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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/511,738	10/10/2014	Shinji Ishida	02581-P1726A	9022
154825	7590	01/02/2020	EXAMINER	
KS - Whitmyer IP Group LLC 600 Summer Street 3rd Floor Stamford, CT 06901			JAMIALAHMADI, MAJID	
			ART UNIT	PAPER NUMBER
			3771	
			NOTIFICATION DATE	DELIVERY MODE
			01/02/2020	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SHINJI ISHIDA, HIROAKI SANO,
TSUNEYOSHI SUZUKI, and HIROFUMI MUGISHIMA

Appeal 2018-004082
Application 14/511,738
Technology Center 3700

Before STEFAN STAICOVICI, EDWARD A. BROWN, and
ANNETTE R. REIMERS, *Administrative Patent Judges*.

BROWN, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1 and 5–8.² Appellant's representative presented oral argument on December 13, 2019. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Karl Storz GmbH & Co. KG. Appeal Br. 2.

² Claims 2–4 and 9 are cancelled. Appeal Br. (Claims App.).

CLAIMED SUBJECT MATTER

Appellant's disclosure "relates to a medical manipulator by which an end effector can be inserted into the interior of a living body for enabling a treatment to be carried out on a treatment target." Spec. ¶ 1.

Claim 1, reproduced below, is the sole independent claim on appeal.

1. A medical manipulator, comprising:
 - a shaft;
 - a distal end working unit provided on a distal end of the shaft and having an end effector configured to carry out a treatment on a treatment target; and
 - a main body portion disposed on a proximal end of the shaft and configured to operate the end effector based on an input from a person;wherein the distal end working unit includes:
 - a bending portion disposed between the end effector and the shaft and which causes the distal end working unit to bend in a direction that differs from an axial direction of the shaft, in accordance with an operating force in a bending direction that is transmitted from the main body portion; and
 - a hollow tube, which is disposed at a position overlapping with the bending portion and is capable of bending in following relation to movement of the bending portion, wherein the hollow tube transmits a rotational operating force, which is transmitted from the main body portion, to the end effector, so as to enable the end effector to be rotated through an unlimited range of rotation;wherein the distal end working unit transmits operating forces in a distal end direction and a proximal end direction, which are transferred from the main body portion, to the end effector by the hollow tube;
- wherein the end effector is a gripper in which first and second gripper members are opened and closed to grip the treatment target;
- wherein the gripper closes the first and second gripper members by the operating force in the proximal end direction

that is transmitted by the hollow tube, and opens the first and second gripper members by the operating force in the distal end direction that is transmitted by the hollow tube;

wherein the bending portion includes a structure in which three or more rigid joint members are arrayed in the axial direction, and adjacent rigid joint members of the three or more rigid joint members are connected to each other so as to bend mutually; and

wherein the hollow tube extends over a length that is longer than an axial length of the bending portion.

Appeal Br. 13–14 (Claims App.).

REJECTIONS

Claims 1, 5, 6, and 8 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Nobis³, Glossop⁴, and Fortier⁵.

Claim 7 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Nobis, Glossop, Fortier, and Cui⁶.

ANALYSIS

Claims 1, 5, 6, and 8 as unpatentable over Nobis, Glossop, and Fortier

Claims 1, 6, and 8

In rejecting claim 1, the Examiner finds that Nobis discloses a medical manipulator comprising, in part, a shaft (shaft 106), a distal end working unit provided on a distal end of shaft 106 and having an end effector (end effector 108), a bending portion (articulation joint A₁) disposed between end

³ Nobis et al., US 2008/0147113 A1, published June 19, 2008.

⁴ Glossop, US 2007/0032723 A1, published Feb. 8, 2007.

⁵ Fortier et al., US 2010/0030018 A1, published Feb. 4, 2010.

⁶ Cui, US 8,224,428 B2, issued July 17, 2012.

effector 108 and shaft 106, and an actuation wire (actuation wire 138). Final Act. 4–5 (citing Nobis, Figs. 4A–4E). The Examiner finds that actuation wire 138 is disposed at a position overlapping with the bending portion, is capable of bending in following relation to movement of the bending portion, and transmits a rotational operating force to the end effector, as claimed. *Id.* at 5 (citing Nobis ¶¶ 60).

The Examiner first concedes that Nobis fails to disclose that actuation wire 138 is a hollow tube, as claimed. Final Act. 5. To address this feature, the Examiner relies on Glossop as teaching a manipulator that opens and closes jaws by an actuator hollow tube (body member 201) within which a sensor element (sensor element 110) is secured. *Id.* (citing Glossop ¶¶ 42–48, Figs. 1, 2). The Examiner concludes that it would have been obvious to one of ordinary skill in the art to modify Nobis’ device to instead of having an actuating wire to actuate the end effector, to have an actuating hollow tube with a sensor element inside the lumen, as taught by Glossop, “to track the instrument’s tip location and/or orientation while inside the patient and have a representation of the instrument to be displayed on preoperative or intra-operative scans in which the salient anatomy is visible.” *Id.* at 5–6 (citing Glossop ¶¶ 6, 47).

Second, the Examiner concedes that Nobis fails to disclose that the bending portion includes a structure in which three or more rigid joint members are arrayed in the axial direction, and adjacent rigid joint members are connected to each other so as to bend mutually. *Id.* at 6. The Examiner relies on Fortier as teaching a medical manipulator comprising a bending portion including a structure in which rigid joint members (articulation links 232, 234) are arrayed in the axial direction, and adjacent rigid joint members

are connected to each other so as to bend mutually. *Id.* (citing Fortier, Figs. 8, 11A). The Examiner concludes that because Nobis' medical manipulator includes a bending portion having a three-bar linkage (110), and Fortier teaches a bending portion with the features noted above, it would have been obvious to a skilled artisan to substitute Nobis' bending portion with Fortier's "so that the bending portion of Nobis has three or more rigid joint members arrayed in the axial direction in order to achieve a predictable result." *Id.* at 6–7.

Appellant contends that it would not have been obvious to replace Nobis' actuation wire 138 with Glossop's actuator tube 201 because this modification would change the principle of operation of Nobis. Appeal Br. 6. Appellant contends that, in Nobis, actuation wire 138 is provided in the form of a wire to be able to pass through three-bar linkage 110 without preventing this linkage from being used for its intended purpose. *Id.* at 6–7 (citing Nobis Figs. 1C, 1D, 4B, 4C, ¶ 5). According to Appellant, three-bar linkage 110 of Nobis would be incapable of operating according to its intended purpose while accommodating actuator tube 201 of Glossop, which requires a diameter so large that sensor 110 can be housed therein. *Id.* at 7. Appellant contends that one of ordinary skill in the art would not have scaled up the size of three-bar linkage 110 in Nobis, but would have avoided any change in Nobis that resulted in a size increase of the distal end of the device. *Id.* (citing Nobis ¶ 3).

Appellant's contention is unpersuasive for multiple reasons. First, to the extent Appellant is contending that the structures of Nobis and Glossop must be physically combinable with each other, we disagree. "It is well-established that a determination of obviousness based on teachings from

multiple references does not require an actual, physical substitution of elements.” *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012); *In re Sneed*, 710 F.2d 1544, 1550 (Fed. Cir. 1983) (“[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review.” (Citation omitted)).

Second, Appellant’s contention that Nobis’ disclosed three-bar linkage 110 would be incapable of operating according to its intended purpose while accommodating actuator tube 201 of Glossop fails to take into account the Examiner’s proposed rejection, which substitutes Nobis’ bending portion with Fortier’s.

Third, Glossop describes, for example,

actuator tube 201 *may serve as a transmission element* and thus may perform the function of transmitting forces, energy, material, or other implements from an operating element 107 (not illustrated in FIG. 2) or other element of instrument 100 to a treatment apparatus. *In other embodiments, the transmission element may include a solid wire, a wire cable, or other element.*

Glossop ¶ 46 (boldface omitted, italics added). Glossop also describes, for example, that “a solid actuator wire may be used *in place of or in addition to* actuator tube 201.” *Id.* ¶ 52 (boldface omitted, italics added). Accordingly, Glossop teaches that an actuator tube *or* a solid actuator wire *or* a wire cable can be used interchangeably as a transmission element, or these elements can be used *together*. Further, Appellant does not direct us to any disclosure in Glossop that evidences actuator tube 201 must be larger than Nobis’ actuation wire 138, much less so much larger than actuation wire 138 that replacing or substituting actuation wire 138 with actuator tube 201 would result in Nobis being incapable of operating according to its intended

purpose while accommodating actuator tube 201 of Glossop, as Appellant contends. Appeal Br. 7. We are unpersuaded as well by Appellant's contention that Nobis would have to be significantly scaled up in size to enable this substitution. *Id.* Appellant's contention is not supported by a preponderance of the evidence, and thus, constitutes unsupported attorney argument that cannot take the place of evidence in the record. *In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997).

Fourth, in light of Glossop's express teaching that an actuator tube *or* a solid actuator wire *or* a wire cable can be used interchangeably as a transmission element, or used in combination, Appellant's argument seemingly fails to take into account that a skilled artisan is a person of ordinary creativity, not an automaton, and, as such, would have understood how to utilize different types of transmission elements in Nobis. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("A person of ordinary skill is also a person of ordinary creativity, not an automaton."); *see also In re Sovish*, 769 F.2d 738, 743 (Fed. Cir. 1985) (holding that one of ordinary skill in the art is presumed to be skillful). We are unpersuaded that one of ordinary skill in the art would lack the requisite level of skill to be able to combine the teachings of Nobis and Glossop as proposed by the Examiner to result in the claimed subject matter.

Appellant also contends that it would not have been obvious to a skilled artisan to modify Nobis in view of Fortier as proposed by the Examiner. Appeal Br. 7. Appellant contends that Nobis teaches away from devices like Fortier's that use "articulating effectors," and "Nobis specifically provides the three-bar linkage 110 for the purpose of lowering the force necessary to articulate and/or actuate the working end to a level

that all or a great majority of surgeons can handle.” *Id.* (citing Nobis ¶ 3). According to Appellant, replacing Nobis’ three bar linkage 110 with Fortier’s articulation links 232, 234 would increase the force necessary to articulate the working end and thereby render Nobis inoperable for its intended purpose. *Id.* at 7–8.

These contentions are unpersuasive. The description in paragraph 3 of Nobis is insufficient to support Appellant’s inoperability position. This paragraph does not describe that all devices including an “articulating effector” are “inoperable.” To the contrary, paragraph 3 implicitly discloses that at least some doctors can operate such devices. Nor does Appellant identify any explicit disclosure in Nobis that the three-bar linkage lowers the force necessary to articulate and/or actuate the working end of the device by any particular amount or degree as compared to all other devices that include an “articulating effector.” Even assuming the Examiner’s proposed modification would increase the amount of force needed to articulate the working end in Nobis, Appellant does not show with sufficient evidence that this increase would be so substantial that the as-modified device could not even be operated by persons of ordinary skill in the art for its intended purpose. “A known or obvious [product] does not become patentable simply because it has been described as somewhat inferior to some other product for the same use.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)

As for Appellant’s teaching away position, “[a] reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Urbanski*, 809 F.3d 1237, 1244 (Fed. Cir. 2016) (citation

omitted). “A prior art reference evidences teaching away if it ‘criticize[s], discredit[s], or otherwise discourage[s] the solution claimed.’” *In re Brandt*, 886 F.3d 1171, 1178 (Fed. Cir. 2018) (quoting *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004)). Here, we are unpersuaded that Nobis teaches away from the limitation “the expandable insulating material is configured to be expanded from the first condition to the second condition with the compartment empty to form a finished insulated cup.” This position is likewise premised on Appellant’s unsupported position that replacing Nobis’ three bar linkage 110 with Fortier’s articulation links 232, 234 would increase the force necessary to articulate the working end so significantly that the resulting device would be inoperable for its intended purpose.

Appellant further contends that the Examiner has failed to articulate any reasoning with rational underpinning to support the conclusion of obviousness. Appeal Br. 8. Appellant contends that the Examiner’s reasoning for modifying Nobis in view of Fortier, that is, to “achieve [the] predictable result of bending the end effector,” is conclusory, and “Nobis was already capable of performing [this functionality] (i.e., bending an end effector).” *Id.* at 9 (quoting Final Act. 2–3).

The Examiner responds that the claimed medical manipulator would have been obvious over the applied combination of references based on the rationale that the *substitution* of one bending portion for another would yield predictable results to one of ordinary skill in the art. Ans. 6. The Examiner adds that modifying Nobis in view of Fortier would have provided the benefit of allowing multiple degrees of articulation. *Id.* (citing Fortier ¶¶ 7–9).

Accordingly, the Examiner's rationale for making the proposed modification of Nobis in view of Fortier is a simple substitution rationale. According to this rationale, "when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) (citation omitted). Appellant contends that the three-bar linkage 110 of Nobis is capable of providing the device with multiple degrees of articulation, and a person of ordinary skill in the art would not have been motivated to modify Nobis in view of Fortier to achieve a benefit already possessed by Nobis. Reply Br. 5.

Appellant does not contend, however, that the Examiner's proposed substitution of known elements would *not* have yielded unpredictable results. In fact, Appellant does not expressly disagree that the proposed modification would result in a modified device that provides multiple degrees of articulation. Even if Nobis' device already provides multiple degrees of articulation, Appellant does not apprise us of error in the Examiner's position that the proposed modification is a mere substitution of one known element (i.e., a three-bar linkage as taught by Nobis) with another known in the field (i.e., articulation links as taught by Fortier) to yield predictable results, that is, to provide multiple degrees of articulation with a *different* known structure.

Appellant also contends that the rejection relies on improper hindsight. Appeal Br. 9. The Examiner disagrees, explaining that the rejection relies on teachings of Nobis and Fortier, not on knowledge gleaned only from Appellant's disclosure. Ans. 7.

As discussed above, the Examiner's proposed modification of Nobis relies on elements disclosed in Fortier, and, additionally, the Examiner has articulated adequate reasoning with a rational underpinning supporting this modification. We disagree that the Examiner's reasoning merely constitutes impermissible hindsight. Reply Br. 5–6.

For the above, we sustain the rejection of claim 1, and claims 6 and 8 ultimately depending therefrom and not separately argued, as unpatentable over Nobis, Glossop, and Fortier.

Claim 5

The Examiner finds that Nobis discloses an outer shell member (rotation coupling 120) and a retaining member (clevis 122), as claimed. Final Act. 7. Appellant contends, however, that Nobis' rotation coupling 120 "is not 'connected to a distal end of [a] bending portion [that includes a structure in which three or more rigid joint members are arrayed in the axial direction],'" as claimed. Appeal Br. 10. The Examiner responds that, in Nobis, outer shell member 120 (rotation coupling 120) and retaining member 122 (clevis 122) are connected, indirectly, to the distal end of bending portion 110 (three-bar linkage 110). Ans. 7–8 (citing Nobis, Fig. 4B). The Examiner submits that the proposed modification of Nobis in view of Fortier would still have the same construction, but the only change would be that Nobis' bending portion is replaced with Fortier's bending portion, which results in the outer shell member of Nobis still being connected to the distal end of the bending portion. *Id.* at 8.

Appellant's reply does not address persuasively the Examiner's explanation of the rejection. Reply Br. 6. Appellant's contention seems to be premised on Nobis not disclosing a bending portion as recited in claim 1.

However, Nobis' rotation coupling 120 would be connected to a bending portion in the proposed combination. Because Appellant's argument does not apprise us of error in the Examiner's findings or reasoning, we sustain the rejection of claim 5 as unpatentable over Nobis, Glossop, and Fortier.

Claim 7 as unpatentable over Nobis, Glossop, Fortier, and Cui

Claim 7 depends from claim 1 and recites that "plural coils are disposed in an interior of the hollow tube in an overlapping manner; and at least two coils among the plural coils are wound in mutually different winding directions." Appeal Br. 14 (Claims App.). The Examiner concedes that the combination of Nobis, Glossop, and Fortier does not disclose these limitations. Final Act. 8. The Examiner relies on Cui as teaching an optical scanning probe including plural coils (coil springs 32, 34, 36) disposed in an interior of a hollow band (band 38) in an overlapping manner, where at least two of the coils are wound in mutually different winding directions. *Id.* (citing Cui, col. 3, ll. 17–30). The Examiner concludes that it would have been obvious to one of the ordinary skill in the art to further modify the device of Nobis, as modified by Glossop and Fortier, to include these elements of Cui "in order to transmit a rotational force with high efficiency in both clockwise and counterclockwise directions." *Id.* at 8–9 (citing Cui, col. 4, ll. 31–37).

Appellant contends that the Examiner's proposed modification would suppress or reduce axial movement of actuator tube 201 of Glossop, which would render those elements of Nobis inoperable for their intended purpose. Appeal Br. 11 (citing Cui, col. 4, ll. 33–37). The Examiner responds that because the combination of Nobis and Glossop includes an actuator tube,

Cui’s coils will be disposed in the interior of the hollow tube and will not affect axial movement of the hollow tube. Ans. 8. Appellant replies that the Examiner does not address Appellant’s argument that “‘the proposed modification [of Nobis] would have also had the effect of suppressing or reducing axial movement of . . . the actuator tube 201 of Glossop[.]’” Reply Br. 8.

Appellant’s contention is unpersuasive. The Examiner’s proposed modification in view of Cui will result in plural coils placed inside of the actuator tube to decrease displacement only *of the coils in the axial direction*, and thereby prevent contact with the inner surface of the actuator tube. Ans. 9. Even if this modification may, in some way, suppress or reduce axial movement of the actuator tube in the combination, Appellant has not shown with persuasive evidence that this effect would be so substantial that it would render those elements of Nobis, as modified by Glossop, Fortier, and Cui, inoperable for their intended purpose. Accordingly, because Appellant does not apprise us of error in the Examiner’s findings or reasoning, we sustain the rejection of claim 7 as unpatentable over Nobis, Glossop, Fortier, and Cui.

DECISION SUMMARY

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 5, 6, 8	§ 103(a)	Nobis, Glossup, Fortier	1, 5, 6, 8	
7	§ 103(a)	Nobis, Glossup, Fortier, Cui	7	
Overall Outcome			1, 5–8	

Appeal 2018-004082
Application 14/511,738

FINALITY AND RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED