NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

INTUITIVE SURGICAL, INC.,
Appellant

v.

ETHICON LLC,
Appellee

ANDREW HIRSHFELD, PERFORMING THE FUNCTIONS AND DUTIES OF THE UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE,
Intervenor

2020-1480; 2020-1482

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2018-01247, IPR2018-01254.

Decided: February 11, 2022

STEVEN KATZ, Fish & Richardson P.C., Boston, MA, argued for appellant. Also represented by RYAN PATRICK

O'CONNOR, JOHN C. PHILLIPS, San Diego, CA.

ANISH R. DESAI, Weil, Gotshal & Manges LLP, New York, NY, argued for appellee. Also represented by ELIZABETH WEISWASSER; PRIYATA PATEL, CHRISTOPHER PEPE, Washington, DC.

SARAH E. CRAVEN, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA, argued for intervenor. Also represented by THOMAS W. KRAUSE, FARHEENA YASMEEN RASHEED, MOLLY R. SILFEN.

Before O'MALLEY, CLEVENGER, and STOLL, *Circuit Judges*.

O'MALLEY, *Circuit Judge*.

Intuitive Surgical, Inc. ("Intuitive") appeals from two final written decisions of the Patent Trial and Appeal Board ("Board") upholding the patentability of claims 24–26 of U.S. Patent No. 8,479,969.

At issue in this case is whether the Board erred in upholding the patentability of claim 24 of the '969 patent over the combination of the Giordano and Wallace prior art references, and in upholding the patentability of claims 24–26 over the combination of the Timm and Anderson prior art references. We hold that the Board did not err and *affirm*.

I. BACKGROUND

A.

In minimally invasive surgery ("MIS"), a surgeon uses specialized surgical techniques and tools to access a patient through smaller incisions than would typically be used in traditional open surgery. MIS benefits patients by reducing hospital stays and costs, providing shorter recovery times, and improving operating room efficiency.

The '969 patent, entitled "Drive Interface for Operably Coupling a Manipulatable Surgical Tool to a Robot," relates to a robotically controlled endoscopic surgical instrument commonly used in MIS procedures. As disclosed in the '969 patent, a robotically controlled surgical instrument comprises a robotic system with a control unit (e.g., a controller) and a shaft that includes an electronically conductive elongated member. The surgical instrument comprises an end effector connected to a distal end of the shaft and receives command from the control unit for surgical functions. A surgeon may remotely control the surgical instrument with the controller to robotically perform an MIS.

The end effector may consist of various surgical tools, such as a surgical stapler (also known as an endocutter) capable of cutting and stapling tissue. The '969 patent describes the endocutter as having a pair of jaws that are configured to grasp and clamp onto tissue within the body of a patient. One jaw typically has a staple cartridge and the other jaw (referred to as an anvil) has the ability to clamp down on tissue to secure it. Once a patient's tissue is secured between the jaws, the movement of a sled causes the staples to fire from the cartridge, deforming against the anvil and forming several rows of staples that secure the tissue. Notably, in claims 24–26, the distal end of the shaft comprises an articulation joint to facilitate articulation of the end effector. Articulation means that part of the surgical tool can move relative to the tool shaft. A sample end effector with an articulation joint (14) is shown in Figure 2:

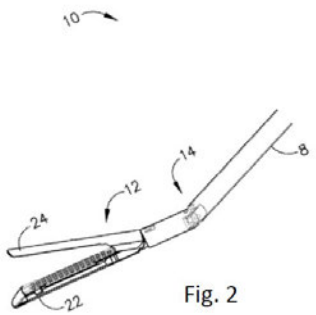

Fig. 2

The articulation joint allows the shaft to articulate along two axes. Articulation cables couple the articulation joint to the tool mounting portion, such that the articulation joint may be operated by rotary motion from the robotic system. The '969 patent also contains tactile feedback sensors in the end effector.

Claim 24 is the primary claim at issue on appeal:[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 at least one rotary output motion to at least one rotatable body portion supported on the tool drive assembly, said surgical tool comprising:
>
> a surgical end effector comprising at least one component portion that is selectively movable between first and second positions relative to at least one

---

[1] As noted, claims 25 and 26 are also at issue in the IPR predicated on the Timm and Anderson references. Because those two claims depend from claim 24 and Intuitive makes no unique arguments relating to their validity, we focus solely on claim 24.

other component portion thereof in response to control motions applied to said selectively movable component portion;

an elongated shaft assembly defining a longitudinal tool axis and comprising:

a distal spine portion operably coupled to said end effector; and

a proximal spine portion pivotally coupled to said distal spine portion at an articulation joint to facilitate articulation of said surgical end effector about an articulation axis that is substantially transverse to said longitudinal tool axis; and

at least one gear-driven portion that is in operable communication with said at least one selectively movable component portion of said surgical end effector and wherein said surgical tool further comprises:

a tool mounting portion operably coupled to a distal end of said proximal spine portion, said tool mounting portion being configured to operably interface with the tool drive assembly when coupled thereto, said tool mounting portion comprising:

a driven element rotatably supported on said tool mounting portion and configured for driving engagement with a corresponding one of the at least one rotatable body portions of the tool drive assembly to receive corresponding rotary output motions therefrom; and

a transmission assembly in operable engagement with said driven

> element and in meshing engagement with a corresponding one of said at least one gear-driven portions to apply actuation motions thereto to cause said corresponding one of said at least one gear driven portions to apply at least one control motion to said selectively movable component.

J.A. 338.

Four prior art references are relevant to this consolidated appeal: U.S. Patent Application No. 2008/0167672 ("Giordano"), U.S. Patent No. 6,699,235 ("Wallace"), U.S. Patent No. 7,510,107 ("Timm"), and U.S. Patent No. 6,783,524 ("Anderson"). Giordano claims a handheld surgical instrument for use in MIS, including the non-robotic elements but not the robotic claim limitations of the '969 patent. J.A. 1563–1769. Giordano discloses an articulation pivot, which allows the surgical tool to bend relative to the shaft, and an articulation control, which allows a surgeon to control rotational articulation about the pivot. Additionally, Giordano incorporates U.S. Patent No. 6,978,921 ("Shelton"), which itself discloses a handheld surgical instrument that has a stapler end effector, but no articulation joint.

Wallace claims a robotically controlled surgical stapler and discloses the same robotic elements as the '969 patent and similar non-robotic elements. J.A. 1311–44. In Wallace, the distal end of the surgical stapler contains a wrist mechanism allowing for articulate movements during MIS.

Timm describes a handheld surgical stapler. J.A. 1423–1562. In Timm, the stapler possesses both active and passive articulation joints. The passive articulation joints may be locked or unlocked. In the locked state, the passive articulation joint does not move. In the unlocked state, the passive articulation joint moves when pressed against

some other object and thus moves the instrument tip. A surgeon may thus unlock the passive articulation joint and move the joint by pressing the tool against some other object and then lock the joint once it has reached the surgeon's desired position.

Anderson describes a robotic surgical tool with an end effector that includes an ultrasound probe tip for cutting and cauterizing tissue. J.A. 1132–1237. Anderson also discloses robotic elements and non-robotic elements that are similar to those disclosed in the '969 patent. The Anderson invention provides the surgeon with tactile feedback, where sensors located on the end effector sense the forces applied to the surgical tool and electronically relay this information back to the surgeon's workstation at the master controller. Anderson does not describe passive articulation.

B.

Intuitive filed three petitions with the Board, each contending claim 24 is invalid as either anticipated or obvious. Only the two petitions asserting claim 24 would have been obvious—IPR2018-01254 ("the Giordano/Wallace proceeding") and IPR2018-01247 ("the Timm/Anderson proceeding")—are relevant to these combined appeals.

In the Giordano/Wallace proceeding, Intuitive argued that claims 1–11 and 24 would have been obvious over the Giordano and Wallace prior art references. Claims 1–11 are not at issue in the appeal from that proceeding. Intuitive set forth two alternative grounds for its contention that Intuitive's proposed combination satisfied claim 24's "articulation joint" limitation.

First, in what the Board termed Intuitive's "primary combination," Intuitive argued that claim 24 would have been obvious because a person of ordinary skill in the art would have been motivated to combine Shelton's stapler end effector with Giordano's articulation mechanism, and

then combine the resulting surgical instrument with Wallace's robotic system. Intuitive acknowledged that Shelton did not include an articulation joint as required by claim 24, but proposed modifying Shelton's shaft assembly—containing the end effector stapler—with Giordano's articulation mechanism—containing the articulation pivot point and articulation control. According to Intuitive, a person of ordinary skill in the art would have been motivated to apply a known technique to a known system to yield predictable results without significantly altering or hindering the functionality of the Shelton stapler. The Board disagreed, finding no motivation to pursue Intuitive's primary combination because the combination would result in a device with a manually controlled articulation control located on the instrument's shaft, contravening Wallace's express purpose of a robotic instrument. The Board also noted that Intuitive never described how a person of ordinary skill in the art would have modified or replaced Giordano's manual articulation control with another component in the tool mounting portion of Wallace.

Second, in what the Board termed Intuitive's "alternative combination," Intuitive argued that a person of ordinary skill in the art would have modified Shelton's stapler to include an articulation joint similar to that described in Wallace. Under this line of logic, a person of ordinary skill in the art would be motivated to improve Giordano's disclosure of one axis movement using Wallace's disclosure of an articulation mechanism using gear-driven articulation rods to enable multi-axis, 360 degree movement. Here, too, the Board disagreed. The Board found that Intuitive waived its "one axis" argument because it was made for the first time in the reply brief. The Board also noted that Intuitive's "one axis" argument contradicted the original theory Intuitive proffered in its petition—that the only motivation for combining Shelton's surgical stapler with Wallace's articulation mechanism was to achieve the benefit of multi-axis articulation. The Board dismissed

Intuitive's argument that Shelton and Wallace were compatible, as Intuitive offered no support for the proposition that Shelton's firing bar could articulate and bend around multiple axes.

In the Timm/Anderson proceeding, Intuitive argued that claims 19–26 would have been obvious over the Timm and Anderson prior art references. Intuitive contended that a person of ordinary skill in the art would have combined the Timm prior art reference—which disclosed the claimed articulating surgical stapler—and the Anderson prior art reference—which disclosed the claimed robotic system—to obtain the claimed invention. According to Intuitive, a person of ordinary skill in the art would have been motivated to combine Timm and Anderson because Timm's end effector and Anderson's robotic system would provide a wide range of articulation movements to facilitate surgery. The Board disagreed once more, finding insufficient motivation to combine because Timm uses a passive articulation joint and Anderson's robotic system lacked the level of tactile feedback needed to safely perform passive articulation. The Board also rejected Intuitive's argument that a person of ordinary skill in the art would have combined tactile feedback with Anderson's robotic system based on a lack of evidence. Even Intuitive's expert admitted that he was unaware of the existence of any system providing tactile feedback for a passively articulated tool.

Intuitive timely appeals to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

II. DISCUSSION

We review the Board's ultimate obviousness determinations *de novo* and review its underlying factual findings for substantial evidence. *PersonalWeb Techs., LLC v. Apple, Inc.*, 917 F.3d 1376, 1381 (Fed. Cir. 2019).

On appeal, Intuitive argues that the Board erred by upholding the patentability of claim 24 over the combination of Giordano and Wallace. Intuitive additionally argues that substantial evidence does not support the Board's finding that a person of ordinary skill in the art would not have been motivated to combine Timm and Anderson. We address each issue in turn.

A.

Intuitive asserts that the Board erred in upholding claim 24's patentability over the Giordano and Wallace prior art references. According to Intuitive, the Board erroneously required the "articulation control" to be specifically discussed in its petition because the "articulation control" is not a claim limitation. Intuitive argues that, contrary to the Board's finding, Intuitive properly described how combining Giordano and Wallace meets the articulation joint requirement in claim 24. Specifically, Intuitive asserts that a person of ordinary skill in the art would have removed and replaced Giordano's handle—which hosts Giordano's articulation control—with Wallace's tool mounting portion, which implies that Giordano's articulation control would no longer externally reside on the handle of the surgical instrument.

But Intuitive's arguments misinterpret the Board's findings. The Board correctly found that Intuitive failed to explain how a person of ordinary skill in the art would have modified Giordano's articulation control to be remotely controlled by Wallace's robotic system. It found that the primary combination did not include any modification to relocate Giordano's articulation control into Wallace's tool mounting portion. Although Intuitive argues in its reply brief that Giordano's manual articulation control would be coupled into the tool base of the Wallace robot, that argument was not set forth in Intuitive's initial petition and was not raised until after Ethicon pointed out the deficiencies in Intuitive's petition. More crucially, the Board did

not abuse its discretion in excluding Intuitive's reply argument. Petitioners may not use reply briefs to cure deficiencies in their petitions. *Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1286–87 (Fed. Cir. 2017) ("We also are unpersuaded by Continental's attempts to cure the petition's deficiencies in its subsequent briefing to the Board and to us."). Although Intuitive terms its argument a "post-petition clarification," the Board is well within its discretion to disregard this belated argument and rely only on Intuitive's petition and its expert declaration—neither of which discussed relocating Giordano's articulation control to Wallace's tool mounting portion. Intuitive only addressed Giordano's articulation control once in its petition, vaguely stating that a person of ordinary skill in the art would have been motivated to combine because "it would have been obvious, in view of Wallace, to adapt the resulting device . . . for use with a surgical robotic system." Although Intuitive has since made extensive arguments on appeal with respect to locating the articulation control in Giordano's handle on Wallace's "tool mounting portion," Intuitive never presented these arguments to the Board, either in its petition or even in its reply.

Intuitive also argues that the Board erred in focusing on non-claim terms, such as "articulation control." We are unconvinced. Intuitive shoulders the burden to present compelling evidence showing that a person of ordinary skill in the art would have been motivated to combine Giordano's manual articulation control with Wallace's robotic system. The Board focused on Giordano's "articulation control" not as a claim limitation, but as evidence of Intuitive's failure to adequately explain how a person of ordinary skill in the art would have combined the Giordano prior art reference with the Wallace prior art reference to satisfy the limitations of claim 24.

B.

Next, substantial evidence supports the Board's decision to uphold claim 24's patentability over the Timm and Anderson prior art references. On appeal, Intuitive argues that the Board erred in finding that there was no motivation for a person of ordinary skill in the art to combine the Timm and Anderson references. Specifically, it asserts that the Board's finding rested on the erroneous assumption that tactile feedback would be required in every form of passive articulation. Intuitive points to testimony by its expert witness Dr. Knodel that tactile feedback may not be necessary in all surgical procedures. We disagree. The Board relied upon the expert testimony of Ethicon's expert witness Dr. Fegelman to make the factual finding that tactile feedback would be necessary in a surgical instrument with a passive articulation joint. The Board also properly found Dr. Knodel's testimony to be undermined by his own admission that "passive articulation against a structure in the body raises concerns of damaging tissue due to excessive force." J.A. 30. To the extent that Intuitive argues that tactile feedback is not required for every surgical procedure involving passive articulation, that argument is a factual dispute. Because the Board's factual finding on this point was supported by substantial evidence, we decline to disturb it.

III. CONCLUSION

We have considered Intuitive's remaining arguments and find them unpersuasive. For the reasons discussed above, on this record, the Board did not err in upholding the patentability of claim 24 of the '969 patent over the combinations of Giordano/Wallace and Timm/Anderson. Accordingly, we *affirm* the decision of the Board.

AFFIRMED