

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SZ DJI TECHNOLOGY CO., LTD.,
Petitioner

v.

AUTEL ROBOTICS USA LLC,
Patent Owner

Case IPR2019-00846

Patent 9,260,184

**PATENT OWNER'S MOTION TO AMEND
UNDER 37 C.F.R. § 42.121**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	LISTING OF PROPOSED SUBSTITUTE CLAIMS	2
III.	NUMBER OF SUBSTITUTE CLAIMS	3
IV.	SCOPE OF THE SUBSTITUTE CLAIMS	3
V.	SUPPORT FOR THE SUBSTITUTE CLAIMS	4
VI.	THE SUBSTITUTE CLAIMS RESPOND TO AND OVERCOME THE PATENTABILITY GROUND IN THIS IPR	9
A.	SUBSTITUTE CLAIMS 12 AND 13 ARE PATENTABLE OVER PETITIONER’S PRIOR ART	9
1.	SASAKI	11
2.	SOKN	14
3.	NO MOTIVATION TO COMBINE	15
B.	SUBSTITUTE CLAIMS 12 AND 13 SATISFY 35 U.S.C. § 112	20
1.	SUBSTITUTE CLAIMS 12 AND 13 ARE NOT INDEFINITE	20
2.	SUBSTITUTE CLAIM 13 PROVIDES ANTECEDENT BASIS	21
VII.	CONCLUSION	22

TABLE OF AUTHORITIES**Page(s)****Cases**

<i>Aqua Prod., Inc. v. Matal</i> , 872 F.3d 1290 (Fed. Cir. 2017) (<i>en banc</i>)	1
<i>Beneficial Innovations, Inc. v. Advance Publications, Inc.</i> , No. 2:11-CV-229-JRG-RSP, 2014 WL 186301 (E.D. Tex. Jan. 14, 2014)	21
<i>Biosig Instruments, Inc. v. Nautilus, Inc.</i> , 715 F.3d 891 (Fed. Cir. 2013), <i>vacated on other grounds</i> , 572 U.S. 898 (2014)	20
<i>HTC Corp. v. IPCom GmbH & Co.</i> , 667 F.3d 1270 (Fed. Cir. 2012)	20
<i>Intuitive Surgical, Inc. v. Ethicon LLC</i> , Case No. IPR2018-00933, Final Written Decision, Paper No. 31 (Dec. 3, 2019)	3, 11
<i>Lectrosonics, Inc. v. Zaxcom, Inc.</i> , Case No. IPR2018-01129, Paper No. 15 (Feb. 25, 2019)	20
<i>Microprocessor Enhancement Corp. v. Texas Instruments Inc.</i> , 520 F.3d 1367 (Fed. Cir. 2008)	21
<i>Vas-Cath Inc. v. Mahurkar</i> , 935 F.2d 1555 (Fed. Cir. 1991)	9

Statutes

35 U.S.C. § 112	20
35 U.S.C. § 316(d)	1

Rules

37 C.F.R. §42.121	1, 22
37 C.F.R. § 42.121(a)	1

37 C.F.R. § 42.121(a)(2)(ii)	3
37 C.F.R. § 42.121(a)(3)	3
37 C.F.R. §§ 42.121(b)(1)-(2)	4, 9

LIST OF EXHIBITS

Exhibit	Description
2001	Declaration of Dr. Charles F. Reinholtz
2002	U.S. Pat. Appl. Pub. No. 2014/0339355 (application publication of U.S. Pat. Appl. No. 14/277,370) (“the ’370 application”)
2003	Canadian Pat. Appl. No. 2815885 (“the ’885 priority application”)
2004	Order 15: Construing the Terms of the Asserted Claims of the Patents at Issue, ITC Inv. No. 337-TA-1133
2005	Hearing Transcript, Oct. 22, 2019, ITC Inv. No. 337-TA-1133
2006	Video of Rotor Blade Installation

I. INTRODUCTION

Patent Owner Autel Robotics USA LLC (“Patent Owner” or “Autel”) submits this motion to amend after satisfying the conference requirement of 37 C.F.R. § 42.121(a). A conference with the Board was held on January 3, 2020, and the Board authorized the filing of the instant motion. Paper No. 9. Petitioner SZ DJI Technology Co., Ltd. (“Petitioner” or “DJI”) challenges claims 3 and 4 of U.S. Patent No. 9,260,184 (“the ’184 patent”). Patent Owner proposes claims 12 and 13 as substitutes to claims 3 and 4, respectively. Patent Owner submits that the instant motion to amend is not contingent on the unpatentability of the original claims. Claims 12 and 13 are presented in a claim listing below.

Pursuant to 35 U.S.C. § 316(d) and 37 C.F.R. §42.121, proposed substitute claims satisfy the requirements for a motion to amend where (1) the number of substitute claims is reasonable; (2) the amendments respond to a ground of unpatentability involved in the trial; (3) the proposed amendments do not enlarge the scope of the claims; and (4) the proposed amendments do not introduce new matter. Patent owner has met its burden as described in further detail below.

Petitioner bears the burden of showing that the substitute claims are unpatentable. *See Aqua Prod., Inc. v. Matal*, 872 F.3d 1290, 1317, 1327 (Fed. Cir. 2017) (*en banc*); *see also* USPTO Memorandum, *Guidance on Motions to Amend in view of Aqua Products* (Nov. 21, 2017). The burden of persuasion with respect to

the patentability of amended claims may not appropriately be placed on the patent owner. *Id.* Even so, there is ample evidence of patentability of the substitute claims as described below.

Patent Owner respectfully requests preliminary guidance on this motion to amend pursuant to Board's pilot program for motions to amend practice. Paper 9 at 3.

II. LISTING OF PROPOSED SUBSTITUTE CLAIMS

Claim 12. (Proposed substitute for claim 3) The apparatus of claim 1 wherein the blade lock portion of the clockwise lock mechanism is configured to engage by partial ~~is rotated~~ counterclockwise rotation with respect to the shaft lock portion thereof to releasably attach the clockwise rotor blade to the first driveshaft.

Claim 13. (Proposed substitute for claim 4) The apparatus of claim 12 wherein the counterclockwise lock mechanism comprises a shaft lock portion attached to the second driveshaft and a blade lock portion attached to the counterclockwise rotor blade, and wherein the blade lock portion of the counterclockwise lock mechanism is configured to engage by partial ~~is rotated~~ clockwise rotation with respect to the shaft lock portion thereof to releasably attach the counterclockwise rotor blade to the second driveshaft.

III. NUMBER OF SUBSTITUTE CLAIMS

Proposed claims 12 and 13 include one substitute claim for each cancelled claim (claims 3 and 4). Thus, Patent Owner has satisfied 37 C.F.R. § 42.121(a)(3). *See Intuitive Surgical, Inc. v. Ethicon LLC*, Case No. IPR2018-00933, Final Written Decision, Paper No. 31 at 9 (Dec. 3, 2019) (“We conclude that this one-for-one substitution presents a reasonable number of substitute claims.”).

IV. SCOPE OF THE SUBSTITUTE CLAIMS

As described below, substitute claims 12 and 13 narrow and do not broaden claims 3 and 4, respectively. Accordingly, Patent Owner has satisfied 37 C.F.R. § 42.121(a)(2)(ii).

In substitute claim 12, the amendment adds the limitation that the clockwise lock mechanism is “configured to engage” in a particular manner. This limitation adds further structural requirements to the claimed lock mechanism and therefore does not broaden the claim. In addition, as explained below in section VI.B, this limitation resolves an indefiniteness issue with respect to original claim 3. The claim 12 amendment also further narrows the scope of the claim with the addition of the “partial” limitation to the scope of claimed rotation. Thus, substitute claim 12 narrows, and does not broaden the scope of original claim 3.

In substitute claim 13, the amendment adds the limitation “wherein the counterclockwise lock mechanism comprises a shaft lock portion attached to the

second driveshaft and a blade lock portion attached to the counterclockwise rotor blade.” This limitation adds further structural components and provides antecedent basis for the claimed shaft lock and blade lock portions of the counterclockwise lock mechanism. The amendment also adds the limitation that the counterclockwise lock mechanism is “configured to engage” in a particular manner. This limitation adds further structural requirements to the claimed lock mechanism and therefore does not broaden the claim. In addition, as explained below in section VI.B., this limitation resolves an indefiniteness issue with respect to original claim 4. The claim 13 amendment also further narrows the scope of the claim with the addition of the “partial” limitation to the scope of claimed rotation. Thus, substitute claim 13 narrows, and does not broaden the scope of original claim 4.

V. SUPPORT FOR THE SUBSTITUTE CLAIMS

As shown below, no new matter is added by way of the substitute claims. Support for the substitute claims is found in the disclosure of U.S. Pat. Appl. No. 14/277,370 (“the ’370 application”) (Ex. 2002), which issued as the ’184 patent, as well as Canadian Pat. Appl. No. 2815885 (“the ’885 priority application”) (Ex. 2003) (also available at Ex. 1001, pp. 158-178), to which the ’370 application claims priority. *See* 37 C.F.R. §§ 42.121(b)(1)-(2). The ’370 application and the ’885 priority application have the same figures and written description.

Claim	Exemplary Support in the '370 Application (Ex. 2002) and the '885 Priority Application (Ex. 2003) ¹
<p>12. The apparatus of claim 1 wherein the blade lock portion of the clockwise lock mechanism <u>is configured to engage by partial is—rotated</u> counterclockwise <u>rotation</u> with respect to the shaft lock portion thereof to releasably attach the clockwise rotor blade to the first driveshaft.</p>	<p>“A clockwise rotor blade is releasably attached to the first driveshaft by engagement in a clockwise lock mechanism and generates a vertical lift force when rotated in the clockwise direction, and a counterclockwise rotor blade is releasably attached to the second driveshaft by engagement in a counterclockwise lock mechanism and generates a vertical lift force when rotated in the counterclockwise direction.” Ex. 2002 at [0008]; <i>see also</i> Ex. 2003 at 3:19-24.</p> <p>“Each clockwise rotor blade 9A, 9B is releasably attached to the corresponding driveshaft 13 by engagement in a clockwise lock mechanism 11AB and each counterclockwise rotor blade 9C, 9D is releasably attached to the corresponding driveshaft 13 by engagement in a counterclockwise lock mechanism 11CD.” Ex. 2002 at [0030]; <i>see also</i> Ex. 2003 at 7:10-14.</p> <p>“The blade lock portion 17A of the clockwise lock mechanisms 11A are rotated counterclockwise with respect to the shaft lock portion 15A thereof to push the blade into the slots 23 to releasably attach the clockwise rotor blade 9A to the shaft lock portion 15A and thus to the driveshaft 13. During operation the shaft lock portion 15A exerts a force in the direction of the arrows on the rotor blade to rotate same, and this force keeps the blade engaged in the slots 23. The counterclockwise lock mechanism 11C operates in a similar fashion with an opposite spin direction.” Ex. 2002 at [0034]; <i>see also</i> Ex. 2003 at 8:14-20.</p>
<p>13. The apparatus of claim 12 <u>wherein the counterclockwise lock mechanism comprises</u></p>	<p>“FIG. 6 shows the shaft lock portion 15C, with recess 21, of a counterclockwise lock mechanism with a counterclockwise rotor blade 9C, with blade lock portion 17C, on one side and a clockwise rotor blade 9A,</p>

¹ Emphasis added throughout unless otherwise noted.

<p><u>a shaft lock portion attached to the second driveshaft and a blade lock portion attached to the counterclockwise rotor blade, and</u></p>	<p>with blade lock portion 17A, on the other side. FIG. 7 shows the blade lock portion 17C of the counterclockwise rotor blade 9C successfully installed in the shaft lock portion 15C to form a counterclockwise lock mechanism 11CD.” Ex. 2002 at [0035]; <i>see also</i> Ex. 2003 at 8:22-26.</p>
<p>wherein the blade lock portion of the counterclockwise lock mechanism <u>is configured to engage by partial is—rotated clockwise rotation</u> with respect to the shaft lock portion thereof to releasably attach the counterclockwise rotor blade to the second driveshaft.</p>	<p>“A clockwise rotor blade is releasably attached to the first driveshaft by engagement in a clockwise lock mechanism and generates a vertical lift force when rotated in the clockwise direction, and a counterclockwise rotor blade is releasably attached to the second driveshaft by engagement in a counterclockwise lock mechanism and generates a vertical lift force when rotated in the counterclockwise direction.” Ex. 2002 at [0008]; <i>see also</i> Ex. 2003 at 3:19-24.</p> <p>“Each clockwise rotor blade 9A, 9B is releasably attached to the corresponding driveshaft 13 by engagement in a clockwise lock mechanism 11AB and each counterclockwise rotor blade 9C, 9D is releasably attached to the corresponding driveshaft 13 by engagement in a counterclockwise lock mechanism 11CD.” Ex. 2002 at [0030]; <i>see also</i> Ex. 2003 at 7:10-14.</p> <p>“The blade lock portion 17A of the clockwise lock mechanisms 11A are rotated counterclockwise with respect to the shaft lock portion 15A thereof to push the blade into the slots 23 to releasably attach the clockwise rotor blade 9A to the shaft lock portion 15A and thus to the driveshaft 13. During operation the shaft lock portion 15A exerts a force in the direction of the arrows on the rotor blade to rotate same, and this force keeps the blade engaged in the slots 23. The counterclockwise lock mechanism 11C operates in a similar fashion with an opposite spin direction.” Ex. 2002 at [0034]; <i>see also</i> Ex. 2003 at 8:14-20.</p>

In addition to the exemplary disclosures noted above, FIGS. 4-5 of the '370 application² provide additional support for the “partial” limitation. The written description accompanying these figures explain that they illustrate how the clockwise rotor blade is releasably attached to the corresponding driveshaft by counterclockwise rotation. Ex. 2002 at [0033]-[0034]; *see also* Ex. 2003 at 8:4-20. These figures illustrate that this counterclockwise rotation is a *partial* counterclockwise rotation, *i.e.*, less than a full rotation of 360 degrees. Ex. 2001 at ¶¶ 35-37.

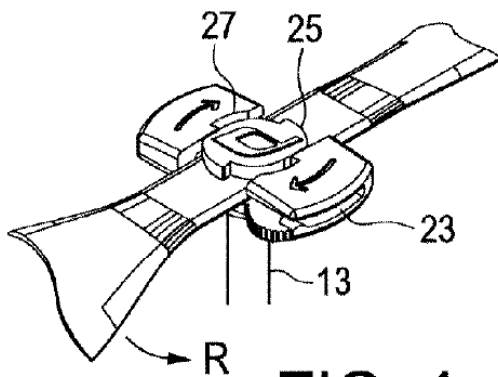


FIG. 4

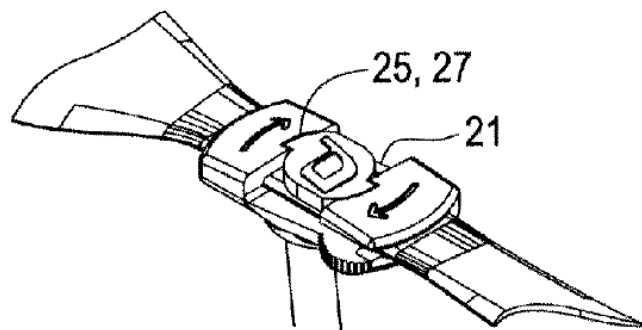


FIG. 5

The written description further explains that “[t]he counterclockwise lock mechanism 11C operates in a similar fashion with an opposite spin direction.” Ex. 2002 at [0034]; *see also* Ex. 2003 at 8:19-20. Accordingly, these figures provide

² The same figures appear in the '885 priority application. Ex. 2003 at 17.

additional support for the “partial counterclockwise rotation” and “partial clockwise rotation” limitations that appear in proposed claim 12 and 13, respectively.

Furthermore, claims 12 and 13 depend directly or indirectly from claim 1.

Below is a chart showing written description support for claim 1.

Claim	Exemplary Support in the '370 Application (Ex. 2002) and the '885 Priority Application (Ex. 2003)
1. A rotary wing aircraft apparatus comprising:	Ex. 2002 at Figs. 1-3, [0008], [0012]-[0014], [0027]-[0029]. Ex. 2003 at Figs. 1-3, 3:14-28, 4:19-4:2, 6:16-7:8.
a body;	Ex. 2002 at Figs. 1-3, [0008], [0012]-[0014], [0027]-[0029]. Ex. 2003 at Figs. 1-3, 3:14-28, 4:19-4:2, 6:16-7:8.
a plurality of arms extending laterally from the body, and a rotor assembly attached to an outside end of each arm;	Ex. 2002 at Figs. 1-3, [0008], [0012]-[0014], [0027]-[0029]. Ex. 2003 at Figs. 1-3, 3:14-28, 4:19-4:2, 6:16-7:8.
each rotor assembly comprising a rotor blade releasably attached to a driveshaft by a lock mechanism, and a drive rotating the driveshaft;	Ex. 2002 at Figs. 1-3, [0008], [0012]-[0014], [0027]-[0029]. Ex. 2003 at Figs. 1-3, 3:14-28, 4:19-4:2, 6:16-7:8.
wherein a first driveshaft rotates in a clockwise direction and a second driveshaft rotates in a counterclockwise direction;	Ex. 2002 at [0008], [0027]-[0029]. Ex. 2003 at 3:14-28, 6:16-7:8.
wherein a clockwise rotor blade is releasably attached to the first driveshaft by engagement in a clockwise lock mechanism and generates a vertical lift force when rotated in the clockwise	Ex. 2002 at Figs. 4-10, [0008], [0015]-[0021], [0027]-[0034].

direction, and a counterclockwise rotor blade is releasably attached to the second driveshaft by engagement in a counterclockwise lock mechanism and generates a vertical lift force when rotated in the counterclockwise direction;	Ex. 2003 at Figs. 4-10, 3:14-28, 5:4-25, 6:16-7:20.
wherein the clockwise rotor blade is engageable only with the clockwise lock mechanism and cannot be engaged in the counterclockwise lock mechanism, and the counterclockwise rotor blade is engageable only with the counterclockwise lock mechanism and cannot be engaged in the clockwise lock mechanism; and	Ex. 2002 at Fig. 8, [0008], [0019], [0036], [0043]. Ex. 2003 at Fig. 8, 3:14-28, 5:18-19, 9:1-6, 10:22-26.
wherein the clockwise lock mechanism comprises a shaft lock portion attached to the first driveshaft and a blade lock portion attached to the clockwise rotor blade, the shaft lock portion defining notches configured to engage corresponding lugs on the blade lock portion.	Ex. 2002 at Figs. 4-6, 9-10, [0015]-[0017], [0020]-[0021], [0033]-[0035], [0037]. Ex. 2003 at Figs. 4-6, 9-10, 5:4-13, 5:21-25, 8:4-26, 9:8-11.

Based at least on these disclosures, a person of ordinary skill in the art (“POSA”) would have understood that the inventors of the ’184 patent were in possession of claims 12 and 13. *See* 37 C.F.R. §§ 42.121(b)(1)-(2); *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991).

VI. THE SUBSTITUTE CLAIMS RESPOND TO AND OVERCOME THE PATENTABILITY GROUND IN THIS IPR

A. Substitute Claims 12 and 13 Are Patentable Over Petitioner’s Prior Art

The '184 patent is directed to a locking mechanism for rotor blades in an unmanned aerial vehicle (“UAV”). Ex. 1001 ('184 patent) at Abstract, claims.³ The invention of the '184 patent includes a unique and novel twist-lock mechanism for attaching UAV rotor blades that (1) allows for quick and easy detachment of the blades and (2) prevents a user from attaching a rotor blade to the wrong driveshaft (i.e., a clockwise rotor blade cannot be attached to a counterclockwise spinning driveshaft and vice versa.) Ex. 1001 at 2:16-18; Ex. 2001 at ¶¶ 33, 37, 70.

Substitute claims 12 and 13 require clockwise and counterclockwise UAV blade lock mechanisms that are configured to engage by partial rotation of a blade lock portion with respect to a shaft lock portion. This partial rotation provides the UAV with the convenient twist-lock feature described above, and is a distinct improvement over conventional threaded screw-on type attachment mechanisms that require multiple full revolutions to attach a rotor blade. Ex. 2001 at ¶¶ 27, 37, 70. As explained more fully below, neither of the prior art references—Sasaki and Sokn—disclose clockwise and counterclockwise UAV blade lock mechanisms that are configured to engage by partial rotation of a blade lock portion with respect to a shaft lock portion. Accordingly, substitute claims 12 and 13 respond to the

³ The parties have submitted substantially similar levels of ordinary skill in the art for the '184 patent. Petition at 20-21; Ex. 2001 at ¶¶ 28-30.

patentability ground involving those prior art references. *See Intuitive Surgical, Inc. v. Ethicon LLC*, Case No. IPR2018-00933, Final Written Decision, Paper No. 31 at 9 (Dec. 3, 2019) (finding that substitute claims responded to proposed ground of patentability “because none of the prior-art references on which the grounds are based . . . discloses a limitation Patent Owner proposes adding”).

1. Sasaki

Sasaki relates to a propeller for a flying toy. Ex. 1006 at 1:30-32. Sasaki discloses a prior art conventional screw-on type blade attachment mechanism. Ex. 1006 at 1:49-2:4; Figures 8 and 9. In the Sasaki design, the central portion of the propeller blade includes a threaded nut that screws onto the driveshaft, which is threaded at the distal end. Ex. 1006 at 1:49-2:4. One drawback of this screw-on type mechanism is that a user must rotate the blade several full revolutions in order to attach the blade to the driveshaft. Ex. 2005 at 313:16-315:24; Ex. 2001 at ¶¶ 45-47.

Sasaki explains that in a design of this type, it is necessary to ensure that a propeller that rotates to the right uses a left threaded nut and a propeller that rotates to the left utilizes a right threaded nut. Ex. 1006 at 2:5-16. With this type of arrangement, the directional force caused by rotation of the propeller blades will have a tightening effect on the blades. *Id.* If the screw directions were reversed, the directional force would have a loosening effect, which would be an untenable design due to the danger of a prop releasing. Ex. 2005 at 315:25-317:4; Ex. 2001 at ¶ 46.

Sasaki explains that a drawback of the screw-on prior art design is that the connections become tightened more than necessary, and the props are difficult to remove and replace. Ex. 1006 at 2:9-16; Ex. 2001 at ¶ 48. Sasaki explains that its invention overcomes the overtightening problem by using a mechanism for attaching the prop to the shaft that is not dependent on the direction in which the prop rotates. Ex. 1006 at 2:24-28; Ex. 2001 at ¶ 49. Sasaki then goes on to describe a propeller blade connection mechanism that is (1) independent of the direction of the blade rotation and (2) does not require any rotation (much less partial rotation) of a blade lock portion with respect to a shaft lock portion. Ex. 1006 at 5:31-7:28; Ex. 2001 at ¶¶ 50-51. Sasaki thus teaches away from directionally specific rotational lock mechanisms. Ex. 2001 at ¶ 59.

Thus, Sasaki does not disclose clockwise and counterclockwise UAV blade lock mechanisms that are configured to engage by partial rotation of a blade lock portion with respect to a shaft lock portion. Ex. 2001 at ¶ 60. Accordingly, the proposed amendments are responsive to a ground of unpatentability and substitute claims 12 and 13 are patentable over Sasaki.

In addition, Claim 1, from which substitute claims 12 and 13 depend, requires that “the clockwise rotor blade is engageable only with the clockwise lock mechanism and cannot be engaged in the counterclockwise lock mechanism, and the counterclockwise rotor blade is engageable only with the counterclockwise lock

mechanism and cannot be engaged in the clockwise lock mechanism.” This limitation, which will be referred to as the “Engagement Limitation”, means that the claimed lock mechanisms prevent a rotor blade from being attached to the wrong drive (i.e., that a clockwise rotor blade cannot be attached to a counterclockwise driveshaft and vice versa). Ex. 2001 at ¶¶ 42-44.

Petitioner’s assertions of unpatentability are based on the false premise that Sasaki discloses this limitation. Petition at 28 (“Sasaki’s directionally threaded coupling mechanism is ‘mistake-proof.’”), 29, 36. But the conventional screw-on type blade attachment mechanism does not prevent the attachment of a blade on the wrong drive. Ex. 2001 at ¶¶ 52-54, 59. In fact, it is relatively easy to attach a blade on the wrong drive on a UAV that utilizes the conventional screw-on type connection mechanism. Ex. 2001 at ¶¶ 52-54. At a recent ITC hearing involving the ‘184 patent, counsel for Autel demonstrated that a blade can be attached on the wrong drive on a Phantom 3, which is a DJI UAV that uses a conventional screw-on type blade attachment mechanism like that disclosed in Sasaki. Ex. 2005 at 332:23-337:20. In addition, Dr. Reinholtz created a video demonstrating that a blade can be attached to the wrong drive using a screw-on type attachment mechanism. Ex. 2006; Ex. 2001 at ¶ 54. Thus, substitute claims 12 and 13 are patentable over Sasaki for this additional reason, and Sasaki lacks the unique and novel convenient twist-lock and mistake-proofing features of the ‘184 patent.

2. Sokn

Sokn is directed to a motor mount assembly for a domestic clothes dryer. Ex. 1007 at Abstract. It discloses a mounting system used to mount a fan motor to a housing that contains the fan in a clothes dryer. Ex. 1007 at 1:9-11; Ex. 2001 at ¶¶ 55-56. Since Sokn is directed at a mounting system for connecting a motor to a fixed housing, there is no consideration in Sokn for creating an attachment mechanism where rotor blades can be easily detached for transport or storage. Ex. 2001 at ¶¶ 57. It is likely that the mounting solution provided by Sokn will never need to be disassembled or transported by a user, and there is no discussion in Sokn regarding disassembly. Ex. 2001 at ¶ 57.

There is no disclosure in Sokn of UAVs or UAV rotor blades. Ex. 2001 at ¶¶ 57. There is no disclosure in Sokn regarding clockwise or counterclockwise rotating blades and accordingly no disclosure of lock mechanisms that depend on direction of rotation. Ex. 2001 at ¶¶ 57, 61, 63-65. There is no disclosure in Sokn of clockwise or counterclockwise lock mechanisms or different configurations of its mounting system that depend on the direction of blade rotation. *Id.* Accordingly, Sokn does not disclose clockwise and counterclockwise UAV blade lock mechanisms that are configured to engage by partial rotation of a blade lock portion with respect to a shaft lock portion. Thus, the proposed amendments are responsive to a ground of unpatentability and substitute claims 12 and 13 are patentable over Sokn.

3. No Motivation To Combine

A person of ordinary skill in the art (“POSA”) would not be motivated to combine Sasaki with Sokn to achieve the inventions claimed in the ‘184 patent. There is no disclosure in Sasaki that indicates a need, motivation, or desire to utilize lock mechanisms for the propeller blade and driveshaft that (1) depend on the rotational direction of the propeller blade or (2) are configured to engage with partial rotation. Ex. 2001 at ¶ 62. As previously explained, the problem identified in Sasaki – overtightening – was resolved with a design that (1) did not depend on the direction of rotation and (2) did not require rotation of a blade lock portion with respect to a shaft lock portion in order to attach the blade. Ex. 2001 at ¶ 62. Sasaki teaches away from directionally specific lock mechanisms. Ex. 2001 at ¶ 59.

Further, a POSA would not look to Sokn when designing an attachment mechanism for UAV blades. Ex. 2001 at ¶ 63. Sokn relates to domestic clothes dryers, a different field than UAVs. *Id.*

A POSA would not look to Sokn to achieve the novel twist-lock mechanism for attaching UAV rotor blades that allows for quick and easy detachment of the blades. Ex. 2001 at ¶ 63. There is no consideration in Sokn for creating an attachment mechanism such that rotor blades can be easily detached. Ex. 2001 at ¶¶ 57, 63. It is likely that the clothes dryer fan blade mounting solution provided by

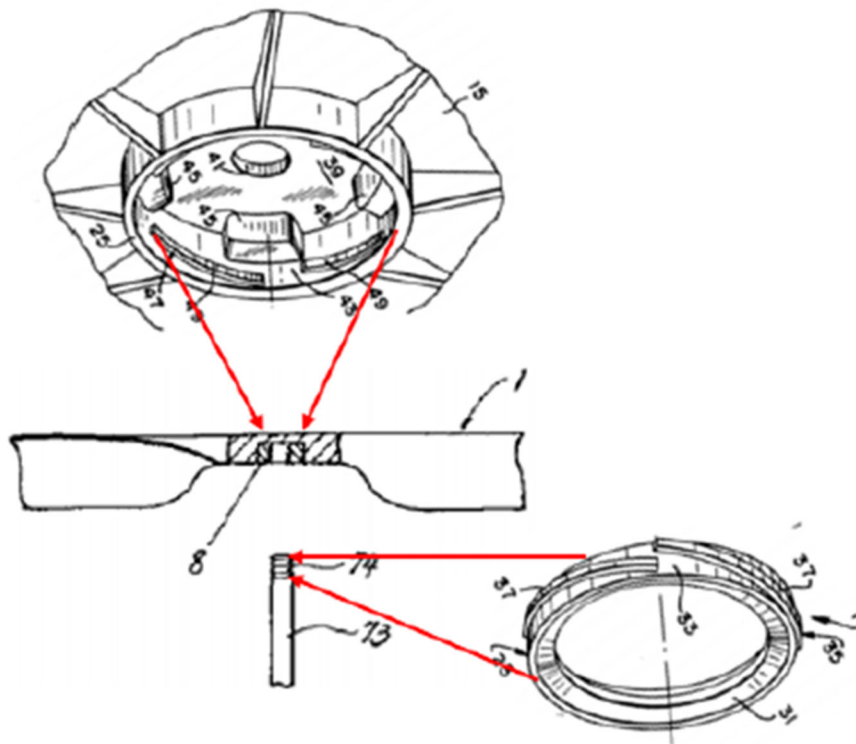
Sokn will never need to be disassembled or transported by a user. *Id.* Sokn discusses only assembly and does not mention disassembly of its system. *Id.*

A POSA would also not look to Sokn to achieve directionally specific lock mechanisms that prevent a user from attaching a rotor blade to the wrong driveshaft. Ex. 2001 at ¶¶ 63-65. There is no discussion in Sokn regarding clockwise and counterclockwise rotating rotor blades or the critical need to prevent interchangeably mounting such blades in a rotorcraft. Ex. 2001 at ¶ 57. Sokn is concerned with accurate assembly of a motor to a housing to allow minimum clearance between the fan blades and the fan housing. Ex. 2001 at ¶¶ 56, 63. Nowhere does Sokn mention the direction of rotation being a consideration in the mounting of an electric fan motor to an associated fan housing. Ex. 2001 at ¶ 63. Thus, Sokn does not depict or discuss different configurations for its lock mechanism to accommodate the proper fitting of components based on the direction of rotation. Ex. 2001 at ¶ 63.

Petitioner implies that Sokn teaches clockwise and counterclockwise engagement mechanisms. Petition at p. 34. But this is incorrect. Ex. 2001 at ¶ 64. In both embodiments in Sokn, the motor assembly is rotated clockwise to tighten it into the dryer housing. Ex. 2001 at ¶ 64. As previously noted, there is no discussion in Sokn regarding the direction of rotation or the relevance of clockwise versus counterclockwise rotation when installing a fan motor to a housing.

Petitioner's argument is based on a misreading of Sokn's discussion of the importance of achieving precise alignment between components. Petition, citing to Sokn at 3:66-4:2, asserts that "Sokn further teaches that the first and second engagement portions and stop members can be configured to provide a predetermined orientation for engagement and interlock connection." Petition at 34. But reading further in the same passage of Sokn, it is clear that Sokn's reference to providing a "predetermined orientation" is referring to the accurate alignment of components and not to a clockwise and counterclockwise assembly direction. Ex. 2001 at ¶ 65 (citing Ex. 1007, Sokn at 3:66-4:4 ("It is of course possible to configure engagement portions 35 and 47, and also stop members 45, in order to provide a predetermined orientation for the engagement and interlock connection between ring assembly 19 and socket 24, and also an interference fit therebetween for further assuring precise alignment and a secure direct attachment of motor 3 to housing 15.") (emphasis added).) This understanding is also supported elsewhere in Sokn. Ex. 2001 at ¶ 65 (citing Ex. 1007, Sokn at Abstract, 5:10-24).

Petitioner also incorrectly asserts that its proposed combination of Sasaki and Sokn will solve the overtightening problem described in Sasaki. Petition at 35. But Petitioner's proposed combination of Sasaki and Sokn would lead to the same basic self-tightening screw and nut combination that Sasaki is teaching away from. Ex. 2001 at ¶¶ 67-69. Below is Petitioner's figure depicting the alleged combination:



Petition at 33. As explained by Dr. Reinholtz, in Petitioner's proposed combination, the interaction of stops 45 and the face of ring 19 would be just like threading a lid onto a jar. Ex. 2001 at ¶ 68. As the closed end of the lid (stops 45) contacts the top of the jar (face of ring 19), further rotation may become more difficult, but it would not prevent the lid from being overtightened. *Id.* In Petitioner's combination, the face of Sokn's ring assembly 19 simply becomes the distal end face of the driveshaft 73 in Sasaki. Ex. 2001 at ¶ 69. The face of ring 19 abuts the stops 45 just as the end of Sasaki's drive shaft would abut the closed end of nut 8. Ex. 2001 at ¶ 69. Petitioner's substitutions simply replace the continuous shaft threading 73 of Sasaki with the segmented threads and they replace the closed end of Sasaki's nut 8 with

the segmented face of stops 45. Ex. 2001 at ¶ 69. But just like the jar and lid example mentioned above, cylindrical socket 25 and ring 19 can be overtightened. Ex. 2001 at ¶ 69. Accordingly, Petitioner's proposed combination would not solve the overtightening problem. The combination is a threaded connection where the end of the drive shaft will tighten against the closed end of the nut due to normal operational rotor torques. Ex. 2001 at ¶ 69. Petitioner's proposed combination would thus result in a design that Sasaki specifically criticizes.

Further, the vast time difference between Petitioner's alleged prior art and the invention of the '184 patent supports the conclusion that a POSA would not combine Sasaki and Sokn. The priority application for the '184 patent was filed on May 15, 2013. Ex. 1001 at cover page (30). The Sasaki application published, and the Sokn application was filed, in 1991, over 20 years before the invention of the '184 patent. Ex. 1006 at cover page (65); Ex. 1007 at cover page [22]. Petitioner asserts that the blade attachment mechanism of the '184 patent was obvious, but it has not cited a single prior art reference that discloses a UAV lock mechanism that prevents the attachment of a blade to the wrong drive or that includes the convenient twist-lock mechanism that utilizes partial rotation to attach a blade to a drive.

Because a POSA would not combine Sasaki with Sokn, substitute claims 12 and 13 are patentable over the prior art that form the basis for the ground in the Petition.

B. Substitute Claims 12 and 13 Satisfy 35 U.S.C. § 112

“[O]nce a proposed claim includes amendments to address a prior art ground in the trial, a patent owner also may include additional limitations to address potential § 101 or § 112 issues, if necessary.” *Lectrosonics, Inc. v. Zaxcom, Inc.*, Case No. IPR2018-01129, Paper No. 15 at 5-6 (Feb. 25, 2019). In addition to the proposed amendments responding to issues of patentability, as discussed in the previous section, the substitute claims include amendments that address 35 U.S.C. § 112.

1. Substitute Claims 12 and 13 Are Not Indefinite

In a related International Trade Commission investigation involving the ’184 patent, original claims 3 and 4 were found indefinite for reciting both a system and a method for using that system. Ex. 2004 at 25-26. Without conceding that original claims 3 and 4 are indefinite, Patent Owner submits that the addition of the “configured to engage” limitation in substitute claims 12 and 13 resolves this indefiniteness issue.

An apparatus claim does not improperly claim a method step (and thus is not indefinite) when, particularly in a wherein clause, the claim is directed to the capability of a structure or its intended environment for use. *See, e.g., Biosig Instruments, Inc. v. Nautilus, Inc.*, 715 F.3d 891, 904 (Fed. Cir. 2013), *vacated on other grounds*, 572 U.S. 898 (2014); *HTC Corp. v. IPCom GmbH & Co.*, 667 F.3d

1270, 1275 (Fed. Cir. 2012); *Microprocessor Enhancement Corp. v. Texas Instruments Inc.*, 520 F.3d 1367, 1374 (Fed. Cir. 2008).

The same principles apply to substitute claims 12 and 13. These claims are directed to the capability of a structure and the environment in which the structure operates. Claim 12, for example, recites, “wherein the blade lock portion of the clockwise lock mechanism is configured to engage by partial counterclockwise rotation.” The use of the phrase “configured to engage” indicates that the claims are directed to the *capability* of the blade lock portion to engage with the corresponding shaft lock portion. Thus, substitute claims 12 and 13 are not indefinite because they “do not require actions, instead they inform a person of ordinary skill how the claimed apparatus should be constructed. *See Beneficial Innovations, Inc. v. Advance Publications, Inc.*, No. 2:11-CV-229-JRG-RSP, 2014 WL 186301, at *4 (E.D. Tex. Jan. 14, 2014).

2. Substitute Claim 13 Provides Antecedent Basis

Substitute claim 13 and original claim 4 both recite the terms “*the* blade lock portion of the counterclockwise lock mechanism” and “*the* shaft lock portion thereof.” The limitation “wherein the counterclockwise lock mechanism comprises a shaft lock portion attached to the second driveshaft and a blade lock portion attached to the counterclockwise rotor blade” is added to substitute claim 13 to provide antecedent basis for these two terms.

VII. CONCLUSION

Substitute claims 12 and 13 satisfy the requirements of 37 C.F.R. § 42.121 and are patentable over the ground asserted by Petitioner in this IPR. Patent Owner requests that claims 3 and 4 be replaced with substitute claims 12 and 13, respectively.

Respectfully Submitted,

Date: January 10, 2020

/Timothy C. Bickham/

Timothy C. Bickham
Registration No. 41,618
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, NW
Washington, DC 20036
Telephone: 202-429-5517
Facsimile: 202-429-3902
tbickham@steptoe.com

Counsel for Patent Owner Autel Robotics
USA LLC

CERTIFICATION UNDER 37 C.F.R. §42.24

Under the provisions of 37 C.F.R. §42.24, the undersigned hereby certifies that the foregoing document contains 22 pages, and thus complies with the page limits of 37 C.F.R. § 42.24.

Date: January 10, 2020

/ Timothy C. Bickham /

Timothy C. Bickham, Reg. No. 41,618

STEPTOE & JOHNSON LLP

1330 Connecticut Avenue, NW

Washington, DC 20036

Tel: (202) 429-5517

Fax: (202) 429-3902

tbickham@steptoe.com

***Counsel for Patent Owner Autel Robotics
USA LLC***

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e), the undersigned hereby certifies that a copy of the foregoing PATENT OWNER'S MOTION TO AMEND UNDER 37 C.F.R. § 42.121 was served on the counsel of record for the Petitioners by filing this document through the Patent Trial Appeal Board End to End system as well as by delivering an electronic copy to the following email address:

lgordon@kslaw.com
speters@kslaw.com
DJI-PTAB@kslaw.com

Date: January 10, 2020

By: /s/ Timothy C. Bickham

Timothy C. Bickham
Registration No. 41,618
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, NW
Washington, DC 20036
Tel: (202) 429-5517
Fax: (202) 429-3902
tbickham@steptoe.com

*Counsel for Patent Owner Autel Robotics
USA LLC*