.* If separate cables are installed for such stapler actuation, they will take up more space in the shaft 102 and add more weight to the tool that has already added weight due to McGarry's additional push plate assembly components. Additional weight, as Madhani acknowledges, adversely affects feedback, control and dexterity. *Id.* at ¶¶ 101, 113-114.

Id. at 40–41; Ex. 2001 ¶¶ 100, 135.

Patent Owner contends that Madhani teaches away from the combination of Tierney and McGarry. Prelim. Resp. 42–44. In particular, Patent Owner contends that Madhani recognized that the problem of cable "slippage" can be reduced by fixing the cable to the drive shaft "at one point by soldering, welding, or mechanical fixing means." *Id.* at 43 (citing Ex. 1009, 10:31–45; Ex. 2001 ¶ 105). Patent Owner contends that a

> [person of ordinary skill in the art] would have known that fixing the cable to the drive shaft (*e.g.* by soldering or other fixing means) would reduce the range of motion of the cable and pulley system and would require a longer and thus heavier cable. *Id.* at 10:38-45. Ex. 2001 at ¶ 106. Madhani expressly cautions against adding weight to the instrument, and a [person of ordinary skill in the art] thus would not have been motivated to employ such an approach. *Id.*

Id. Patent Owner further contends that "[t]he precise tool control desired by Tierney/Madhani would not be achieved when introducing a different end effector such as McGarry's stapler that requires significant force to fire the stapler." *Id.* at 44 (citing Ex. 2001 ¶¶ 108–109). For example, "the forces necessary to fire the staple pushing mechanism of McGarry's hand-held staple applier would significantly exceed the control forces provided by the cable and pulley system of Tierney/Madhani." *Id.* (citing Ex. 2001 ¶¶ 101, 110).

c. Analysis

(1) Independent Claims 1, 10 and 18

(a) Whether the combination of Tierney and McGarry teaches or suggests a computer that limits the axial and transverse forces applied to a fastener

As noted by Patent Owner, there are certain differences between the scope and content of the asserted prior art references that a person of ordinary skill in the art would have had to contemplate prior to combining the teachings to arrive at the claimed subject matter. Prelim. Resp. 51–57. In this regard, the parties dispute whether the combination of Tierney and McGarry teaches or suggests a computer that limits the axial and transverse forces applied to a fastener. At this stage of the proceeding, however, we determine that Petitioner has presented sufficient argument and evidence to support its contention that, together, Tierney and McGarry disclose the elements of a computer that limits the axial and transverse forces applied to a fastener. In particular, we are persuaded, on the current record, that Tierney's processor would have been configurable to limit the magnitude of

the forces that can be applied to operate a stapler end effector,[1] such as the stapler of McGarry. Ex. 1004, 15:42–16:61; Pet. 36–27; Ex. 1003 ¶¶ 94–97. To that point, at this stage, we credit the testimony of Dr. Fischer explaining that the magnitude of the forces applied to the driven elements of the Tierney's robotic system is limited and, as a result, so too is the magnitude of the axial and transverse forces that would have been applied to the fastener by McGarry's lands 104R, 104L. Ex. 1003 ¶¶ 94–97.

We recognize Patent Owner's arguments that combining the robotic system of Tierney/Madhani with the stapler of McGarry would have rendered the robotic system of Tierney/Madhani unsatisfactory for the disclosed intended purposes, and that Madhani teaches away from such a combination. Prelim. Resp. 38–50 (*citing generally* Ex. 2001). In this regard, we note that combinations that change the "basic principles under which the [prior art] was designed to operate," *In re Ratti*, 270 F.2d 810, 813 (C.C.P.A. 1959), or that render the prior art "inoperable for its intended purpose," *In re Gordon*, 733 F.2d 900, 902 (Fed.Cir.1984), may fail to support a conclusion of obviousness. On the current record, however, we determine that Petitioner has offered sufficient evidence to institute trial. In particular, we note that Dr. Fischer opines that "one can increase the torque output [of the driven disks of Tierney/Madhani] by increasing the number of driven disks providing the mechanical power." Ex. 1003 ¶ 100; Pet. 39–40. We recognize further the expert declaration of Dr. Riviere (e.g. Ex. 2001 ¶¶

[1] Tierney discloses that "[o]ne or more of the robotic arms will often support a surgical tool which may be articulated [such as] staple appliers." Ex. 1004, 6:22–25. Madhani discloses staplers as suitable "laparoscopic surgical instruments" to be used with its disclosed robotic system. Ex. 1009, 1:51–55, 5:52–55.

101, 110–120), and conclude that there exists genuine issues of fact requiring resolution, and that it is more appropriate to resolve such issues in trial. *See* 37 C.F.R. § 42.108(c) ("a genuine issue of material fact created by . . . testimonial evidence will be viewed in the light most favorable to the petitioner solely for purposes of deciding whether to institute an *inter partes* review"). That being said, we will evaluate both parties' arguments once the record is developed further during trial.

(b) Whether a person of ordinary skill in the art would have had reason to combine Tierney and McGarry

A critical issue in this case is whether a person of ordinary skill in the art would have had reason to combine the system of Tierney with the stapler of McGarry to achieve a robotic system encompassed by the challenged claims. Whether there was a motivation to combine prior art references is a question of fact. *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc*., 876 F.3d 1350, 1359 (Fed. Cir. 2017). An invention is not obvious simply because all of the claimed limitations were known in the prior art at the time of the invention. Instead, we ask "whether there is a reason, suggestion, or motivation in the prior art that would lead one of ordinary skill in the art to combine the references, and that would also suggest a reasonable likelihood of success." *Smiths Indus. Med. Sys., Inc. v. Vital Signs, Inc*., 183 F.3d 1347, 1356 (Fed. Cir. 1999). The motivation "can be found explicitly or implicitly in the prior art references themselves, in market forces, in design incentives, or in 'any need or problem known in the field of endeavor at the time of invention and addressed by the patent.'" *Arctic Cat*, 876 F.3d at 1359 (quoting *KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 420–21,705 (2007)).

After considering both the Petition and the Preliminary Response, we determine that Petitioner's arguments and evidence on the issues of reason to combine and reasonable expectation of success provide a sufficient basis on which to institute trial. In this regard, we note Petitioner's contention that Tierney suggests the use of its robotic system with "stapler appliers" (Ex. 1004, 6:20–27); that Tierney suggests that "[i]t should be understood that a wide variety of alternative end effectors for differing tool-types may be provided, and that . . . the tools of [Tierney's] invention may incorporate any . . . end effector which is useful for surgery, particularly at an internal surgical site" (*id.* at 10:5–11); and that McGarry discloses a surgical stapler applier (Ex. 1005, 1:10–13). Furthermore, we are persuaded, on the current record, that a person of ordinary skill in the art would have been aware of the safety concerns associated with the operation of robotic surgical systems and would have been motivated to modify McGarry's stapler for use with Tierney's robotic system to obtain the safety benefits of Tierney's force limitation mechanism, specifically, Tierney's tool memory 148 that stores "the maximum force to be applied via driven element 118." Pet. 31–32; Ex. 1004, 15:59–66; Ex. 1003 ¶¶ 83–85.

Additionally, we recognize the merit of Patent Owner's counterarguments, which are supported by the expert testimony of Dr. Riviere. Prelim. Resp. 37–53 (citing generally Ex. 2001). The issues identified by Patent Owner implicate genuine issues of fact more appropriately resolved at trial. 37 C.F.R. § 42.108(c). Furthermore, we decline to engage in weighing of the evidence at this stage of the proceeding. We will evaluate both parties' arguments and evidence once the record is fully developed further during trial.

(c) Conclusion

Accordingly, at this stage of the proceeding, for the reasons discussed by Petitioner (Pet. 23–37, 43–51), and taking into account the Preliminary Response, we are satisfied that Petitioner has established a reasonable likelihood that it would prevail in showing the unpatentability of at least independent claims 1, 10 and 18 over the combination of Tierney and McGarry.

(2) Dependent Claims 2–3, 8–9, 11–12, 16, 17, and 19–20

We have reviewed Petitioner's obviousness contentions as to claims 2–3, 8–9, 11–12, 16, 17, and 19–20 in this ground of unpatentability (Pet. 36–54) and the arguments in the Preliminary Response, and we are persuaded on the current record that Petitioner's arguments and evidence are sufficient to show a reasonable likelihood Petitioner would prevail in proving unpatentability of these claims.

D. Remaining Grounds 2–5

We have reviewed Petitioner's contentions as to the remaining grounds (Pet. 51–78) and the arguments in the Preliminary Response, and on this record we are persuaded that Petitioner's arguments and evidence are sufficient to show a reasonable likelihood Petitioner would prevail in proving unpatentability of at least one claim in challenged in each of Grounds 2–5. However, the burden remains on Petitioner to prove unpatentability of each challenged claim. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc*., 800 F.3d 1375, 1378 (Fed. Cir. 2015).

III. CONCLUSION

For the reasons expressed above, we determine that Petitioner has demonstrated a reasonable likelihood of showing that at least one claim of

the ’281 patent is unpatentable as obvious. In accordance with the Court’s decision in *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018) and Office policy, we institute an *inter partes* review of all challenged claims of the ’281 patent on all grounds alleged by Petitioner. *See* Guidance on the Impact of SAS on AIA Trial Proceedings (Apr. 26, 2018), https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial (“At this time, if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition.”).

This Decision is not a final determination on either the patentability of any challenged claim or the construction of any claim term and, thus, leaves undecided any remaining fact issues necessary to determine whether sufficient evidence supports Petitioner’s contentions by a preponderance of the evidence in the final written decision. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that “there is a significant difference between a petitioner’s burden to establish a ‘reasonable likelihood of success’ at institution, and actually proving invalidity by a preponderance of the evidence at trial”) (quoting 35 U.S.C. § 314(a) and comparing *id.* § 316(e)). We further note that the burden remains on Petitioner to prove unpatentability of each challenged claim. *Dynamic Drinkware*, 800 F.3d at 1378.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–20 of the ’281 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), the *inter partes* review of the '281 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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