

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTUITIVE SURGICAL, INC.,
Petitioner,

v.

ETHICON LLC,
Patent Owner.

IPR2019-01110
Patent 8,602,288 B2

Before JOSIAH C. COCKS, ZHENYU YANG, and
JOHN E. SCHNEIDER, *Administrative Patent Judges*.

SCHNEIDER, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Granting in part and Denying in part Patent Owner's Motion to Amend
35 U.S.C. § 318(a)

I. INTRODUCTION

On May 23, 2019, Intuitive Surgical, Inc. (Petitioner”) filed a Petition requesting *inter partes* review of claims 10 and 11 of U.S. Patent 8,602,288 B2 (Ex. 1001) (“the ’288 patent”). Paper 2 (“Pet.”). Ethicon LLC (“Patent Owner”) filed a Preliminary Response on September 15, 2019. Paper 6 (“Prelim. Resp.”). We determined, based on the information presented in the Petition and Preliminary Response, that there was a reasonable likelihood that Petitioner would prevail in showing that claims 10 and 11 were unpatentable. Pursuant to 35 U.S.C. § 314, the Board instituted trial on December 4, 2019. Paper 7 (“Inst. Dec.”).

Patent Owner did not file a Response to the Petition. Instead, Patent Owner filed a non-contingent Motion to Amend on March 12, 2020 substituting claims 12 and 13 for claims 10 and 11.¹ Paper 14 (“MTA”). Petitioner filed an Opposition to the Motion to Amend on June 18, 2020. Paper 19 (“MTA Opp.”). At Patent Owner’s request, we provided Preliminary Guidance concerning Patent Owner’s Motion to Amend on June 30, 2020. Paper 21 (“Prelim. Guid.”). Patent Owner then filed a Reply in Support of its Motion to Amend on July 31, 2020. Paper 24 (“MTA Reply”). Petitioner filed a sur-reply on August 13, 2020. Paper 27 (“MTA Sur-reply”).

Oral arguments relating to Patent Owner’s Motion to Amend were heard on September 10, 2020. A copy of the transcript has been entered into the record. Paper 29 (“Tr.”).

¹ While the Motion to Amend did not clearly state whether the Motion was non-contingent, in its Reply, Patent Owner stated that the Motion to Amend was non-contingent. MTA Reply, 1. Patent Owner confirmed that the Motion to Amend was non-contingent at the Oral Hearing. Tr. 4.

We have jurisdiction under 35 U.S.C. § 6. We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, Patent Owner's Motion to Amend is *granted* with respect to cancelling claims 10 and 11 and *denied* with respect to proposed substitute claims 12 and 13.

A. Real Parties in Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner, Intuitive Surgical, Inc. identifies itself as the real party in interest. Pet. 2.

Patent Owner states that it is an indirect subsidiary of Johnson & Johnson. Paper 5, 2. Patent Owner also states that the '288 patent is licensed to Ethicon Endo-Surgery, Inc., which has in turn sublicensed the '288 patent to Ethicon US, LLC. *Id.* Patent Owner states that Ethicon Endo Surgery, Inc. and Ethicon US, LLC are also indirect subsidiaries of Johnson & Johnson. *Id.*

B. Related Matters

The parties have indicated that the '288 patent is involved in the following litigation: *Ethicon LLC et al. v. Intuitive Surgical, Inc. et al.*, C.A. No. 1:18-cv-01325-LPS (D. Del.). Pet. 2; Paper 5, 2.

Patent Owner also represents that patents assigned to Patent Owner and asserted against Petitioner in the litigation listed above are involved in the following IPRs: IPR2018-00933, -934, -935, -936, -938, -1247, -1248, -1254, -1703, IPR2019-00880, -00991, and -01066. *Id.*

C. The '288 Patent

The '288 patent is entitled Robotically-Controlled Motorized Surgical End Effector System with Rotary Actuated Closure Systems Having Variable Actuation Speeds. Ex. 1001, code (54). The '288 patent issued from U.S. App. No. 13/369,588, filed on Feb. 9, 2012, which is a

continuation of U.S. App. No. 13/118,253, filed on May 27, 2011, which is a continuation-in-part of U.S. App. No. 12/235,972, filed on Sept. 23, 2008. Ex. 1001, codes (21), (45), and (63).

The '288 patent generally relates to motorized surgical instruments. Ex. 1001, col. 1, ll. 62–66. In one embodiment, the instrument comprises an end effector which includes a component or part which can be selectively moved between first and second position where the movement of the component occurs in two phases and where the rate of movement during one phase is different from the rate of movement in the other phase. *Id.* Abstr. The end effector may comprise “graspers, cutters, staplers, clip applicers, access devices, drug/gene therapy devices, ultrasound, RF or laser devices” and the like. *Id.* at col. 9, ll. 46–52. In one embodiment, the moveable component is an anvil of a surgical stapler. *Id.* at col. 10, ll. 1–19.

The '288 patent discloses at least two methods for controlling the rate at which the anvil is closed. The first involves the use of a variable pitch groove/thread arrangement to close the anvil at two different rates. *Id.* at col. 53, ll. 50–64; Pet. 7–8. The second involves the use of a trunnion which engages a slot having a steeper proximal portion and a shallower distal portion. Ex. 1001, Figs. 57–58, col. 50, ll. 15–18; col. 4, ll. 60–63; Pet. 9–10.

D. Proposed Substitute Claims

In its Motion to Amend, Patent Owner proposes substitute claims 12 and 13 for original claims 10 and 11, the only claims challenged in the Petition. MTA 1. Substitute claims 12 and 13 read as follows²:

² The claims are annotated to show the differences between the original claims and the proposed substitute claims with underlining showing limitations added to the claims and brackets showing deletions.

12. (proposed substitute for claim 10) A surgical tool for use with a robotic system that has a tool drive assembly that is operatively coupled to a control unit of the robotic system that is operable by inputs from an operator and is configured to provide rotary output motions to a plurality of rotatable body portions supported on the tool drive assembly, said surgical tool comprising:

a surgical end effector comprising:

at least one component portion comprising a rotatable jaw that is selectively movable between first and second positions relative to at least one other component portion thereof; and

a staple cartridge comprising a plurality of staples and a sled, said staples being configured to be ejected out of said staple cartridge by a distal movement of said sled through said end effector;

an elongated shaft assembly operably coupled to said surgical end effector, said elongated shaft assembly comprising:

an axially movable portion comprising a first cam in operable communication with said at least one selectively movable component portion of said surgical end effector, wherein said first cam is configured to communicate with said rotatable jaw to transmit closing motions thereto;

[and]

a rotatably movable portion comprising a rotatable drive shaft configured to rotate in response to one of said rotary output motions; said rotatable drive shaft in operable engagement with said axially movable portion wherein an initial rotation of said rotatably movable portion causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said first position into an intermediate position at a first rate, wherein a subsequent rotation of said rotatably movable portion in a same direction causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said intermediate position to said second position at a second rate, and wherein said first rate is greater than said second rate[.];

a first articulation joint configured to articulate said end effector about a first axis in response to one of said rotary output motions;

a second articulation joint configured to articulate said end effector about a second axis in response to one of said rotary output motions; and

a tool mounting plate supporting said elongate shaft assembly and configured to be releasably mounted to said tool drive assembly, said tool mounting plate comprising a plurality of driven elements configured for driving engagement with a corresponding plurality of rotatable body portions of said tool drive assembly when said tool mounting plate is mounted to said tool drive assembly.

13. (proposed substitute for claim 11) A surgical tool for use with a robotic system that has a tool drive assembly that is operatively coupled to a control unit of the robotic system that is operable by inputs from an operator and is configured to provide rotary output motions to a plurality of rotatable body portions supported on the tool drive assembly, said surgical tool comprising:

a surgical end effector comprising:

at least one component portion comprising a rotatable jaw that is selectively movable between first and second positions relative to at least one other component portion thereof; and

a staple cartridge comprising a plurality of staples and a sled, said staples being configured to be ejected out of said staple cartridge by a distal movement of said sled through said end effector;

an elongated shaft assembly operably coupled to said surgical end effector, said elongated shaft assembly comprising:

an axially movable portion comprising a first cam in operable communication with said at least one selectively movable component portion of said surgical end effector, wherein said first cam is configured to communicate with said rotatable jaw to transmit closing motions thereto;

[and]

a rotatably movable portion comprising a rotatable drive shaft configured to rotate in response to one of said rotary

output motions; said rotatable drive shaft in operable engagement with said axially movable portion wherein an initial rotation of said rotatably movable portion causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said first position into an intermediate position at a first rate, wherein a subsequent rotation of said rotatably movable portion in a same direction causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said intermediate position to said second position at a second rate, and wherein said rotatably movable portion comprises a closure member in threaded engagement with said axially movable portion[.];

a first articulation joint configured to articulate said end effector about a first axis in response to one of said rotary output motions;

a second articulation joint configured to articulate said end effector about a second axis in response to one of said rotary output motions; and

a tool mounting plate supporting said elongate shaft assembly and configured to be releasably mounted to said tool drive assembly, said tool mounting plate comprising a plurality of driven elements configured for driving engagement with a corresponding plurality of rotatable body portions of said tool drive assembly when said tool mounting plate is mounted to said tool drive assembly.

E. Evidence

Petitioner relies on the following references:

Timm et al., US 7,510,107 B2, issued March 31, 2009 (Ex. 1006 “Timm”).

Anderson et al., US 6,783,524 B2, issued August 31, 2004 (Ex. 1008 “Anderson”).

Schulze et al., US 5,632,432, issued May 27, 1997 (Ex. 1007 “Schulze”).

Viola et al., US 5,915,616, issued June 29, 1999 (Ex. 1005 “Viola”).

Tierney et al., US 6,331,181 B1, issued December 18, 2001 (Ex. 1009 “Tierney”).

Petitioner also relies on the Declaration of Dr. Gregory S. Fischer and the Supplemental Declaration of Dr. Gregory S. Fischer. Exs. 1003 and 1023. Patent Owner relies on the Declaration of Dr. William Cimino. Ex. 2012.

F. Prior Art and Asserted Grounds

Petitioner asserts that proposed substitute claims 12 and 13 would have been unpatentable on the following grounds:³

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
12, 13	112, first paragraph	Written Description ⁴
12, 13	103(a)	Timm, Anderson, Schulze, Viola, Tierney
12, 13	103(a)	Timm, Anderson, Schulze, Shelton, Tierney

II. ANALYSIS

A. Statutory and Regulatory Requirements for the Motion to Amend

While the Board must assess the patentability of the proposed substitute claims “without placing the burden of persuasion on the patent

³ The provisions of the America Invents Act regarding novelty and obviousness apply to patents containing at least one claim having an effective filing date on or after March 16, 2013. Pub L. 112–29. Petitioner contends and Patent Owner does not contest that the ’288 patent has an effective filing date of at least May 27, 2011. Pet. 4. Therefore, the Pre-AIA provisions of 35 U.S.C. §§ 102, 103, and 112 apply to this decision.

⁴ We do not address this asserted ground because, as discussed below, it is Patent Owner’s burden to show that the proposed substitute claims have written description support.

owner,” *Aqua Prods.*, 872 F.3d at 1328 (en banc), Patent Owner’s proposed substitute claims, however, must still meet the statutory requirements of 35 U.S.C. § 316(d) and the regulatory requirements of 37 C.F.R. § 42.121 as a threshold matter. *See* USPTO’s Memorandum, Guidance On Motions to Amend in view of Aqua Products (Nov. 2017), available at https://www.uspto.gov/sites/default/files/documents/guidance_on_motions_to_amend_11_2017.pdf. Accordingly, Patent Owner must demonstrate: (1) the amendment proposes a reasonable number of substitute claims; (2) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter; (3) the amendment responds to a ground of unpatentability involved in the trial; and (4) the original disclosure sets forth written description support for each proposed claim. *See* 35 U.S.C. § 316(d)(1)(B), (3); 37 C.F.R. § 42.121; *Hospira, Inc. v. Genentech, Inc.*, IPR2017-00737, Paper 108 at 47 (PTAB Oct. 3, 2018).

1. Patent Owner Proposes a Reasonable Number of Claims.

Patent Owner’s Motion to Amend substitutes one substitute claim for each of the challenged claims. MTA 4. This is a reasonable number of claims. *See* 37 C.F.R. § 41.121(a)(3) (“The presumption is that only one substitute claim would be needed to replace each challenged claim.”).

2. The Proposed Substitute Claims do not Enlarge the Scope of the Claims

Patent Owner contends that the proposed substitute claims do not enlarge the scope of the claims of ’288 patent as the proposed substitute claims include narrowing limitations. MTA 2. Petitioner does not contest Patent Owner’s contention. *See* MTA Opp. 1–5.

We find that the proposed substitute claims do not enlarge the scope of the ’288 patent’s claims. The proposed substitute claims add limitations relative to the original claims such as requiring the presence of a staple

cartridge and a tool mounting plate, which narrow the scope of the claims. MTA 2–3.

3. The Amendments Respond to a Ground of Unpatentability

Patent Owner contends that the proposed amendments respond to a ground of unpatentability. MTA 14–17. Specifically Patent Owner contends that the proposed substitute claims include limitations calling for “(1) a staple cartridge comprising a sled that ejects staples through distal movement of the sled through an end effector; (2) multiple articulation joints; and (3) articulation in response to rotary output motion from a tool drive assembly of a robotic system.” *Id.* at 14–15. Patent Owner contends that these limitations address the grounds of invalidity based on Heinrich⁵ alone or in combination with Viola and/or Anderson. *Id.* Patent Owner also contends that the limitation calling for a mounting plate distinguishes the invention from the teachings of Timm, either alone or in combination with Viola or Schulze. *Id.* at 16.

We agree that proposed substitute claims 12 and 13 each recite new limitations or new combinations of limitations which are offered to address the grounds of unpatentability recited in the Petition.

4. The Amendments Introduce New Matter and Lack Written Description Support

Proposed substitute claims 12 and 13 introduce limitations calling for (1) an axially movable closure cam; (2) a rotatable drive shaft, which causes the axially movable cam to close a jaw; and (3) two articulation joints. MTA A-1–A-5. Patent Owner contends that these elements are supported by the Specification and do not introduce new matter. MTA 8–10, 12–13.

⁵ Heinrich et al., US 2005/0131390 A1, published June 16, 2005 (Ex. 1004 “Heinrich”).

Petitioner contends that while the Specification discloses each of the individual elements of the proposed substitute claims the Specification does not disclose a single embodiment that includes all of the recited elements. MTA Opp. 2. Petitioner contends that Patent Owner is improperly combining features of two different embodiments from the Specification. *Id.* at 2–4.

Patent Owner responds that there is no requirement that a single embodiment be present in the Specification to provide written support as long as the Specification provides sufficient description to “convey with reasonable clarity to a POSITA that the applicant possessed the invention claimed in proposed substitute claims 12 and 13.” MTA Reply 3. Patent Owner, through its expert, contends that the Specification provides a sufficient description to support proposed substitute claims 12 and 13. *Id.*; Ex. 1012 ¶¶ 32–42. Patent Owner contends that one skilled in the art would have understood that the embodiments described in the Specification are not to be considered separate instruments but would have understood that they possess common elements. MTA Reply 3–6; Ex. 1012 ¶¶ 39–42. Patent Owner contends that one skilled in the art would understand that features from one embodiment could be successfully incorporated into another, specifically, that “the two joint articulation mechanism of surgical tool 6000 (driven by articulation drive gear 6322 attached to one of the driven elements 1304) was complementary to and suitable to be used with the closure and firing mechanisms described with respect to surgical tool 3400^[6].” MTA Reply 6 (footnote omitted); Ex. 2012 ¶¶ 39–42.

⁶ We use the same shorthand to refer to the different embodiments as the parties. Embodiment 3400 refers to the endocutter system shown in Ex. 1001, Figs. 72–76 and discussed at col. 54, l. 41–col. 56, l. 20. Embodiment

Petitioner responds that while it may have been obvious to combine different elements from different embodiments, that is not the same as satisfying the written description requirement. MTA Sur-reply 2. Petitioner contends that the Specification must contain sufficient disclosure that the inventors contemplated “adding embodiment 6000’s articulation mechanism to embodiment 3400.” *Id.* Petitioner contends that the present Specification does not contain such a disclosure. *Id.* at 3–5.

We have considered the arguments presented by the parties and the evidence of record and conclude that proposed substitute claims 12 and 13 are not sufficiently supported by the Specification. While we agree with Patent Owner that a single embodiment with all the features of the claims is not required to satisfy the written description requirement, the disclosure must convey with reasonable clarity to one skilled in the art that the inventors possessed the invention claimed in proposed substitute claims 12 and 13. *See Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). We find that the present disclosure does not meet this requirement.

In support of its contention that one skilled in the art would have recognized that the inventors contemplated combining the articulation element of the 6000 embodiment to the 3400 embodiment, Patent Owner points to the Declaration of Dr. Cimino. MTA Reply 3. Dr. Cimino testifies that one skilled in the art would understand that the various embodiments are not to be viewed in isolation. Ex. 2012 ¶ 39. To support this observation, Dr. Cimino points to the teachings of the Specification where it states “[t]he

6000 refers to the endocutter system shown in Ex. 1001, Figs. 135–140 and discussed at col. 79, l. 8–col. 80, l. 62.

features illustrated or described in connection with one exemplary embodiment may be combined with the features of other embodiments. Such modifications and variations are intended to be included within the scope of the present invention.” *Id.* (quoting Ex. 2003 ¶ 154). Dr. Cimino also contends that this language would lead one skilled in the art to understand that the various control motions disclosed in the ’288 patent are all operable on the same surgical instrument. *Id.*

Based on a preponderance of the evidence we disagree with Patent Owner’s contentions.. The cited paragraphs only discuss the possibility of combining various unspecified aspects of the invention with each other. We discern nothing in the cited passage which would inform one skilled in the art that the inventors contemplated the specific combination of elements recited in the proposed substitute claims. As Petitioner points out, the portions of the Specification cited by Patent Owner do not inform one skilled in the art that the inventors were in possession of the claimed subject matter. MTA Sur-Reply, 4; *See, e.g., Fujikawa v. Wattanasin*, 93 F.3d 1559, 1571 (Fed. Cir. 1996) (“In the absence of such blazemarks, simply describing a large genus of [potential surgical instruments] is not sufficient to satisfy the written description requirement as to particular species or subgenuses.”).

Patent Owner also contends that the teaching in the ’288 patent that the two embodiments are operated using the same rotary output motions would have led one skilled in the art to conclude that the inventors contemplated an embodiment using the articulation mechanism of embodiment 6000 in embodiment 3400. MTA Reply 4–5. Patent Owner contends that one skilled in the art “would have understood that the closure and cutting mechanisms are complimentary to articulation mechanisms,

including either a single articulation joint driven by one rotary control motion (Figs. 34-36) or two articulation joints driven by one rotary control motion (Fig. 136-139).” *Id.* at 5 (citing Ex. 2012 ¶¶ 39–41, Ex. 2003 ¶¶ 234, 367, 389).

Again we do not agree with Patent Owner’s argument. While it is clear that the two embodiments use the same drive mechanisms, Patent Owner and Dr. Cimino do not adequately explain how this demonstrates that the inventors contemplated using the articulation mechanism of the 6000 embodiment in the 3400 embodiment. *See* MTA Reply 5; Ex. 2012 ¶ 40. Patent Owner’s statement that the two embodiments are complementary does not explain how the combination of elements recited in the proposed substitute claims was contemplated by the inventors. *See, e.g., Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997) (“One shows that one is ‘in possession’ of the invention by describing the invention, with all its claimed limitations, not that which makes it obvious.”); *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc) (noting the “well-settled” principle that “a description that merely renders the invention obvious does not satisfy the [written description] requirement.”). This is especially true given Dr. Cimino’s testimony that the closure mechanisms of the two embodiments operate differently such that the articulation mechanism of the 6000 embodiment would not work with the closure mechanism of the 3400 embodiment. Ex. 1024, 22–33.

Based on the forgoing, we conclude that Patent Owner has not shown that the proposed substitute claims meet the statutory requirements.⁷

⁷ While we acknowledge that in our Preliminary Guidance we found that the proposed substitute claims were supported by the Specification and did not introduce new matter, that finding was preliminary and non-binding. Prelim.

Specifically, Patent Owner has not shown that the proposed substitute claims are fully supported by the Specification and do not introduce new matter. As discussed above, while each of the elements of the proposed substitute claims can be found in either embodiment 3400 or embodiment 6400, Patent Owner has not pointed to, nor do we discern, either a specific embodiment containing all of the elements or a teaching in the Specification that the inventors contemplated combining the articulation mechanism of the 6400 embodiment in the 3400 device. That alone is sufficient reason to deny entry of those proposed substitute claims. Nevertheless, we also proceed to evaluate the patentability of the substitute claims over the prior art.

B. Legal Standards

In an *inter partes* review, amended claims are not added to a patent as of right, but rather must be proposed as a part of a motion to amend. 35 U.S.C. § 316(d). The Board must assess the patentability of proposed substitute claims “without placing the burden of persuasion on the patent owner.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc); *see also Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 3–4 (PTAB Feb. 25, 2019) (precedential). Subsequent to the issuance of *Aqua Products*, the Federal Circuit issued a decision in *Bosch Automotive Service Solutions, LLC v. Matal*, 878 F.3d 1027 (Fed. Cir. 2017) (“Bosch”), as well as a follow-up order amending that decision on rehearing. *See Bosch Auto. Serv. Sols., LLC v. Iancu*, No. 2015-1928 (Fed. Cir. Mar. 15, 2018) (Order on Petition for Panel Rehearing).

Guid. 2. Petitioner has subsequently presented additional arguments which have persuaded us that our preliminary conclusions were in error. *See* MTA Sur-reply 2–7.

In accordance with *Aqua Products*, *Bosch*, and *Lectrosonics*, a patent owner does not bear the burden of persuasion to demonstrate the patentability of the substitute claims presented in the motion to amend. Rather, ordinarily, “the petitioner bears the burden of proving that the proposed amended claims are unpatentable by a preponderance of the evidence.” *Bosch*, 878 F.3d at 1040 (as amended on rehearing); *Lectrosonics*, Paper 15 at 3–4. In determining whether a petitioner has proven unpatentability of the substitute claims, the Board focuses on “arguments and theories raised by the petitioner in its petition or opposition to the motion to amend.” *Nike, Inc. v. Adidas AG*, 955 F.3d 45, 51 (Fed. Cir. 2020).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Objective evidence of nonobviousness may include the following: “commercial success, long felt but unsolved needs, failure of others, etc.” *Id.*

We analyze the patentability of proposed substitute claims 12 and 13 in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis.

AlSite Corp. v. VSI Int'l Inc., 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17–18; *Ryko Mfg. Co. v. NuStar, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Petitioner, through its declarant, Dr. Fischer, contends that

[a] person of ordinary skill in the art at the time of the claimed invention (“POSITA”) would have had the equivalent of a Master’s degree or higher in mechanical engineering, electrical engineering, biomedical engineering, or a related field directed towards medical electro-mechanical systems and at least 2-3 years working experience in research and development for surgical instruments. Experience could take the place of some formal training, as relevant skills may be learned on the job. This description is approximate, and a higher level of education might make up for less experience, and vice versa.

Ex. 1003 ¶ 30. Patent Owner has not contested this definition of the skilled artisan’s qualification. See MTA, 7–8. For purposes of this decision, we adopt Dr. Fischer’s description of the level of ordinary skill in the art.

We also note that the applied prior art reflects the appropriate level of skill at the time of the claimed invention. See *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

D. 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). See Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,340, 51,358 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b)

effective November 13, 2018) (now codified at 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.* Furthermore, we need only construe the claims to the extent necessary to resolve the issue of whether the proposed substitute claims are patentable. *See 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))).

As seen from the discussion which follows, we need not construe any of the terms of the claims to resolve the issues before us.

E. Patentability of the Proposed Substitute Claims

1. Motivation to Combine References

“It is well-established that before a conclusion of obviousness may be made based on a combination of references, there must have been a reason, suggestion, or motivation to lead an inventor to combine those references.” *Pro-Mold & Tool Co. v. Great Lakes Plastics Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996).

[A] proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have had a reasonable expectation of success. Both the

suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure.

In re Vaeck, 947 F.2d 488, 493 (Fed. Cir. 1991) (citation omitted).

Each of the grounds asserted by Petitioner relies, at least in part, on the combined teachings of Timm and Anderson. *See*, MTA Opp. 6, 18–19. Central to both grounds is the issue of whether one skilled in the art would have been motivated to combine the teachings of the references to create the claimed invention and whether one skilled in the art would have had a reasonable expectation of success in combining the teachings of the references to arrive at the claimed subject matter. *See* MTA Opp. 6–10; MTA Reply 7–18. Therefore we will first address the issues of motivation to combine Timm with Anderson and whether one skilled in the art would have had a reasonable expectation of success in doing so before we address whether the combination of Timm and Anderson, and the other asserted references (if necessary) teach all of the limitations of the proposed substitute claims.

a) Timm

Timm relates to a surgical instrument such as a surgical stapler. Ex.1006, col. 1, ll. 8–13. Referring to Figure 73A, reproduced below, in one embodiment, the opening and closing of the stapler is accomplished using a closure ring which engages a ramp at the end of the anvil. *Id.* at col. 36, ll. 18–24. As the closure ring is moved forward, the anvil is moved relative to the staple cartridge. *Id.* The movement of the closure ring is controlled by the rotation of a closure tube, which is threadably connected to the closure ring. *Id.* In this embodiment, the anvil includes a pair of trunnions which engage slots in the device which regulate the rate at which the anvil moves. *Id.* at col. 35, l. 64 – col. 36, l. 3; col. 45, ll. 45–55; Ex. 1003 ¶ 89.

Figure 73A of Timm illustrates a portion of a surgical stapler and is reproduced below:

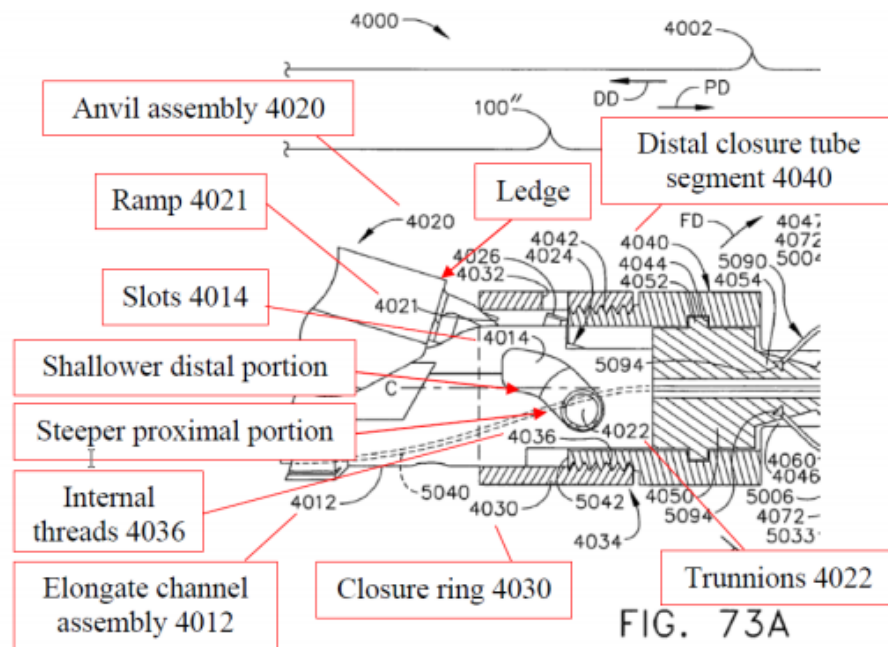


Figure 73A of Timm as annotated by Petitioner showing a partial cross-section of a surgical stapling and severing instrument. Pet. 33.

b) Anderson

Anderson discloses an apparatus for enhancing robotic surgery. Ex. 1008, col. 3, ll. 64–65. The apparatus of Anderson comprises a tool drive assembly coupled to a control station that is operated by a surgeon or other user. *Id.* at col. 10, l. 40–col. 12, l. 22, col. 15, ll. 3–8, col. 21, l. 66–col. 22, l. 19, col. 31, ll. 31–45, Figs. 1, 2, 12A–D, and 20.

c) Discussion

Petitioner contends that one skilled in the art would have been motivated to combine the teachings of Timm with Anderson to produce a surgical instrument like that taught by Timm that is operated by a robotic system such as that taught by Anderson. MTA Opp. 6. In support of this contention, Petitioner points to the teachings in Timm that the surgical

instruments described therein can be robotically operated. *Id.* (citing Ex. 1006, col. 8, ll. 3–8, col. 12, ll. 1–3, col. 19, ll. 28–36; Ex. 1023 ¶¶ 42–72).

Petitioner also contends that one skilled in the art would have had a reasonable expectation of success in producing a robotically controlled instrument as claimed. MTA Opp. 9–10. Petitioner supports this contention by pointing to various prior art systems where handheld surgical tools such as that described in Timm were successfully modified to operate using a robotic system. *Id.* (citing Exs. 1004, 1008, 1015, 1019; Ex. 1023 ¶¶ 56–59, 62–67).

Patent Owner contends that one skilled in the art would not have been motivated to combine the teachings of Timm and Anderson. MTA Reply 7. Patent Owner contends that Timm does not teach that its endocutters could be operated using a robotic system. *Id.* Patent Owner also contends that Anderson does not teach that its robotic system could be used with an endocutter. *Id.*

Patent Owner contends that one skilled in the art would not have had a reasonable expectation of success in combining the teachings of the references. *Id.* at 8. Patent Owner contends that combining the teachings of the references would have required a complete redesign in the system taught by Anderson. *Id.*

We have considered the arguments presented by the parties and the evidence of record and find that the evidence of record supports the conclusion that one skilled in the art would have been motivated to adapt the endocutter of Timm to be operated robotically using a robotic system disclosed in Anderson with a reasonable expectation of success.

Referring to Figure 1, reproduced below, Timm teaches that “the proximal end 24 can be permanently or removably associated with a handle

or other actuating assemblies of a manually (or other, e.g., robotic or computer) operated open or endoscopic surgical stapler 1.” Ex. 1006, col. 2, ll. 5–8.

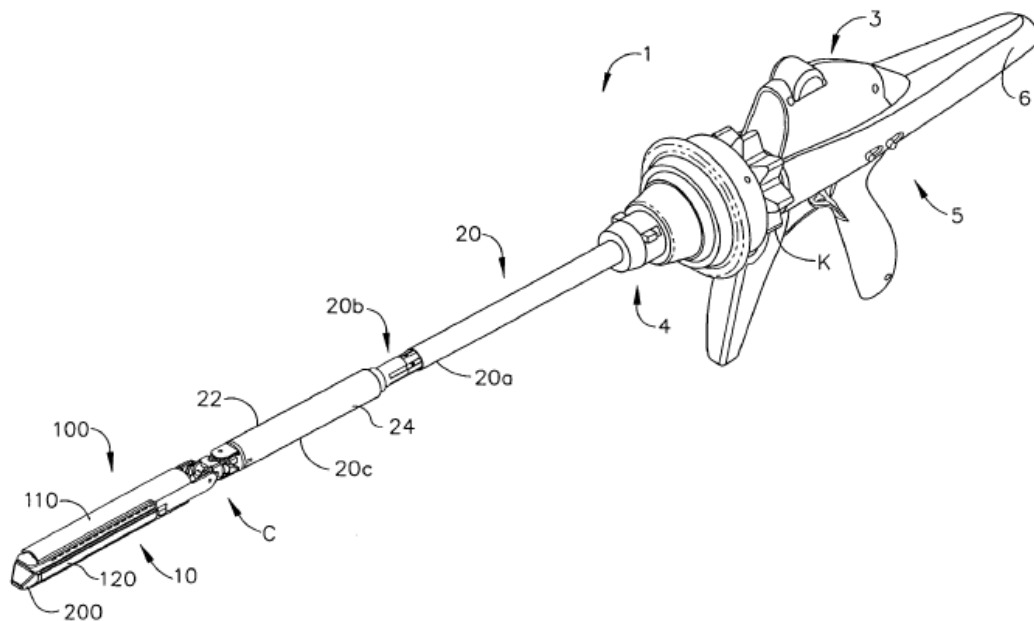


FIG. 1

Figure 1 of Timm showing a perspective view of a surgical stapling and severing instrument of various embodiments of the invention disclosed therein.

Timm also teaches “[t]he use of the above-described tool assembly 100 as part of a robotic system is also envisioned.” Ex. 1006, col. 12, ll. 1–3. We agree with Dr. Fischer that these teachings in Timm demonstrate that Timm contemplated using the disclosed endocutter with a surgical robot and that this would have motivated one skilled in the art to combine the instrument of Timm with a robotic system, such as that taught by Anderson. Ex. 1023 ¶ 44.

Moreover, Anderson also contemplates use of its robotic system with devices such as endocutters. Anderson teaches:

In further examples, the instrument probe assembly may include suitable OEM components of biopsy probes, suction probes, substance injection probes, surgical accessory application probes, stapler probes, tissue grasping and cutting probes, and the like. Likewise, the instrument probe assembly may combine more than one of the medical functions of the above described instruments.

Ex. 1008, col. 7, ll. 19–25. We agree with Dr. Fischer that this passage demonstrates that Anderson contemplated use of the disclosed robotic system with a variety of devices including the surgical instrument disclosed in Timm. Ex. 1023 ¶ 43.

Patent Owner contends that Timm does not teach that the articulating endocutters described therein could be operated using a robotic system. MTA Reply 8–9. Patent Owner contends that the cited statements in Timm are limited to embodiments for a handheld endocutter with a manual trigger. *Id.* Patent Owner, through its expert Dr. Cimino, postulates that the complexities of adapting a handheld instrument to a robotic control system would not have motivated one skilled in the art to make such a system. *Id.* at 9. We are not persuaded by Patent Owner’s arguments.

While we agree with Patent Owner that the statements in Timm regarding the use of a robotic control system are not specifically directed to an articulated endocutter, the statements refer to the endocutters of Timm in general and one skilled in the art would have regarded the statements as applying to all of the endocutters disclosed in Timm. For example, referring to Figure 1, Timm teaches that the endocutter can be associated with a robotic system. Ex. 1006, col. 8, ll. 4–8. Figure 1 is described as

“perspective view of a surgical stapling and severing instrument of *various embodiments* of the present invention.” *Id.* at col. 3, ll. 1–3 (emphasis added). We find that it would have been obvious based on these disclosures that Timm’s various embodiments may be adapted for use in robotic systems.

Moreover, the motivation to combine Timm and Anderson is would not have been limited to the statements in Timm alone. Anderson teaches that the system disclosed therein can be used with various other components including staplers, tissue grasping and cutting probes and instruments that combine more than one of the recited medical functions. Ex. 1008, col. 7, ll. 19–25.

We are also not persuaded by Patent Owner’s contention that the complexities of adapting the device of Timm to work with the system of Anderson would have discouraged one skilled in the art from combining the references. MTA Reply 9. As discussed more fully below, we find that one skilled in the art would have understood how to make the necessary modifications and would have had reasons for, and would not have been discouraged from, making the proposed combination.

We are also not persuaded by Patent Owner’s argument that the stapler probes mentioned in Anderson are fundamentally different from the endocutter of Timm and that one skilled in the art would have understood that Anderson’s reference to a stapler probe does not include an endocutter. MTA Reply 10–11. In the same vein, we are not persuaded by Patent Owner’s argument that Anderson’s reference to OEM equipment means that the devices are used without modification and that adapting the endocutter for Timm to work with the Anderson system would have required extensive modifications. *Id.* at 11–12. While Dr. Cimino testifies that one skilled in the

art would understand an OEM component is to be used without modification, Dr. Cimino offers no support for this conclusion. *See* Ex. 2012 ¶ 56. We discern nothing in Anderson to teach that the OEM instruments recited are to be used without modification of either the instrument or the system of Anderson. As the Federal Circuit explained in *ClassCo*, “the rationale of *KSR* does not support [the] theory that a person of ordinary skill can only perform combinations of a puzzle element A with a perfectly fitting puzzle element B.” *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1219 (Fed. Cir. 2016), *see also id.* (“*KSR* does not require that a combination only unite old elements without changing their respective functions.”).

Anderson teaches that the disclosed system can be used with stapler probes, tissue and grasping probes and may combine more than one of the recited functions. Ex. 1008, col. 7, ll. 19–25. Even if we accept Patent Owner’s argument that the term stapler probe as used in Anderson does not include endocutters, Anderson clearly embraces instruments which combine stapling and cutting.

Patent Owner also contends that one skilled in the art would not have been motivated to combine the teachings of Timm with Anderson as the system of Anderson does not provide sufficient force to operate an endocutter. MTA Reply 13. In support of this contention, Patent Owner cites to the testimony of Dr. Cimino that the OEM devices contemplated by Anderson only use about a tenth of the force required to operate an endocutter. *Id.* (citing Ex. 2012 ¶¶ 83–84). We remain unpersuaded by this argument. Dr. Cimino compares a sonic scalpel with an endocutter. Ex. 2012 ¶ 82. While we agree with Dr. Cimino that a sonic cutting instrument is one type of OEM instrument contemplated by Anderson, as discussed above, Anderson also teaches use of instruments such as staplers and instruments

that combine the feature of cutting instruments and staplers. Ex. 1008, col. 7, ll. 19–25. Dr. Cimino does not offer a comparison of a stapler probe with an endocutter or a comparison of an endocutter with an instrument that combines the functions of a stapler and a cutter. Moreover, Timm teaches that adaptations such as changes in gear ratios can be used to transmit the forces necessary to operate a surgical instrument. Ex. 1006, col. 19, ll. 22–27. Dr. Fischer testified that such modifications would have been within the skill of an ordinary artisan. Ex. 1023 ¶ 68. We find that testimony adequately supported by the record and credit the testimony.

Patent Owner cites to two prior patents and applications assigned to Petitioner as showing that, at the time the invention was made, one skilled in the art would have understood that the system of Anderson would not have been able to drive an endocutter. MTA Reply 14. We remain unpersuaded. The grounds of unpatentability before us are not limited to the teachings of Anderson alone but are based on Anderson and Timm. Timm teaches modifying the gear ratios as a means to generate the forces necessary to operate an endocutter. Ex. 1006, col. 19, ll. 22–27. Thus, the combined teachings of Timm and Anderson would have motivated one skilled in the art to combine the teachings of the references to produce the claimed endocutter system.

We now turn to the question of whether one skilled in the art would have had a reasonable expectation of success in combining the endocutter of Timm with the robotic system of Anderson.

Petitioner contends that one skilled in the art would have had a reasonable expectation of success in combining the two disclosures. MTA Opp. 9–10. Petitioner contends that the modifications necessary to adapt

handheld instruments like those in Timm for use with a robotic system were well known in the art. *Id.* at 9.

Patent Owner disagrees. MTA Reply 15–18. Patent Owner contends that the system disclosed in Anderson is not capable of articulation as the ultrasound devices disclosed in Anderson must be straight along a longitudinal axis to operate properly. *Id.* at 15 (citing Ex. 2012 ¶ 81). Patent Owner also contends that the system disclosed in Anderson is not capable of operating the five control motions of Timm in that the device of Anderson has at best four output motions. *Id.* at 15–16 (citing Ex. 1008, Fig. 13; Ex. 2012 ¶¶ 85–93). Patent Owner also contends that Petitioner has failed to properly explain how one skilled in the art would have modified the system of Anderson to operate the endocutter of Timm. *Id.* at 17–18.

We have considered the arguments presented by the parties and the evidence of record and find that one skilled in the art would have had a reasonable expectation of success in combining the endocutter of Timm with the robotic system of Anderson.

As discussed above, both Anderson and Timm teach adapting endocutters for use with a robotic system. Ex. 1006, col. 8, ll. 3–8, col. 12, ll. 1–3; Ex. 1008, col. 7, ll. 19–25. The art at the time also shows that one skilled in the art would have known how to adapt a handheld endocutter to be operated by a robotic system. For example, Dachs⁸ discloses a robotic surgical system that allows operation of a surgical instrument as well as articulation of the device. *See* Ex. 1015, col. 2, ll. 43–65. We agree with Dr. Fischer that the teachings of Timm and Anderson combined would have led

⁸ Dachs II, et al. US 8,640,788 B2, issued February 4, 2014 (Ex. 1015 “Dachs”).

one skilled in the art to have a reasonable expectation of success in combining the teachings of the references. Ex. 1023 ¶ 47. We also find Dr. Fischer's testimony persuasive that the combination would have involved the application of a known technique (Timm's tool) with a known system (Anderson's robot) in the same field (surgical instruments). *Id.*

Patent Owner contends that modifying the system of Anderson to operate the endocutter of Timm would have required a complete redesign of the Anderson system which would entail more than just ordinary experimentation. MTA Reply 17–18 (citing Ex. 2012 ¶ 90). We are not persuaded by this argument.

Anderson teaches:

As described above, in alternative embodiments another type of activation modality may be substituted for the rotatable interface body of the robotic surgical system. For example, an electrical power/control interface (e.g., including a multi-pin connector) may be included in the interface assembly to transmit electrical power and/or control signals from the robotic surgical system to actuate a motor pack mounted in the instrument base, the motor pack output may in turn may be coupled to the instrument probe assembly so as to impart one or more corresponding degrees of freedom to all or portions of the instrument probe assembly relative to the base. The motor pack may include one or more electrical motors, transmission gearing, position encoders, torque sensors, feedback sensors, and the like, and may transmit feedback or sensor signals to the robotic surgical system via the interface.

Ex. 1008, col. 6, ll. 21–37. Anderson also teaches:

For example, one or more electric motor assemblies or motor packs (optionally having gears and/or encoders) may be mounted to base to drive one or more of the rotational and/or translational degrees of freedom of the instrument, the motor packs being electrically connected to receive control/power

signals from (and optionally transmit feedback signals to) the robotic surgical control system.

Id. at col. 23, ll. 39–45 (reference numeral omitted). Dr. Fischer has testified that given this teaching in Anderson, one skilled in the art would have had a reasonable expectation of success in adapting the robotic system of Anderson to operate the endocutter of Timm. Ex. 1023 ¶ 68.

We are also not persuaded by Dr. Cimino’s testimony that modifying Anderson would have required an extraordinary amount of experimentation. Ex. 2012 ¶ 90. While Dr. Cimino lists various considerations which need to be taken into account when modifying the system of Anderson, Dr. Cimino does not explain why these considerations constitute more than ordinary design considerations. *See id.*

Based on the foregoing we conclude that one skilled in the art would have had a reasonable expectation of success in combining the robotic system of Anderson with the endocutter of Timm to produce the claimed invention as argued by Petitioner in Grounds 1 and 2.

2. *Ground 1 – Obviousness based on Timm Instrument 4000 Combined with Anderson, Schulze, Viola and Tierney*
 - a) *Proposed Substitute Claim 12*

Petitioner contends that proposed substitute claim 12 is unpatentable under 35 U.S.C. § 103(a) as obvious over Timm in view of Anderson and if needed Schulze, Viola, and Tierney. MTA Opp. 6. Specifically, Petitioner contends that it would have been obvious to one of ordinary skill in the art to modify Timm’s surgical instrument labeled 4000 for use with Anderson’s robotic system. *Id.* Petitioner also contends that it would have been obvious to modify Timm’s surgical instrument labeled 1 for use with Anderson’s robotic system. *Id.*

Patent Owner contends that the combination of Timm and Anderson does not teach all of the limitations of the proposed substitute claims, specifically that neither reference teaches two closure rates as required by proposed substitute claim 12. MTA Reply 19. As discussed above, Patent Owner also contends that one skilled in the art would not have been motivated to combine the teachings of Timm and Anderson and that one skilled in the art would not have had a reasonable expectation of success in combining the teachings of the references. MTA Reply 7–18.

(a) A surgical tool for use with a robotic system that has a tool drive assembly that is operatively coupled to a control unit of the robotic system that is operable by inputs from an operator and is configured to provide rotary output motions to a plurality of rotatable body portions supported on the tool drive assembly, said surgical tool comprising:

Petitioner contends that Timm combined with Anderson teaches this limitation. MTA Opp. 10. Petitioner contends that the combination of Timm and Anderson (including Tierney)⁹ teaches

⁹ Petitioner’s analysis also relies, in part, on the teachings of Tierney. *See* MTA Opp. 10. Anderson incorporates the teachings of Tierney by reference including the discussion of the carriage used in Anderson. Ex. 1008, col. 16, ll. 17–23; col. 22, ll. 61–67; Col. 24, ll. 35–40. Incorporation by reference provides a method for integrating material from various documents into a host document — a patent or printed publication in an anticipation determination — by citing such material in a manner that makes clear that the material is effectively part of the host document as if it were explicitly contained therein. *Advanced Display Systems, Inc. v. Kent State Univ.*, 212 F.3d 1272, 1281 (Fed. Cir. 2000). To incorporate material by reference, the host document must identify with detailed particularity what specific material it incorporates and clearly indicate where that material is found in the various documents. *See In re Seversky*, 474 F.2d 671, 674 (CCPA 1973) (providing that incorporation by reference requires a statement “clearly identifying the subject matter which is incorporated and where it is to be found”).

surgical tool (a surgical stapler) for use with a robotic system (Anderson's robotic surgical system 10) that has a tool drive assembly (the combination of Tierney 181's tool holder/carriage 129 and adaptor 128; Anderson's corresponding carriage 37) that is operatively coupled to a control unit (Anderson's control station 12) of the robotic system that is operable by inputs from an operator ("a surgeon or other user").

Id. (citing Ex. 1006, Figs. 73–83; Ex. 1008, col. 12, ll. 6–22, Fig. 1; Ex. 1009, Figs. 1, 6–7M; Ex. 1023 ¶¶ 74–76). Petitioner goes on to contend that "Anderson's tool drive assembly is also configured to provide rotary output motions to a plurality of rotatable body portions (Tierney 181's drive elements 119; Anderson's corresponding engaging/interface members in carriage 37) supported on the tool drive assembly." *Id.* (citing Ex. 1008, col. 16, ll. 17–23, col. 22, ll. 61–67, col. 23, ll. 31–39, col. 24, ll. 35–40; Ex. 1023 ¶ 76).

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm combined with Anderson discloses a surgical tool for use with a robotic system that has a tool drive assembly that is operatively coupled to a control unit of the robotic system that is operable by inputs from an operator and is configured to provide rotary output motions to a plurality of rotatable body portions supported on the tool drive assembly. Timm discloses a surgical tool that could be operated as part of a robotic system. Ex. 1006, 8:3–8, 12:1–3, 19:28–36. Anderson discloses a robotic arm assembly with

actuators (control unit) to selectively angularly displace (rotate) transmission members of the surgical instrument. Ex. 1008, 12:6–22, Fig. 1. Anderson incorporates Tierney by reference, and Tierney discloses providing rotary output motions to a plurality of rotatable body portions. Ex. 1009, 11:33–35, Figs. 7F–7M.

(b) A surgical end effector comprising

Petitioner contends that Timm teaches this limitation. MTA Opp. 11. Petitioner contends “Timm discloses a surgical end effector (*e.g.*, the combination of anvil assembly 4020, elongate channel assembly 4012, and ‘staple cartridge assemblies’).” *Id.* (citing Pet. 57; Ex. 1023 ¶ 77).

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches a surgical end effector. Timm discloses a surgical stapler instrument capable of applying lines of staples to tissue while cutting the tissue between the lines of staples. Ex. 1006, col. 1, ll. 8–12. A surgical stapler that also cuts tissue is a type of end effector. *See id.* at ll. 54–60.

(c) at least one component portion comprising a rotatable jaw that is selectively movable between first and second positions relative to at least one other component portion thereof; and

Petitioner contends that Timm teaches this limitation. MTA Opp. 11. Petitioner contends that Timm discloses an anvil assembly that is selectively moveable between an open and closed position. *Id.* Petitioner also contends that Timm teaches that the anvil assembly is rotatable. *Id.*

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches a component portion comprising a rotatable jaw that is selectively movable between first and second positions relative to at least one other component portion thereof. As we discussed in our Decision to institute, the component portion refers to the anvil of a linear surgical stapler. Inst. Dec. 12–13. Timm discloses an anvil that is selectively moveable between an open and closed position. Ex. 1006, col. 35, l. 64–col. 36, l. 24; Ex. 1023 ¶ 78. Timm teaches that the anvil comprises a rotatable jaw, i.e., the portion of the anvil assembly which clamps the tissue. *Id.*

(d) a staple cartridge comprising a plurality of staples and a sled, said staples being configured to be ejected out of said staple cartridge by a distal movement of said sled through said end effector

Petitioner contends that Timm teaches this limitation. MTA Opp. 11–12. Petitioner contends that Timm teaches a staple cartridge comprising a plurality of staples and a sled where the staples are configured to be ejected from the staple cartridge by the distal movement of the sled through the end effector. *Id.* (citing Ex. 1006, col. 9, ll. 31–67, col. 10, ll. 40–53, col. 12, ll. 63–67; col. 35, ll. 55–58, Figs. 5–6; Ex. 1023 ¶¶ 79–80). Petitioner argues:

A POSITA would have understood that Timm’s “staple cartridge assemblies” include the cartridge assembly shown in Figures 5-6 of Timm. And it would have been obvious to use the staple cartridge assembly in Figures 5-6 because Timm does not restate the details of the “staple cartridge assemblies” used with surgical instrument 4000. Thus, a POSITA would have

been motivated to look at Timm's other embodiments for a suitable staple cartridge.

Id. (citations omitted).

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches a staple cartridge comprising a plurality of staples and a sled, said staples being configured to be ejected out of said staple cartridge by a distal movement of said sled through said end effector. Timm teaches a staple cartridge comprising surgical fasteners arranged to be ejected from the cartridge. Ex. 1006, col. 9, ll. 31–55. Timm also teaches a sled comprising “a pair of upwardly-extending cam wedges which, when actuated to move by the user, cam a series of surgical fasteners or staples into and through the tissue and against staple forming pockets of anvil assembly to form the fasteners and fasten tissue therewith.” *Id.* at col. 9, ll. 56–61 (reference numbers omitted); *see* Ex. 1023 ¶¶ 79–80.

(e) an elongated shaft assembly operably coupled to said surgical end effector, said elongated shaft assembly comprising

Petitioner contends that Timm discloses this limitation. MTA Opp. 12. Petitioner contends that Timm discloses an elongated tube assembly which includes a closure ring and distal closure tube that are operably coupled to the surgical end effector. *Id.* (citing Ex. 1023 ¶¶ 81–82).

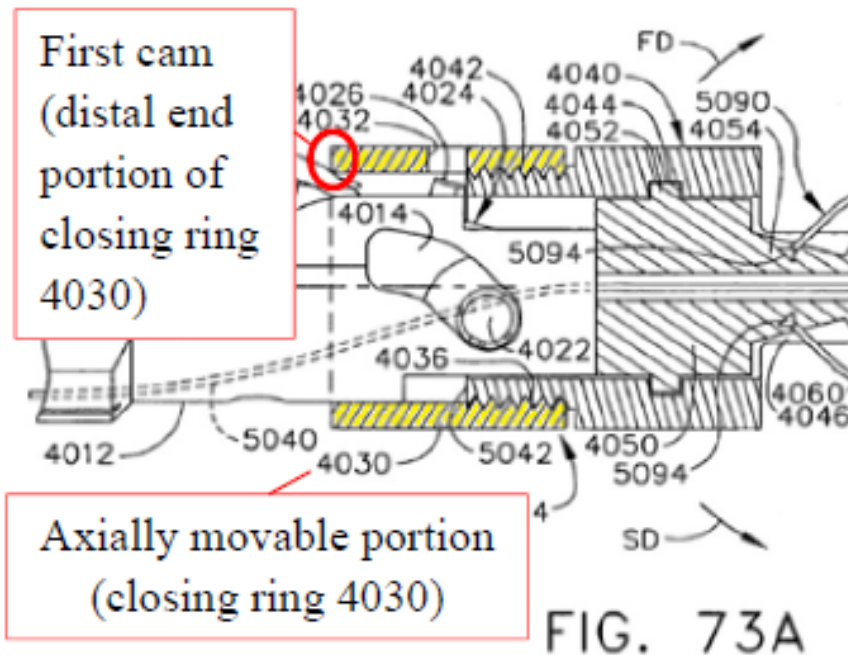
Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to

argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches an elongated shaft assembly operably coupled to said surgical end effector, said elongated shaft assembly. Timm teaches that the device may comprise an elongated closure tube assembly. Ex. 1006, col. 36, ll. 25–27. Timm teaches that the closure tube acts on a closure ring such that the closure ring causes the anvil assembly to pivot to the closed position. *Id.* at col. 35, l. 64–col. 36, l. 24, Figs. 73A, 74A; Ex. 1023 ¶¶ 81–82.

(f) an axially movable portion comprising a first cam in operable communication with said at least one selectively movable component portion of said surgical end effector, wherein said first cam is configured to communicate with said rotatable jaw to transmit closing motions thereto

Petitioner contends that Timm teaches this limitation. MTA Opp. 12–13. Petitioner contends that Timm teaches an axially moveable closure ring in operable communication with the selectively moveable portion of the surgical end effector. *Id.* Referring to Figure 73A of Timm, reproduced below, Petitioner contends that “[c]losure ring 4030 also comprises a first cam (distal end portion) wherein the first cam is configured to communicate with (contact) said rotatable jaw to transmit closing motions thereto.” *Id.* (citing Ex. 1023 ¶¶ 83–89).



A portion of Figure 73A of Timm as annotated by Petitioner showing a partial cross-sectional view of a surgical instrument of Timm. WTA Opp. 13.

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches an axially movable portion comprising a first cam in operable communication with said at least one selectively movable component portion of said surgical end effector, wherein said first cam is configured to communicate with said rotatable jaw to transmit closing motions thereto. Timm teaches that the closure ring is driven axially in the distal direction and rides up a ramp on the proximate end of the anvil assembly causing the anvil assembly to pivot to the closed position. Ex. 1006, col. 36, ll. 16–21;

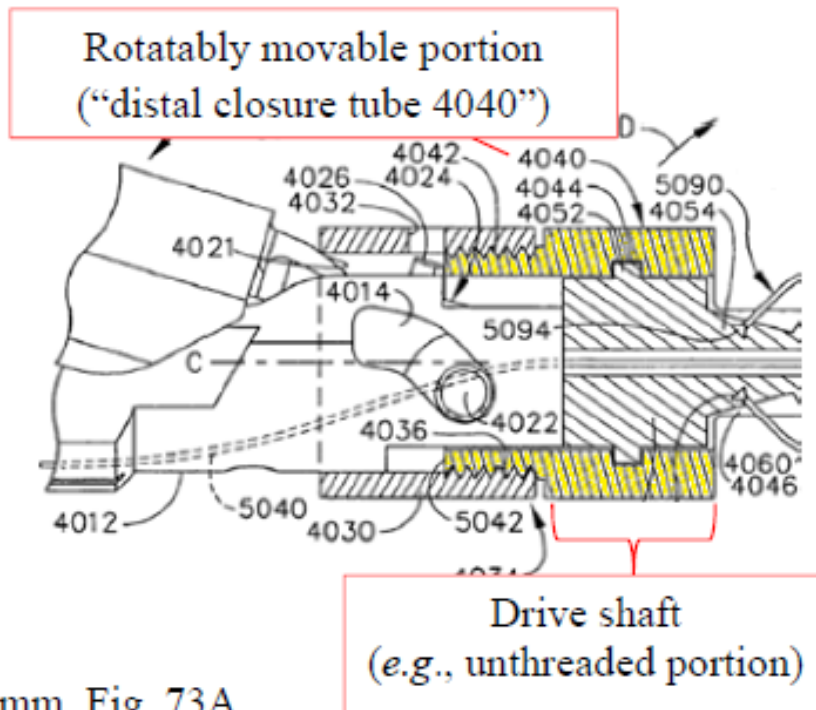
Ex. 1023 ¶ 83. As shown in Figure 73A above, Timm also discloses a first cam (or distal end of the closure ring) configured to communicate with the jaw of the anvil to cause the jaw to pivot to the closed position. *Id.*

(g) *rotatably movable portion comprising a rotatable drive shaft configured to rotate in response to one of said rotary output motions; said rotatable drive shaft in operable engagement with said axially movable portion wherein an initial rotation of said rotatably movable portion causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said first position into an intermediate position at a first rate, wherein a subsequent rotation of said rotatably movable portion in a same direction causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said intermediate position to said second position at a second rate, and wherein said first rate is greater than said second rate;*

Petitioner contends that Timm teaches this limitation. MTA Opp. 13–14. Referring to annotated Figure 73A of Timm, reproduced below, Petitioner contends

Timm discloses a rotatably movable portion (distal closure tube segment 4040) comprising a drive shaft (*e.g.*, the unthreaded portion or the entire distal closure tube segment 4040), which, in the Timm/Anderson instrument, is configured to rotate in response to one of said rotary output motions. *See, e.g.*, Petition, 64-67; Timm, 35:64-36:24, Fig. 73A; Fischer Supp., ¶¶90-94. The rotatable drive shaft is also in operable engagement with said axially movable portion wherein an initial rotation of said rotatably movable portion causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said first position into an intermediate position at a first rate, wherein a subsequent rotation of said rotatably movable portion in a same direction causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said intermediate position to said second position at a second rate, and wherein said first rate is greater than said second rate. *Id.*

Id.



Timm, Fig. 73A.

Figure 73A of Timm annotated by Petitioner showing a partial cross-section of an instrument of Timm. *Id.*

Petitioner also contends that if Timm does not teach two closure rates, that element is taught by Viola or Schulze. *Id.*

Patent Owner contends that Timm does not teach or suggest closing the end effector at two different closure rates. MTA Reply 20. Patent Owner contends that Petitioner improperly draws a comparison with the closure system of the '288 patent. *Id.* Patent Owner also contends that one skilled in the art would not have interpreted Timm's 4000 embodiment as teaching two closure rates. *Id.* (citing Ex. 2012 ¶¶ 71–75).

With respect to the teachings of Viola and Schulze, Patent Owner contends that Petitioner's argument improperly incorporates arguments from the petition (with respect to the original claims) and that such argument

should not be considered relative to the substitute claims. *Id.* at 21–22. Patent Owner also argues that even if Petitioner has properly raised Viola and Schulze, one skilled in the art would not have been motivated to combine the teachings of those references with those of Timm and Anderson. *Id.*

We have considered the arguments presented by the parties and the evidence of record and conclude that Timm teaches a rotatably movable portion comprising a rotatable drive shaft configured to rotate in response to one of said rotary output motions; said rotatable drive shaft in operable engagement with said axially movable portion wherein an initial rotation of said rotatably movable portion causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said first position into an intermediate position at a first rate, wherein a subsequent rotation of said rotatably movable portion in a same direction causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said intermediate position to said second position at a second rate, and wherein said first rate is greater than said second rate.

Referring to Figure 73A, Timm teaches

as the distal closure tube segment 4040 is rotated, the closure ring 4030 is driven axially in the distal direction DD. As the closure ring 4030 moves in the distal direction DD, it rides up a ramp 4021 on the proximal end of anvil assembly 4020 to cause the anvil assembly 4020 to pivot to a closed position.

Ex. 1006, col. 36, ll. 16–21.

With respect to the closure rates, while we agree with Patent Owner that the text of Timm’s disclosure does not include a discussion of closure rates, the drawings, particularly Figure 73A provide such a disclosure. *See*

In re Wagner, 63 F.2d 985 (CCPA 1933) (explaining that it is proper to rely on drawing to support a finding of obviousness).

Referring to Figure 73A, reproduced below, Timm teaches that the anvil assembly 4020 is pivotally coupled to an elongated channel 4012 by a pair of trunnions 4022 that are adapted to be received in corresponding slots 4014 in the walls of the elongated channel. Ex. 1006, col. 35, l. 64 – col. 36, l. 24. As shown in Figure 73A below, the slots in the walls of the channel have a steep portion and a shallow portion. *Id.* Fig. 73A; *see also id.* Figs. 104–105. In addition, ramp 4021 also has a steep portion and a shallow portion. *Id.* As seen in Figure 73A below and as Dr. Fischer has testified, “the steeper camming surfaces of ramp 4021 and the proximal portions of slots 4014 cause anvil 4020 to move faster than the shallower distal camming surfaces of slots 4014.” Ex. 1003 ¶ 89.

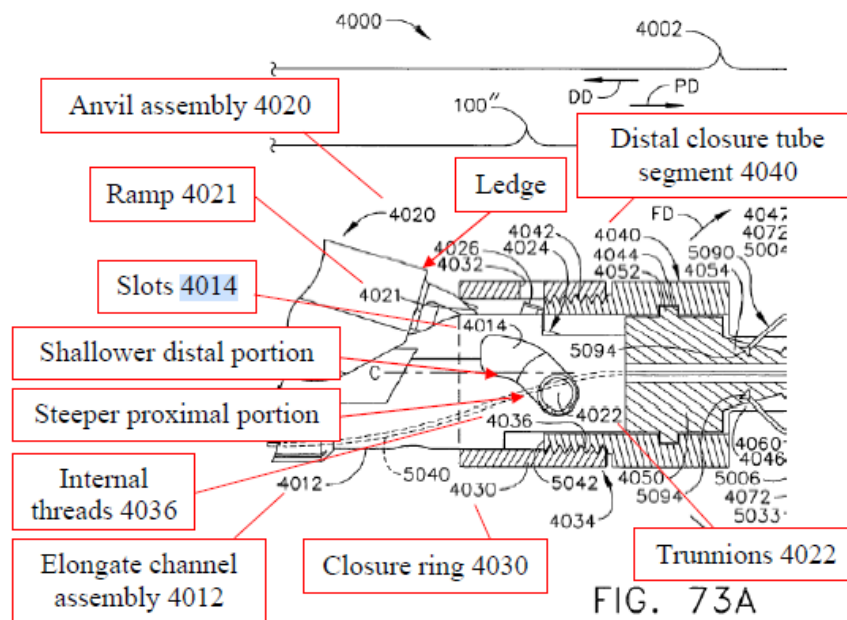


Figure 73A as annotated by Dr. Fischer showing a partial cross-section of an instrument of Timm.

Patent Owner contends that one skilled in the art would not interpret the cam surface of Timm as necessarily disclosing two closure rates. MTA Reply 21. Patent Owner supports this contention with the testimony of Dr. Cimino. *Id.* (citing Ex. 2012 ¶¶ 71–75). We are not persuaded by this argument.

With respect to the closure mechanism disclosed in Figure 73A of Timm, Dr. Cimino first opines that Timm does not disclose two closure rates as Timm does not teach the variable pitch tread arrangement taught in the '288 patent. Ex. 2012 ¶ 73. While this may be true, as discussed above, Petitioner's contention with respect to two closure rates is not dependent on the presence of a variable pitch thread.

Dr. Cimino also contends that one skilled in the art would not have interpreted the slot arrangement shown in Figure 73A as necessarily disclosing two closure rates but that one skilled in the art would have needed more information to reach such a conclusion. *Id.* ¶ 74. Again, we are unpersuaded.

Dr. Cimino offers no support for his conclusion that Timm does not necessarily have two closure rates. During his deposition, Dr. Cimino testified that to determine whether the end effector of Timm exhibited two different closure rates, one would need to perform a kinematic analysis of the mechanism motion. Ex. 1024, 118. Dr. Cimino admitted that he did not perform such an analysis. *Id.* at 119. This is in contrast to Dr. Fischer's testimony where he explains precisely why he concludes that the end effector of Timm exhibits two closure rates. Ex. 1003 ¶¶ 88–89.

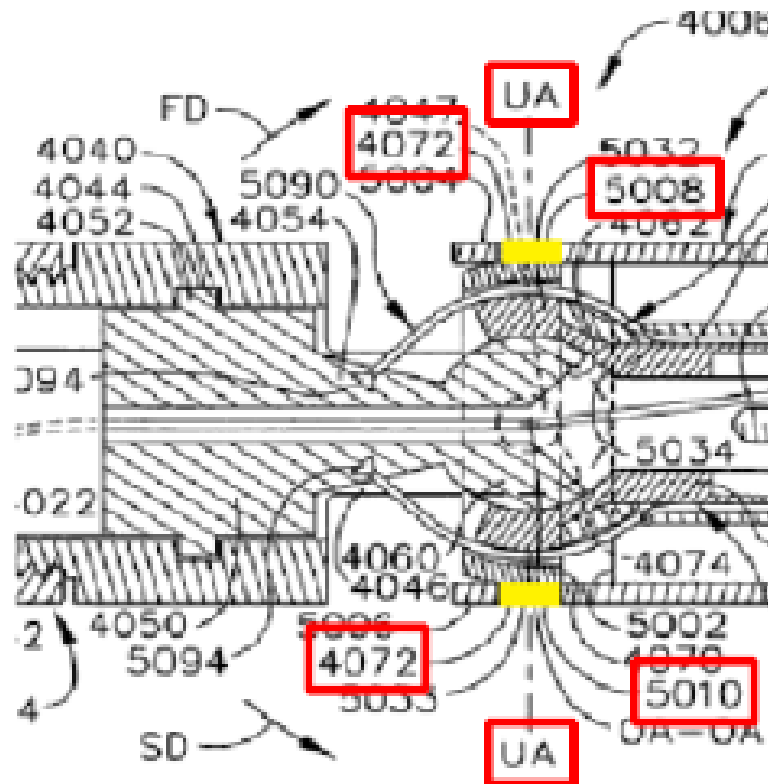
Since we find that Timm alone teaches closure of the anvil at two different rates, we need not address the issue of whether Viola or Schulze provides such a teaching.

(h) first articulation joint configured to articulate said end effector about a first axis in response to one of said rotary output motions

Petitioner contends that Timm teaches this limitation. MTA Opp. 15.
Referring to an annotated portion of Figure 73A of Timm, Petitioner contends

Timm discloses a first articulation joint (pivot holes 5008, 5010 and pins 4072, 4074), which, in the Timm/Anderson instrument, is configured to articulate said end effector about a first axis (pivot axis UA-UA) in response to one of said rotary output motions (the rotary output motion from one of Anderson's engaging members).

Id. (citing Ex. 1006, col. 36, ll. 45–65, col. 37, ll. 8–13, col. 37, l. 55–col. 38, l. 24, Fig. 73A; Ex. 1023 ¶¶ 95–98).



Petitioner's Annotated Figure 73A of Timm showing an articulation joint in cross-section. MTA Opp. 15.

Patent Owner contends that Timm does not disclose an active articulation for the instrument but instead refers to a passive articulation. MTA 17. Patent Owner goes on to contend that even if Timm discloses an active articulation, it accomplishes the articulation using a different method than required by the claims. *Id.* Patent Owner also contends that Anderson does not teach an articulated instrument. *Id.*

We find that the evidence of record supports the conclusion that Timm teaches a first articulation joint configured to articulate said end effector about a first axis in response to one of said rotary output motions. Tim teaches that the distal closure tube may be formed with a pair of opposed universal pivot arms, which allow the ring to pivot about an axis. Ex. 1006, col. 36, ll. 45–46. Timm goes on to teach:

Thus, the person of ordinary skill in the art will appreciate that the above-described universal ring 4070 arrangement facilitates the articulation of the distal closure tube 4040 and ultimately tool assembly 100" which is attached thereto about multiple axes UA-UA and OA-OA relative to the closure tube assembly 5000.

Id. at col. 37, ll. 8–13.

With respect to whether the articulation is active or passive, we agree with Petitioner that Timm discloses an active articulation. MTA Opp. 15.

Timm teaches

[t]he proximal end (not shown) of the horizontal actuator bar 6140 may be operably attached to a joy stick assembly of the type described above operably supported in the handle assembly or other actuation arrangement for applying pushing and pulling motions to the horizontal actuator bar 6140.

Ex. 1006, col. 44, ll. 47–52. While Timm teaches manual operation of the articulation, Dr. Fischer has testified that one skilled in the art would have

used the rotary output of one of Anderson's engaging members to operate the articulation joint. Ex. 1023 ¶ 95. We agree with Dr. Fischer that Anderson teaches using a robotic system with articulating instruments such as staplers. *Id.* ¶ 96. Anderson teaches

[a] single pivot wrist, a multi-pivot wrist, a distal roll joint mechanism or other joints may be included to provide additional operational degrees of freedom to the end effector. Movement of end effector 38 relative to manipulator arm 26 controlled by appropriately positioned actuators, such as electric motors, or the like, which respond to inputs from an associated master control at the control station 12, so as to drive the end effector 38 to a required orientation as dictated by movement of the associated master control.

Ex. 1008, col. 11, ll. 56–65.

- (i) *a second articulation joint configured to articulate said end effector about a second axis in response to one of said rotary output motions*

Petitioner contends that Timm teaches this limitation. MTA Opp. 16.

Referring again to an annotated version of Timm's Figure 73A, Petitioner contends

Timm discloses a second articulation joint (pivot holes 4047 and pins 4074), which, in the Timm/Anderson instrument, is configured to articulate said end effector about a second axis (pivot axis OA-OA) in response to one of said rotary output motions (the rotary output motion from one of Anderson's engaging members).

Id. (citing Ex. 1006, col. 36, l. 65–col. 37, l. 13; Fig. 73A; Ex. 1023 ¶¶ 99–101).

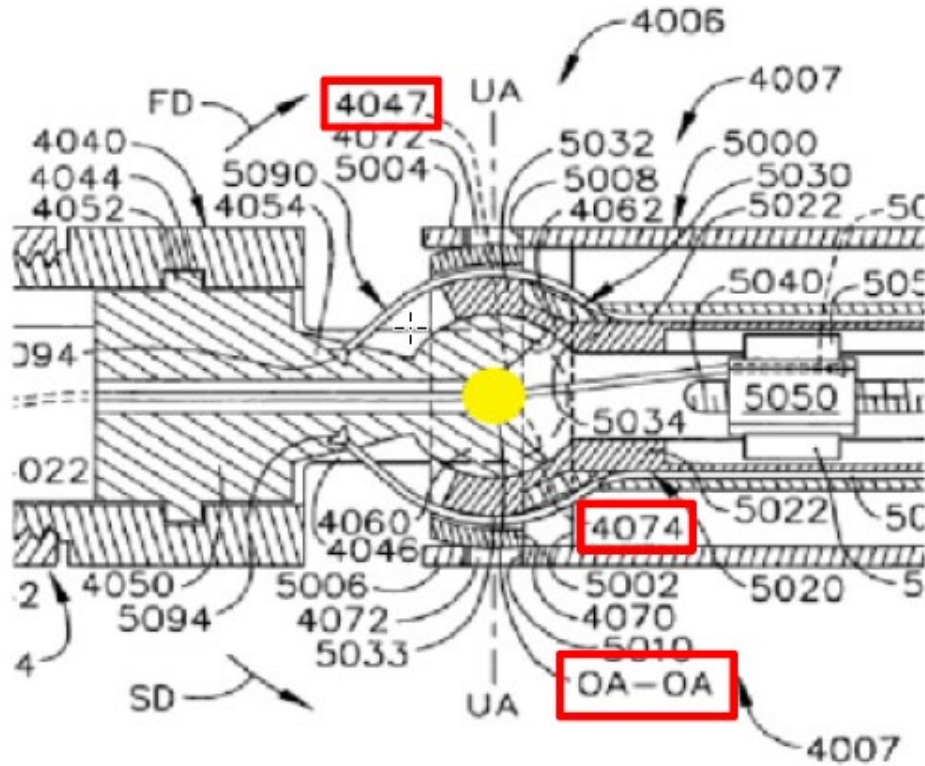


Figure 73A of Timm as annotated by Petitioner to show a second articulation joint. MTA Opp. 16.

Patent Owner presents the same arguments regarding this limitation as with the limitation regarding the first articulation joint. *See* MTA 17.

We find that the evidence of record supports the conclusion that Timm teaches a second articulation joint configured to articulate said end effector about a second axis in response to one of said rotary output motions. Timm teaches a second articulating joint which pivots about an axis is substantially orthogonal to the axis of the first joint. Ex. 1006, col. 36, l. 65–col. 37, l. 7. As discussed above, Timm discloses an active articulation joint and the teachings of Anderson would have led one skilled in the art to operate the joint using one of the rotary outputs of Anderson. *Id.* at col. 44, ll. 47–52; Ex. 1023 ¶ 99.

(j) a tool mounting plate supporting said elongate shaft assembly and configured to be releasably mounted to said tool drive assembly, said tool mounting plate comprising a plurality of driven elements configured for driving engagement with a corresponding plurality of rotatable body portions of said tool drive assembly when said tool mounting plate is mounted to said tool drive assembly.

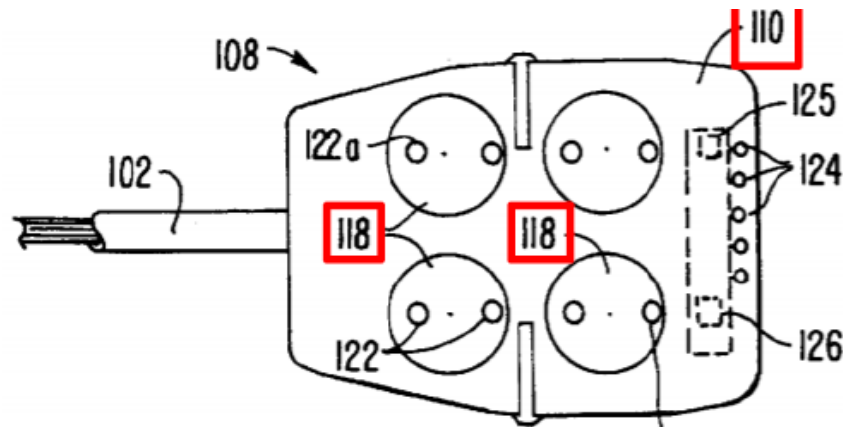
Petitioner contends that Anderson alone or through incorporation of Tierney teaches this limitation. MTA Opp. 17–18. Referring to Tierney Figure 6 and Anderson Figure 3, reproduced below, Petitioner contends

Anderson discloses a tool mounting plate (Tierney 181's interface 110; Anderson's corresponding instrument base 34 or 330, which includes a mounting plate 78), which, in the Timm/Anderson instrument, supports said elongate shaft assembly and is configured to be releasably mounted to said tool drive assembly.

Id. at 17 (citing Ex. 1006, col. 11, l. 32–col. 12, l. 22, col. 16, l. 7–col. 18, l. 4, col. 18, ll. 16–19, col. 22, l. 8–col. 23, l. 45, Figs. 2, 3, 11–17, 20–22, 24; Ex. 1009, col. 9, ll. 8–12, col. 10, ll. 12–24, col. 10, ll. 36–40; col. 16, l. 62–col. 17, l. 4, Figs. 4, 6, 14A–C; Ex. 1023 ¶ 102). Petitioner also contends

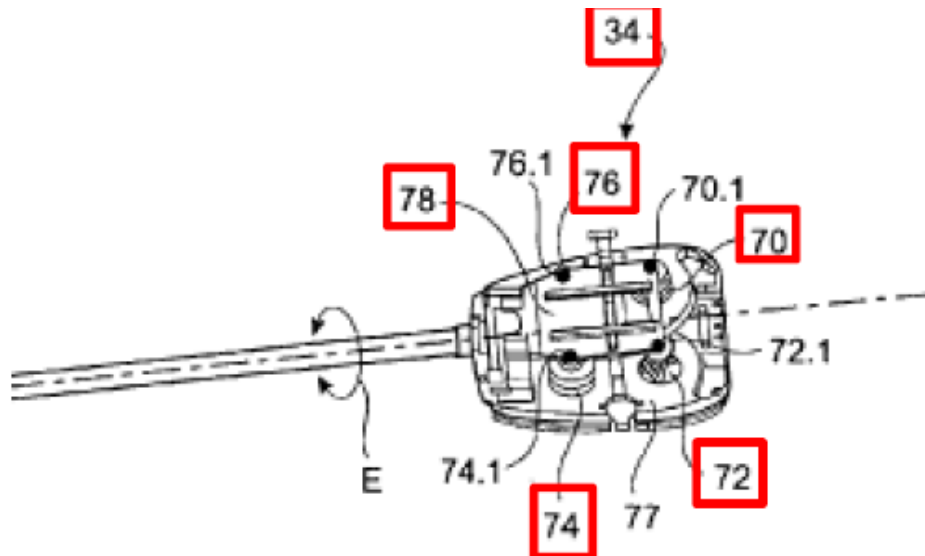
[t]he tool mounting plate also comprises a plurality of driven elements (Tierney 181's driven elements 118; Anderson's corresponding transmission members 70, 72, 74, and 76 and interface actuator members 344 and 353a-b) configured for driving engagement with a corresponding plurality of rotatable body portions (Tierney 181's drive elements 119; Anderson's corresponding engaging/interface members) of said tool drive assembly when said tool mounting plate is mounted to said tool drive assembly.

Id. at 17–18.



Tierney 181, Fig. 6.

Figure 6 of Tierney as annotated by Petitioner showing the mechanical and electrical interface of the tool disclosed in Tierney. MTA Opp. 18.



Anderson, Fig. 3.

Figure 3 of Anderson as annotated by Petitioner showing a perspective illustration of the robotic surgical tool with a cover of a tool base removed to show internal structures of the tool base. *Id.* at 18.

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references

and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Anderson, either alone or through incorporation of Tierney, teaches a tool mounting plate supporting said elongate shaft assembly and configured to be releasably mounted to said tool drive assembly, said tool mounting plate comprising a plurality of driven elements configured for driving engagement with a corresponding plurality of rotatable body portions of said tool drive assembly when said tool mounting plate is mounted to said tool drive assembly. Anderson teaches:

Referring now to FIG. 3, base 34 of surgical instrument 28 suitably includes transmission members 70, 72, 74, and 76, which include spools secured on shafts 70.1, 72.1, 74.1, and 76.1. Ends of shafts 70.1, 72.1, 74.1, 76.1 generally extend from a side 77 of base 34 to a mounting plate 78 within base 34 and are configured to rotate. Generally, the ends of shafts 70.1, 72.1, 74.1, 76.1 at side 77 of base 34 extend through side 77, to an outer surface of side 77 (not shown). At the outer surface, each shaft 70.1, 72.1, 74.1, 76.1 includes an engaging member (not shown) configured to releasably couple with a complementary engaging member (not shown) rotatably mounted on the carriage 37 of a robotic arm assembly 26 (see FIG. 1). The engaging members on carriage 37 are generally coupled to actuators (not shown), such as electric motors or the like, to cause selective angular displacement of each engaging member on the carriage 37 in response to actuation of its associated actuator. Thus, selective actuation of the actuators is transmitted through the engaging members on the carriage 37, to the engaging members on the opposed ends of the shafts 70.1, 72.1, 74.1, 76.1 to cause selective angular displacement of the spools 70, 72, 74, 76. Where more or fewer degrees of freedom are desired, the number of spools may be decreased or increased.

Ex. 1008, col. 11, l. 66– col. 12, l. 22.

(k) Conclusion

Based on the foregoing we conclude that Petitioner has shown by a preponderance of the evidence that the subject matter of proposed substitute claim 12 would have been obvious to one of ordinary skill in the art at the time the invention was made over Timm combined with Anderson.¹⁰

b) Proposed Substitute Claim 13

Proposed substitute independent claim 13 differs from proposed substitute independent claim 12 by omitting the requirement that movement of the selectively movable component portion at first and second rates comprises a “first rate . . . greater than said second rate,” and by requiring “wherein said rotatably movable portion comprises a closure member in threaded engagement with said axially movable portion.” MTA, A-2, A-4. With the exception of this element, our discussion of substitute claim 12 is applicable to claim 13. Therefore we limit our discussion to the limitation requiring “wherein said rotatably movable portion comprises a closure member in threaded engagement with said axially movable portion.”

Petitioner contends that Timm teaches this limitation. MTA Opp., 18. Petitioner contends that “[t]he rotatably moveable portion (Timm’s modified closure tube segment 4040) is a closure member in threaded engagement with the axially movable portion (modified closure ring 4030).” Pet. 77–78(citing Ex. 1003 ¶ 174).

Patent Owner does not contest the specific teachings of Timm with respect to this element of proposed substitute claim 13 other than to argue that there would have been no motivation to combine the references and one

¹⁰ As discussed above, we find Timm and Anderson alone teach all of the elements of proposed substitute claim 12. Therefore we do not reach the issue of obviousness based on Viola and Schulze.

skilled in the art would not have had a reasonable expectation of success.
See MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches the limitation calling for said rotatably movable portion comprises a closure member in threaded engagement with said axially movable portion. Referring to Figure 73A, reproduced above in Section II.E.2.a.1.(g), Timm teaches “[a] series of internal threads 4036 may be provided in the proximal end 4034 of the non-rotating closure ring 4030 for threadably receiving a threaded distal end 4042 of a distal closure tube segment 4040.” Ex. 1006, col. 36, ll. 12–16.

In light of the foregoing discussion, we conclude that the subject matter of proposed substitute claim 13 would have been obvious to one of ordinary skill in the art at the time the invention was made over Timm combined with Anderson.

3. *Ground 2 – Obviousness based on Timm instrument 1 combined with Anderson, Schulze, Shelton and Tierney.*

a) *Proposed Substitute Claim 12*

Petitioner contends that proposed substitute claim 12 is unpatentable under 35 U.S.C. § 103(a) as obvious over Timm in view of Anderson and if needed Schulze, Shelton, and Tierney. MTA Opp. 18. Specifically, Petitioner contends that it would have been obvious to one of ordinary skill in the art to modify Timm’s surgical instrument 1 for use with Anderson’s robotic system. *Id.* Petitioner also contends that it would have been obvious to modify Timm’s surgical instrument label 1 for use with Anderson’s robotic system. MTA Opp. 18–20.

Patent Owner contends that the combination of Timm and Anderson does not teach all of the limitations of the proposed substitute claims,

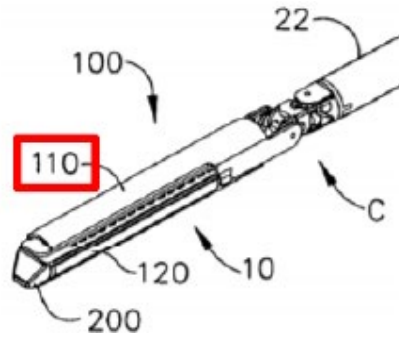
specifically that neither reference teaches two closure rates as required by the claims. MTA Reply 19. As discussed above, Patent Owner also contends that one skilled in the art would not have been motivated to combine the teachings of Timm and Anderson and that one skilled in the art would not have had a reasonable expectation of success in combining the teachings of the references. MTA Reply 7–18.

(1) A surgical tool for use with a robotic system that has a tool drive assembly that is operatively coupled to a control unit of the robotic system that is operable by inputs from an operator and is configured to provide rotary output motions to a plurality of rotatable body portions supported on the tool drive assembly, said surgical tool comprising

The parties present the same evidence and arguments regarding this limitation as discussed in Section II.E.2.a)1.(a) above. MTA Opp. 24; MTA Reply 7–18. For the reasons stated above, we find that Timm combined with Anderson teaches this limitation.

(2) at least one component portion comprising a rotatable jaw that is selectively movable between first and second positions relative to at least one other component portion thereof

Petitioner contends that Timm instrument 1 teaches this limitation. MTA Opp. 24–25. Referring to annotated Figure 1 of Timm, Petitioner contends “Timm discloses at least one component portion (anvil assembly 110) of the end effector comprising a rotatable jaw (the portion of anvil assembly 110 . . . between first (open) and second (closed) positions relative to at least one other component portion thereof (elongate channel assembly 120).” *Id.* (citing Ex. 1006, col. 10, l. 54–col. 11, l. 7, Figs. 1–9; Ex. 1023 ¶ 127).



Portion of Figure 1 of Timm as annotated by Petitioner showing anvil assembly of the end effector of Timm. MTA Opp. 25.

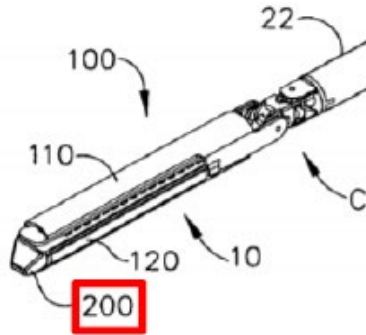
Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches at least one component portion comprising a rotatable jaw that is selectively movable between first and second positions relative to at least one other component portion thereof. Timm teaches the anvil assembly can pivot from “an open first position wherein the anvil assembly 110 and the elongate channel assembly 120 are disposed in spaced relation relative to one another to a second closed position.” Ex. 1006, col. 10, l. 65–col. 11, l. 1; *see* Ex. 1023 ¶ 127.

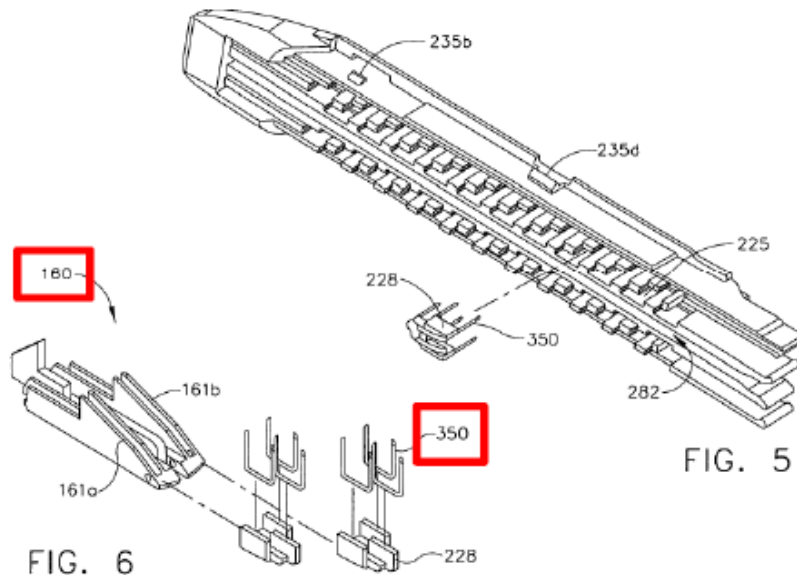
(3) a staple cartridge comprising a plurality of staples and a sled, said staples being configured to be ejected out of said staple cartridge by a distal movement of said sled through said end effector

Petitioner contends that Timm teaches this limitation. MTA Opp. 25. Referring to annotated Figures 1, 5, and 6 of Timm, Petitioner contends “Timm discloses a staple cartridge (staple cartridge assembly 200) comprising a plurality of staples (350) and a sled (160), and that the staples

are configured to be ejected out of said staple cartridge by a distal movement of said sled through said end effector.” *Id.* (citing Ex. 1006, col. 9, ll. 31–67, col. 10, ll. 40–53, col. 12, ll. 63–67; col. 17, ll. 10–13; col. 18, ll. 16–24, Figs. 5–6; Ex. 1023 ¶ 128).



A portion of Figure 1 of Timm as annotated by Petitioner showing the anvil assembly of an end effector of Timm including the location of a staple cartridge. MTA 25.



Figures 5 and 6 of Timm as annotated by Petitioner showing a staple cartridge and sled. *Id.*

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references

and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches a staple cartridge comprising a plurality of staples and a sled, said staples being configured to be ejected out of said staple cartridge by a distal movement of said sled through said end effector. Timm teaches that the instrument may include a staple cartridge assembly. Ex. 1006, col. 9, ll. 14–15. Timm teaches a staple cartridge comprising surgical fasteners arranged to be ejected from the cartridge. Ex. 1006, col. 9, ll. 31–55. Timm also teaches a sled comprising “a pair of upwardly-extending cam wedges which, when actuated to move by the user, cam a series of surgical fasteners or staples into and through the tissue and against staple forming pockets of anvil assembly to form the fasteners and fasten tissue therewith.” *Id.* at col. 9, ll. 56–61 (reference numbers omitted); Ex. 1023 ¶ 128.

(4) an elongated shaft assembly operably coupled to said surgical end effector

Petitioner contends that at least two embodiments of Timm, either alone or in combination with Anderson teach this limitation. MTA Opp. 26–27.

Referring to Timm Figures 1 and 2, reproduced below, Petitioner contends that in the embodiment which Petitioner calls the clamping collar embodiment “Timm discloses an elongated shaft assembly (*e.g.*, the combination of elongated shaft 20 and clamping collar 140 as well as the actuating cables contained therein) operably coupled to said surgical end effector.” MTA Opp. 26 (citing Ex. 1006, col. 7, l. 49–col. 9, l. 11, col. 10, l. 61–col. 11, l. 35, Figs. 1–4; Ex. 1023 ¶¶ 129–130).

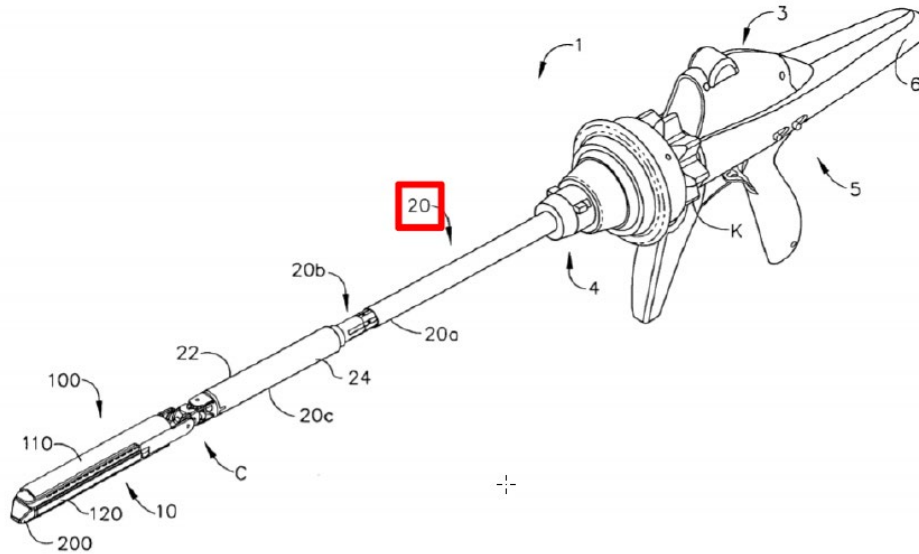


Figure 1 of Timm as annotated by Petitioner showing a perspective view of a surgical severing and stapling instrument. MTA 26.

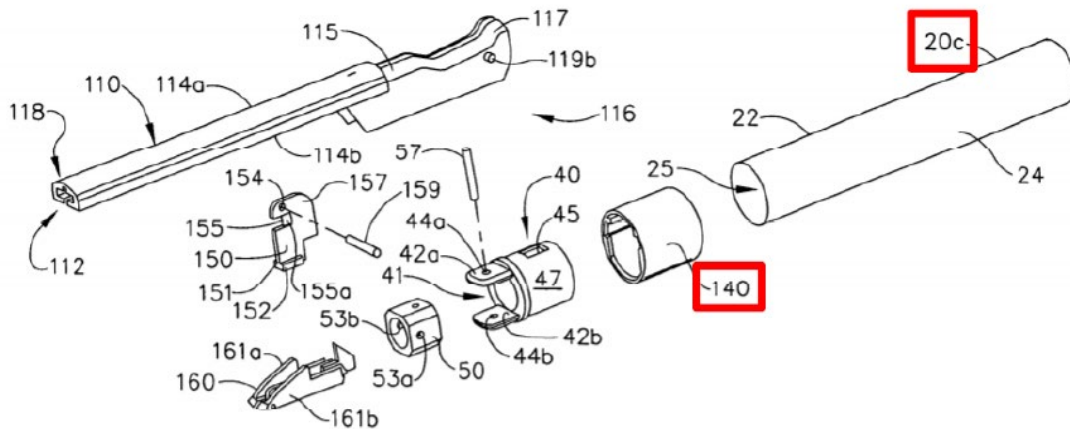


Figure 2 of Timm as annotated by Petitioner showing an exploded view of a surgical tool assembly. *Id.*

Petitioner also contends that “the elongated shaft assembly of the Timm/Anderson instrument also includes one of Anderson’s transmission members (*e.g.*, 76, which includes drive shaft 76.1) in the tool mounting portion that drives clamping collar 140.” *Id.* (citing Ex. 1008, col. 11, l. 66–col. 12, l. 22, Fig. 3; Ex. 1023 ¶ 130).

The second embodiment relied on by Petitioner is called the “closure tube embodiment.” Referring to Timm Figures 1 and 44, Petitioner contends, “Timm discloses an elongated shaft assembly (*e.g.*, the combination of elongated shaft 20 and closure tube assembly 2300) operably coupled to said surgical end effector in the same way as the clamping collar embodiment.” *Id.* at 27.

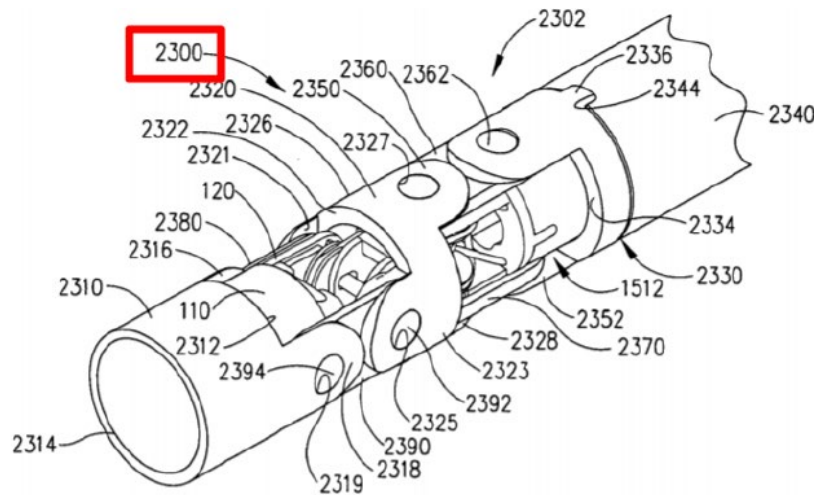


Figure 44 of Timm as annotated by Petitioner showing a perspective view of a closure tube joint assembly installed over an articulated joint. *Id.*

Petitioner also contends that “the elongated shaft assembly of the Timm/Anderson instrument also includes the gear or gear train in the tool mounting portion that drives the gear rack on the modified closure tube assembly 2300.” MTA Opp. 28 (citing Ex. 1023 ¶ 132).

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches an elongated shaft assembly operably coupled to said surgical end effector. Timm teaches that the surgical instrument includes an elongated shaft operably connected to the tool assembly. Ex. 1006, col. 7, ll. 49–62; Ex. 1023 ¶ 129.

(5) an axially movable portion comprising a first cam in operable communication with said at least one selectively movable component portion of said surgical end effector, wherein said first cam is configured to communicate with said rotatable jaw to transmit closing motions thereto;

Petitioner contends that two embodiments of Timm teach this limitation: a clamping collar embodiment and a closure tube embodiment. MTA Opp. 28–29.

With respect to the clamping collar embodiment shown in Figure 2 of Timm reproduced below, Petitioner contends

Timm discloses an axially movable portion (clamping collar 140) of the elongated shaft assembly comprising a first cam (distal end portion) in operable communication (contact) with said at least one selectively movable component portion of said surgical end effector, wherein the first cam is configured to communicate with (contact) said rotatable jaw to transmit closing motions thereto.

Id. at 28 (citing Ex. 1006, col. 10, l. 61–col. 11, l. 7, Figs. 2–4, 9; Ex. 1023 ¶¶ 133–134).

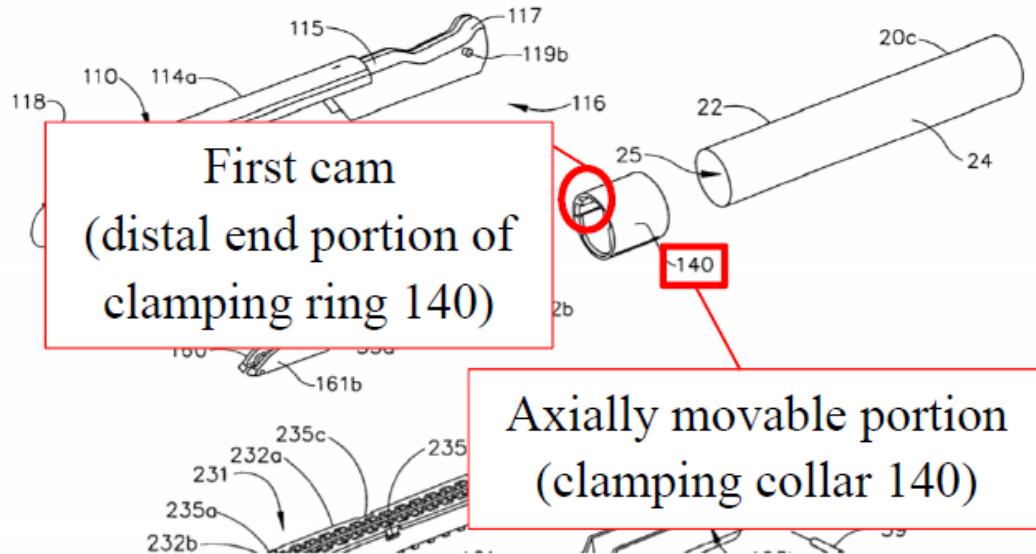
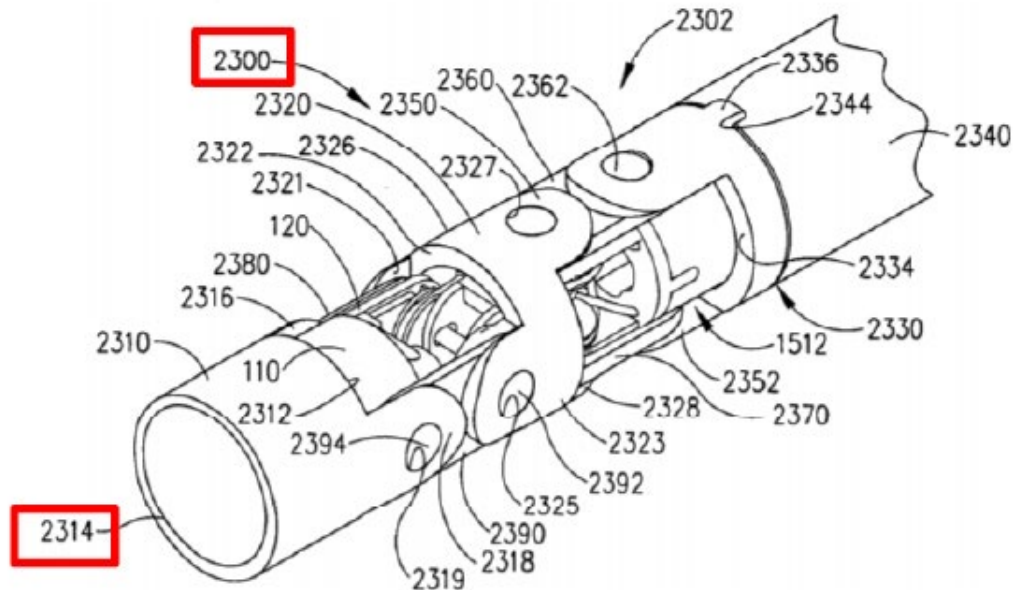


Figure 2 of Timm as annotated by Petitioner showing a portion of an exploded perspective view of a surgical instrument. *Id.*

With respect to the closure tube embodiment, referring to Timm Figure 44 reproduced below, Petitioner contends

Timm discloses an axially movable portion (closure tube assembly 2300) of the elongated shaft assembly comprising a first cam (distal end 2314) in operable communication (contact) with said at least one selectively movable component portion of said surgical end effector wherein the first cam is configured to communicate with (contact) said rotatable jaw to transmit closing motions thereto.

Id. at 28–29 (citing Ex. 1006, col. 24, ll. 56–62, Figs. 2–4, 7, 9, 42–44A; Ex. 1023 ¶ 135).



Timm Figure 44 as annotated by Petitioner showing a perspective view of a closure tube assembly installed over an articulation joint. *Id.* at 29.

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm teaches an axially movable portion comprising a first cam in operable communication with said at least one selectively movable component portion of said surgical end effector, wherein said first cam is configured to communicate with said rotatable jaw to transmit closing motions thereto.

Timm teaches:

It is contemplated that actuation by conventional means (e.g., activated remotely, e.g., by a handle assembly 5 will cause clamping collar 140 to move in a distal direction and engage forward cam surface 115 of anvil assembly 110. This will cause the anvil assembly 110 to pivot from an open first

position wherein the anvil assembly 110 and the elongate channel assembly 120 are disposed in spaced relation relative to one another to a second closed position wherein anvil assembly 110 and staple cartridge assembly 200 cooperate to grasp tissue therebetween, i.e., pre-clamp the tissue between tissue engaging surface 114b of anvil assembly 110 and opposing tissue engaging surface 231 of staple cartridge assembly 200.

Ex. 1006, col. 10, l. 61–col. 11, l. 6. Timm also teaches:

Those of ordinary skill in the art will understand that, as the closure tube assembly 2300 is moved (pushed) in the distal direction DD, the distal end 2314 of the distal closure tube segment 2310 applies a closing motion to the anvil assembly 110 by contacting the cam surface 115 of anvil assembly 110 (shown in FIGS. 2, 4 and 7) to close anvil assembly 110 relative to the staple cartridge assembly 200.

Id. at col. 24, ll. 56–62.

(6) a rotatably movable portion comprising a rotatable drive shaft configured to rotate in response to one of said rotary output motions; said rotatable drive shaft in operable engagement with said axially movable portion wherein an initial rotation of said rotatably movable portion causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said first position into an intermediate position at a first rate, wherein a subsequent rotation of said rotatably movable portion in a same direction causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said intermediate position to said second position at a second rate, and wherein said first rate is greater than said second rate

Petitioner contends that both the clamping collar embodiment and the closure tube embodiment of Timm combined with Anderson teach this limitation. MTA Opp. 29–32.

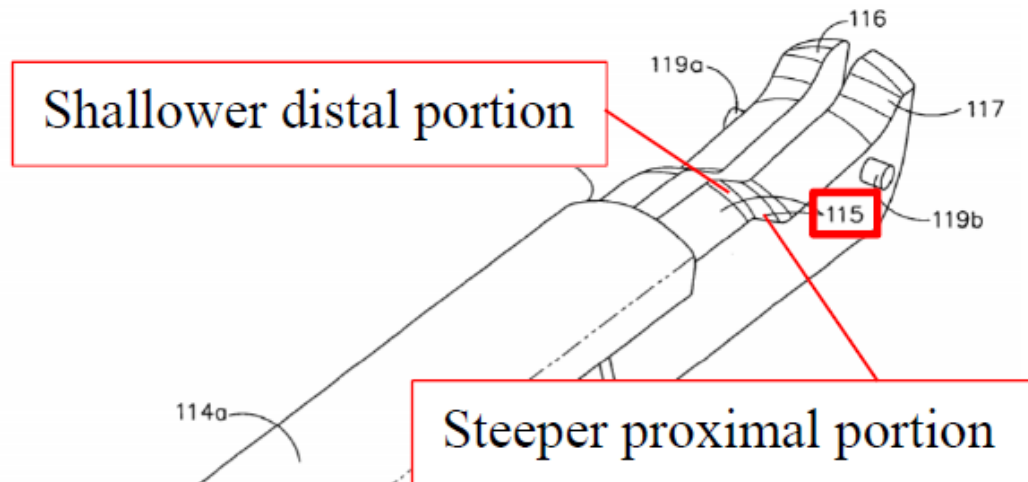
With respect to the clamping collar embodiment, Petitioner contends Timm in view of Anderson discloses a rotatably movable portion (*e.g.*, Anderson's transmission member 76) of the elongated shaft assembly

comprising a rotatable drive shaft (Anderson's drive shaft 76.1) configured to rotate in response to one of said rotary output motions (the rotary output motion of the corresponding engaging member in the tool drive assembly). *Id.* (citing Ex. 1008, col. 11, l. 66–col. 12, l. 22; Ex. 1006, col. 22, ll. 29–40; Ex. 1023 ¶¶ 136–139). Petitioner also contends that Timm and Anderson teach that the drive shaft is in operable engagement with the axially movable portion. *Id.* at 29 (citing Ex. 1008, col. 11, l. 66 – col. 12, l. 22; Ex. 1006, col. 22, ll. 29–40; Ex. 1023 ¶¶ 136–139).

With respect to the closure rates Petitioner contends:

An initial rotation of said rotatably movable portion causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said first position into an intermediate position (the position of anvil assembly when clamping collar transitions from contacting the steeper proximal portion of cam surface to contacting the shallower distal portion of cam surface) at a first rate (the rate resulting from the interaction of clamping collar and the steeper proximal portion of cam surface).

Id. at. 30 (reference numbers omitted) (citing Ex. 1023 ¶¶ 133–134, 136–139). Petitioner goes on to contend that as the rotatable portion continues to advance the axially moveable portion cause the selectively movable portion to move from an intermediate position to a second position at a second rate. *Id.* (citing Ex.1023 ¶¶ 133–134, 136–139). Referring to Figure 7 of Timm reproduced below, Petitioner contends “said first rate is greater than said second rate because the steeper proximal portion of cam surface 115 causes anvil assembly 110 to move faster than the shallower distal camming surface of anvil assembly 110, which is a radius.” *Id.* (citing Ex. 1023 ¶¶ 133–134, 136–139; Ex. 1006, col. 10, l. 54–col. 11, l. 7, Fig. 7.).

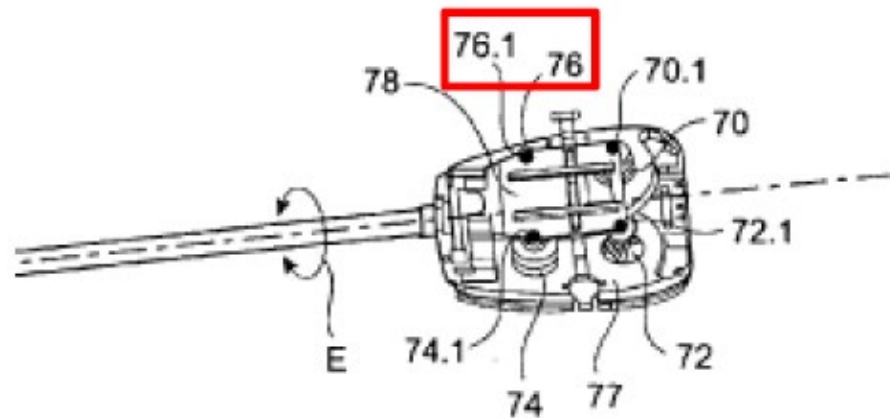


Portion of Figure 7 of Timm as annotated by Petitioner showing a perspective view of an anvil portion of a surgical instrument. *Id.* at. 30.

Turning to the closure tube embodiment, referring to Figure 3 of Anderson reproduced below, Petitioner contends

Timm in view of Anderson (and, if necessary, Shelton) discloses a rotatably movable portion (*e.g.*, Anderson's transmission member 76, which includes a gear secured on drive shaft 76.1 or a gear train) comprising a rotatable drive shaft (*e.g.*, Anderson's drive shaft 76.1) configured to rotate in response to one of said rotary output motions.

Id. at 31 (citing Ex. 1008, col. 11, l. 66–col. 12, l. 22, Fig. 3; Ex. 1006, col. 22, l. 43–col. 25, l. 50; Ex. 1023 ¶¶ 140–144). Petitioner also contends “[t]he drive shaft 76.1 is in operable engagement (via the pinion gear or gear train mounted thereon) with the rack gear of the axially movable portion.” *Id.*



Portion of Figure 3 of Anderson as annotated by Petitioner showing a perspective view of the tool base of a robotic surgical tool with the cover removed to show the internal structures. *Id.*

With respect to the tool operating at two closure rates, Petitioner, referring to Timm Figure 7 above, contends that as the closure tube moves axially, it transitions from contacting the steeper portion of the cam surface to a shallower portion of the cam surface which, in turn, cause the movement of the selectively movable portion of the tool at two different rates with the first rate being faster than the second rate. *Id.* at. 32.

Petitioner also contends that Schulze and Viola teach modifying Timm's cam surface such that the selectively movable portion moves at two rates. *Id.*

Patent Owner contends that the references do not teach all the elements of the claims, particularly the requirement that the selectively movable component moves at two different rates. MTA Reply 18. Patent Owner contends that Timm does not explicitly disclose two different closure rates and that Petitioner improperly relies on inherency. *Id.* at 21. Patent Owner contends that one skilled in the art "would not have understood that the cam surface 115 of Timm's instrument 1 necessarily discloses the

claimed first and second closure rates, wherein the first rate is greater than the second.” *Id.* (citing Ex. 2012 ¶¶ 76–78).

Patent Owner also contends that Petitioner’s argument improperly incorporates arguments from the Petition and should not be considered. *Id.* at 21–22. Patent Owner also argues that even if Petitioner has properly raised Viola and Schulze, one skilled in the art would not have been motivated to combine the teachings of those references with those of Timm and Anderson. *Id.*

We have considered the arguments presented by the parties and the evidence of record and find that the evidence of record supports the conclusion that Timm combined with Anderson teaches a rotatably movable portion comprising a rotatable drive shaft configured to rotate in response to one of said rotary output motions; said rotatable drive shaft in operable engagement with said axially movable portion wherein an initial rotation of said rotatably movable portion causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said first position into an intermediate position at a first rate, wherein a subsequent rotation of said rotatably movable portion in a same direction causes said axially movable portion to move said selectively movable component portion of said surgical end effector from said intermediate position to said second position at a second rate, and wherein said first rate is greater than said second rate.

Anderson teaches rotating a shaft in response to the rotary output from transmission members and spools located in the instrument base. Ex. 1008, col. 11, l. 66– col. 12, l. 4; Ex. 1023 ¶ 140. Timm teaches that the rotation of the shaft causes the closure tube to move axially such that the closure tube

engages the cam surface of the anvil causing the anvil to move to the closed position. Ex. 1006, col. 22, l. 43–col. 25, l. 50: Ex. 1023 ¶ 142.

With respect to two closure rates, we agree with Dr. Fischer that this element is taught by Timm, specifically in Figure 7 shown above. *See* Ex. 1023 ¶¶ 141–143. As Dr. Fischer has testified, the cam surface of the anvil has a steep sloped portion and a shallow sloped portion. *Id.* ¶ 141. Dr. Fischer testified that as the closure ring engages the cam surface of the anvil, the steep portion of the cam will cause the anvil to closure at a first rate and the shallow portion will cause the anvil to close at a second rate with the first rate being greater than the second rate. *Id.* ¶¶ 141–143.

We are not persuaded by Patent Owner’s argument that Timm does not teach two closure rates. MTA Reply 21. As discussed above, Dr. Fischer’s analysis is based on a review of the drawings of Timm which provide the needed teaching. *See In re Wagner*, 63 F.2d 987 (explaining that it is proper to rely on drawing to support a finding of obviousness).

We are similarly unpersuaded by Patent Owner’s contention that one skilled in the art would not interpret the cam surface of Timm as necessarily disclosing two closure rates. MTA Reply 21. Patent Owner relies on the testimony of Dr. Cimino to support this contention. We do not find Dr. Cimino’s testimony persuasive.

Dr. Cimino opines that it is not clear that Timm Figure 7 discloses a shallow or steep portion. Ex. 2012 ¶ 78. Dr. Cimino, however, does not state the basis for his opinion. *Id.* For this reason we give little weight to Dr. Cimino’s opinion. *See In re Beattie*, 974 F.2d 1309, 1313 (Fed. Cir. 1992) (opinion evidence in declarations has little value without factual support).

Dr. Cimino then opines that one skilled in the art would need additional information before concluding that the instrument closed at two

different rates. Ex. 2012 ¶ 78. For the reasons stated above in Section II.E.2.a.1.(g), we find this argument unpersuasive.

Since we find that Timm alone teaches closure of the anvil at two different rates, we need not address the issue of whether Viola or Schulze provides such a teaching.

(7) a first articulation joint configured to articulate said end effector about a first axis in response to one of said rotary output motions

Petitioner contends that Timm combined with Anderson teaches this limitation. MTA Opp. 32–33. Referring to Timm Figures 2 and 3 reproduced below, Petitioner contends

Timm discloses a first articulation joint (*e.g.*, Timm’s apertures 44a-b in flanges 42a-b, . . . []) in the Timm/Anderson instrument, is configured to articulate said end effector about a first axis (the Z axis) in response to one of said rotary output motions (the rotary output motion from one of Anderson’s engaging members).

Id. (citing Ex. 1006, col. 8, l. 46–col. 9, l. 12, col. 22, ll. 43–44, Figs. 1–3; Ex. 1023 ¶ 145).

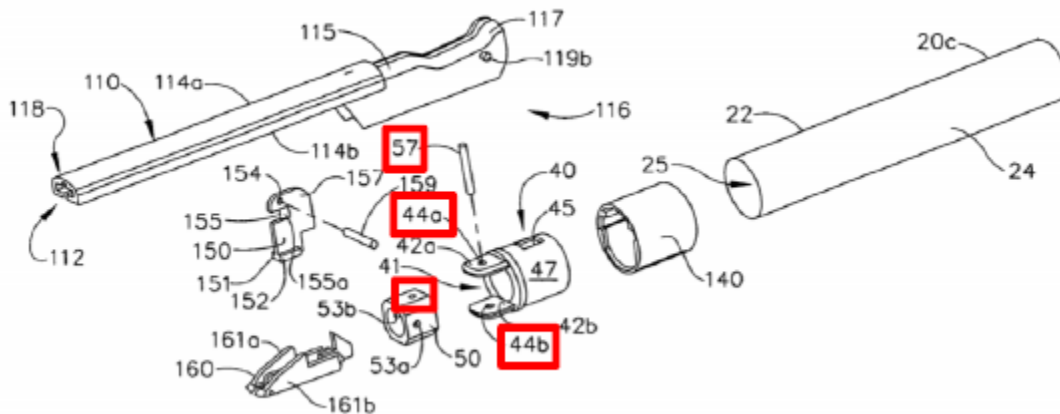


Figure 2 of Timm as annotated by Petitioner showing an exploded perspective view of a surgical stapling and severing instrument. *Id.* at 33.

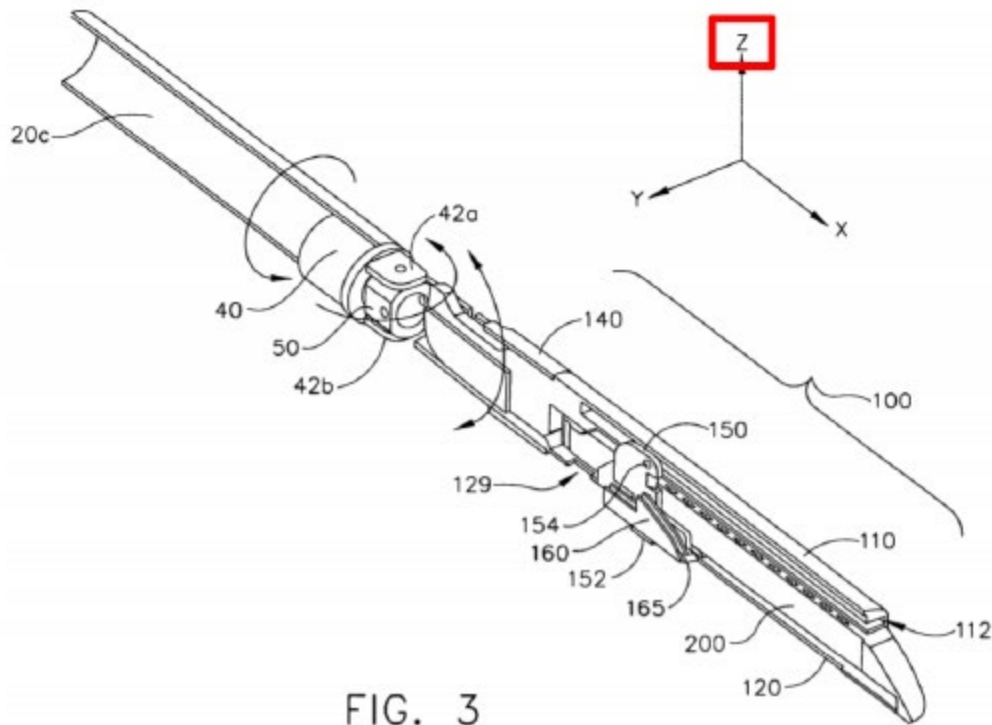


Figure 3 of Timm as annotated by Petitioner showing a right perspective view of a stapling and severing instrument with a portion shown in cross-section. *Id.*

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm in combination with Anderson teaches a first articulation joint configured to articulate said end effector about a first axis in response to one of said rotary output motions.

Referring to Figure 3 above, Timm teaches

[i]n various embodiments, the distal end of tube adapter 40 may include a pair of opposing flanges 42a and 42b which define a cavity 41 for pivotably receiving a pivot block 50

therein. Each flange 42a and 42b may include an aperture 44a and 44b oriented to receive a pivot pin 57 that extends through an aperture in pivot block 50 to allow pivotable movement of pivot block 50 about a “Z” axis defined as perpendicular to longitudinal axis “X” of tool assembly 100. See FIG. 3. As will be explained in more detail below, the channel assembly may be formed with two upwardly extending flanges 121a, 121b that have an aperture 122a, 122b, respectively, which are dimensioned to receive a pivot pin 59. In turn, pivot pin 59 mounts through apertures 53a, 53b of pivot block 50 to permit rotation of the tool assembly 100 about the “Y” axis as needed during a given surgical procedure. Rotation of pivot block 50 about pin 57 along “Z” axis rotates tool assembly 100 about the “Z” axis. Other methods of fastening the channel 120 to the pivot block and of fastening the anvil to the channel may be effectively employed without departing from the spirit and scope of the present invention.

Ex. 1006, col. 8, ll. 46–65. Dr. Fischer testifies that the rotary output would have come from one of Anderson’s engaging members. *See* Ex. 1023 ¶ 145.

(8) a second articulation joint configured to articulate said end effector about a second axis in response to one of said rotary output motions

Petitioner contends that Timm combined with Anderson teaches this limitation. MTA Opp. 33–34. Again referring to Timm figures 2 and 3, Petitioner contends

Timm discloses a second articulation joint (Timm’s apertures 53a, 53b, 122a, 122b and pivot pin 59), which, in the Timm/Anderson instruments, is configured to articulate said end effector about a second axis (the Y axis) in response to one of said rotary output motions (the rotary output motion from one of Anderson’s engaging members).

Id. (citing Ex. 1023 ¶ 146).

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to

argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

We find that the evidence of record supports the conclusion that Timm in combination with Anderson teaches a second articulation joint configured to articulate said end effector about a second axis in response to one of said rotary output motions. In the discussion of the first articulation joint quoted above, Timm also teaches the presence of a second articulation joint which permits movement of the end effector about a second axis. Ex. 1006, col. 8, ll. 46–65. Dr. Fischer testifies that the rotary output would have come from one of Anderson’s engaging members. *See* Ex. 1023 ¶ 146.

(9) a tool mounting plate supporting said elongate shaft assembly and configured to be releasably mounted to said tool drive assembly, said tool mounting plate comprising a plurality of driven elements configured for driving engagement with a corresponding plurality of rotatable body portions of said tool drive assembly when said tool mounting plate is mounted to said tool drive assembly.

Petitioner contends that Timm combined with Anderson teaches this element. MTA Opp. 34. Petitioner presents the same arguments discussed in Section II.E.2.a.1.(j) above with the exception that the elongated shaft engages the clamping collar of the closure tube. *Id.* (citing Ex. 1023 ¶ 147).

Patent Owner does not contest the specific teachings of the references with respect to this element of proposed substitute claim 12 other than to argue that there would have been no motivation to combine the references and one skilled in the art would not have had a reasonable expectation of success. *See* MTA Reply 7–18.

For the reasons stated in Section II.E.2.a)1.(j) above, we find that the evidence of record supports the conclusion that Timm in combination with

Anderson teaches a tool mounting plate supporting said elongate shaft assembly and configured to be releasably mounted to said tool drive assembly, said tool mounting plate comprising a plurality of driven elements configured for driving engagement with a corresponding plurality of rotatable body portions of said tool drive assembly when said tool mounting plate is mounted to said tool drive assembly.

(10) Conclusion

Based on the foregoing, we conclude that the evidence of record supports the conclusion that the subject matter of proposed substitute claim 12 would have been obvious to one of ordinary skill in the art at the time the invention was made over Timm combined with Anderson.

b) Proposed Substitute Claim 13

The arguments presented by the parties with respect to proposed substitute claim 13 in this ground are essentially the same as those discussed above with respect to Ground 1. MTA Opp. 34, MTA Reply 7–18. For the reasons stated above in Section II.E.2.b, we conclude that the subject matter of substitute claim 13 would have been obvious to one of ordinary skill in the art at the time the invention was made over Timm combined with Anderson.

III. CONCLUSION¹¹

For the foregoing reasons, we grant Patent Owner's request to cancel claims 10 and 11 and deny Patent Owner's request to enter proposed substitute claims 12 and 13 as summarized by the following table:

¹¹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner*

Motion to Amend Outcome	Claim(s)
Original Claims Cancelled by Amendment	10, 11
Substitute Claims Proposed in the Amendment	12, 13
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	12, 13
Substitute Claims: Not Reached	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Patent Owner's motion to Amend is *granted* as to its non-contingent request to cancel claims 10 and 11;

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied* as to proposed substitute claims 12 and 13.

Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See 37 C.F.R. § 42.8(a)(3), (b)(2).*

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