

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DIGITAL CHECK CORP. d/b/a ST IMAGING,
Petitioner,

v.

E-IMAGEDATA CORP.,
Patent Owner.

Case IPR2017-00178
Patent 9,179,019 B2

Before KEN B. BARRETT, JENNIFER MEYER CHAGNON, and
MELISSA A. HAAPALA, *Administrative Patent Judges*.

HAAPALA, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C § 318(a) and 37 C.F.R. § 42.73

Digital Check Corp. d/b/a ST Imaging (“Petitioner”) filed a Petition pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–3, 5–9, 20–35, 37, 39–41, 43, 44, 47, 53–57, 63–68, 74, 79, 81, 84–87, 91–96, and 101 of U.S. Patent No. 9,179,019 B2 (“the ’019 patent”). Paper 2 (“Pet.”). Applying the standard set forth in 35 U.S.C. § 314(a), we granted Petitioner’s request and instituted an *inter partes* review of claims 1–3, 5–7, 20–28, 31, 41, 43, 44, 53, and 63; we declined to institute a review as to the other claims challenged. Paper 6 (“Dec.”).

During the trial, Patent Owner timely filed a Response (Paper 11, “PO Resp.”), to which Petitioner timely filed a Reply (Paper 16, “Reply”). Petitioner requested an oral hearing, but then withdrew its request and we canceled the hearing. See Papers 18, 22.

Additionally, Patent Owner filed a Motion to Exclude Evidence (Paper 17), to which Petitioner filed an Opposition (Paper 20), and Patent Owner filed a Reply (Paper 21).

We have jurisdiction under 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the claims on which we instituted trial. Based on the record before us, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–3, 5–7, 20–25, 27, 28, 31, 41, 43, 44, 53, and 63 of the ’019 patent are unpatentable. Petitioner has not shown that claim 26 of the ’019 patent is unpatentable.

I. BACKGROUND

A. The ’019 Patent (Ex. 1001)

The ’019 patent describes a digital microform imaging apparatus (DMIA) that may be used to view/scan a broad range of microfilm media types (e.g., microfilm, microfiche, 16 mm or 36 mm film roll). See

Ex. 1001, 1:19–20, 3:26–28. The DMIA can accommodate a broad range of image reduction ratios without the need to change zoom lenses. *See id.* at 3:28–30, 7:56–59. Figure 4 of the '019 patent is reproduced below:

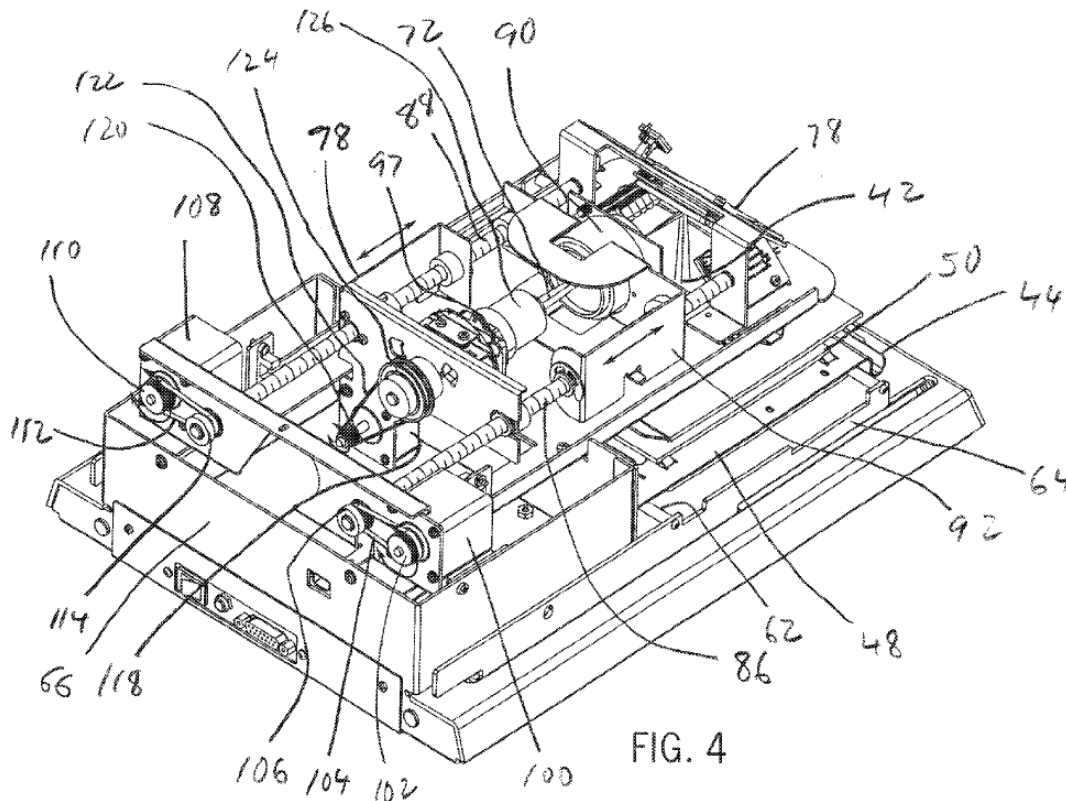


Figure 4 illustrates a perspective view of a DMIA with the cover removed and as viewed from generally rearward of the apparatus. *Id.* at 3:65–67.

The DMIA illustrated in Figure 4 includes: microform media support 44; chassis 66; mirror mount 78; first lead screw 86; second lead screw 88; lens 90; area sensor 97; first carriage 92; second carriage 98; first motor 100; second motor 108; timing pulleys 102, 106, 110, 114; and belts 104, 112. *See id.* at 5:8–6:11. Microform media support 44 is configured to support a microform media. *Id.* at 5:8–10. A fold mirror (not shown) reflects incident light transmitted through microform media and is connected to mirror mount 78, which is connected to chassis 66. *Id.* at 5:31–33, 5:36–38. Lens 90 is

connected to first carriage 92, which is linearly adjustable by rotating first lead screw 86. *Id.* at 5:43–45. Area sensor 97 is connected to second carriage 98, which is linearly adjustable by rotating second lead screw 88. *Id.* at 5:52–54. First motor 100 is rotationally coupled to first lead screw 86 by timing pulley 102, belt 104 with teeth, and timing pulley 106; and second motor 108 is rotationally coupled to second lead screw 88 by timing pulley 110, belt 112 with teeth, and timing pulley 114. *Id.* at 6:7–9.

A controller (not shown) is electrically connected to first motor 100, second motor 108, and area sensor 97. *Id.* at 6:11–13. The controller receives commands and inputs, controls first and second motors 100, 108 and other components of the DMIA, and outputs an image data of area sensor 97. *Id.* at 6:13–17. The layout of the DMIA, including separately adjustable area sensor 97 and lens 90, and algorithms for moving the lens and sensor to appropriate respective locations to achieve proper magnification and focus of the image, allow the DMIA to autofocus to accommodate different reduction ratios of different film media without the need for iterative measurements and refocusing of lens 90. *Id.* at 5:61–7:3. The DMIA depicted in Figure 4 includes additional components not described.

B. Illustrative Claim

Claims 1, 41, and 63 are independent claims. Claim 1 is illustrative of the subject matter at issue.

1. A digital microform imaging apparatus, comprising:
a chassis;
a fold mirror supported by the chassis and including a reflecting surface for directing light from a first optical axis to a second optical axis;

a first elongated and substantially strait lead member supported by the chassis and aligned along a substantially horizontal axis, the first lead member including an elongated shaft;

a first drive mechanism supported by the chassis and extending alongside and spaced apart from the first lead member;

a first motor including a first motor shaft that engages the first drive mechanism;

a first carriage coupled to the first lead member for movement there along and coupled to the chassis via the first drive mechanism and the first motor such that rotation of the first motor shaft causes the first carriage to move along the first lead member along a trajectory that is substantially parallel to the second optical axis;

an area sensor supported by the first carriage and aligned with the second optical axis for movement along the second optical axis within a first range to adjust a distance between the area sensor and the fold mirror; and

a lens supported by the chassis along the second optical axis and positioned between the area sensor and the fold mirror;

wherein the lens and the area sensor are located on a first lateral side of the first lead member and located on a first lateral side of the first drive mechanism.

C. Instituted Grounds of Unpatentability

Petitioner relies on the following references:

1. U.S. Patent Application No. 2004/0012827 A1, published Jan. 22, 2004 (“Fujinawa”) (Ex. 1004).
2. U.S. Patent No. 5,585,937, issued Dec. 17, 1996 (“Kokubo”) (Ex. 1005).

We instituted trial under 35 U.S.C. § 103(a) based on the following combination of references. Dec 23.

References	Claims
Fujinawa and Kokubo	1–3, 5–7, 20–28, 31, 41, 43, 44, 53, 63

In support of its contentions, Petitioner submitted a declaration by its witness, Anthony J. Senn, PE. Ex. 1002. In response, Patent Owner submitted a declaration by its witness, Jonathan D. Ellis, PhD. Ex. 2005. Both experts were cross-examined during the trial, and transcripts of their depositions are in the record. Exs. 2007 (Senn deposition); 1012 (Ellis deposition).

D. Related Proceedings

Patent Owner identifies the '019 patent as a continuation of U.S. Patent No. 8,269,890 ('890 patent) and U.S. Patent No. 8,537,279 ('279 patent). Paper 4. Petitioner and Patent Owner identify numerous matters as related to this proceeding, including currently pending U.S. Patent Application No. 14/931,583, which is a continuation of the '019 patent; Petitioner's concurrently filed Petition for *inter partes* review of the '279 patent (IPR2017-00177); and a number of district court litigation matters involving the '019, '890, and '279 patents. See Paper 4; Pet. 2.

II. ANALYSIS

A. Legal Principles

A claim is unpatentable under § 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 non-obviousness, i.e., secondary considerations such as commercial success, long felt but unsolved needs, and failure of others.¹ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). The obviousness inquiry further requires an analysis of “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”)).

B. Level of Ordinary Skill in the Art

Petitioner asserts a person of ordinary skill in the art at the time of the filing would have had at least some experience with microform imaging apparatuses and would have had at least a bachelor of science degree in either electrical engineering or mechanical engineering with at least three years’ experience designing electro-mechanical products, including imaging equipment such copiers, scanners, and/or microform scanners and readers. Pet. 15–16 (citing Ex. 1002 ¶ 40). Patent Owner asserts a person of ordinary skill in the art “would have an undergraduate degree in mechanical or optical engineering and 3 years of experience working with or designing scanners, camera systems or printers, which involve opto-mechanical systems similar to that described in the ’019 Patent and the prior art.” PO Resp. 4 (citing Ex. 2005 ¶ 20).

Our decision does not turn on the minor differences between the definitions, particularly as Petitioner asserts that, under either definition, its

¹ The record does not include arguments or evidence regarding objective indicia of non-obviousness.

analysis remains the same. *See* Reply 2. Both Petitioner and Patent Owner advocate a similar level of experience. Accordingly, we accept the level of skill advocated by Patent Owner, with the addition of Petitioner's identification of working with microform scanners and readers as permissible experience and electrical engineering as a permissible undergraduate degree.

C. Claim Construction

In an *inter partes* review, claims of an unexpired patent are interpreted using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). In our Institution Decision, we did not find it necessary to construe any terms, and accorded them their ordinary and customary meaning. Dec. 7–8.

In its Response, Patent Owner asserts the district court in the parallel litigation issued its claim construction order and adopted the parties' stipulated construction of "first carriage." PO Resp. 4. Patent Owner further asserts the district court concluded the preamble phrase "digital microform imaging apparatus" limits the claims. *Id.* Petitioner agrees the district court construction of "first carriage" is the broadest reasonable construction. Pet. 17. Petitioner further asserts the parties' dispute whether the preamble limits the claims is not germane to this proceeding because each of the prior art references used in this petition discloses a "digital microform imaging apparatus." *Id.*; Reply 2–3.

Although we have considered the construction of the terms anew in light of the full trial record, we determine that we need not explicitly construe any term to resolve the issues before us. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that

“only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”).

D. Obviousness Over Fujinawa and Kokubo

Petitioner challenges claims 1–3, 5–7, 20–28, 31, 41, 43, 44, 53, and 63 as obvious under 35 U.S.C. § 103(a) over Fujinawa and Kokubo.

Pet. 18–43, 46–53.

1. Scope and Content of Fujinawa

Fujinawa describes an image reading apparatus that can handle films having different sizes. Ex. 1004 ¶ 3. Figure 4 of Fujinawa is reproduced below:

Flu 4

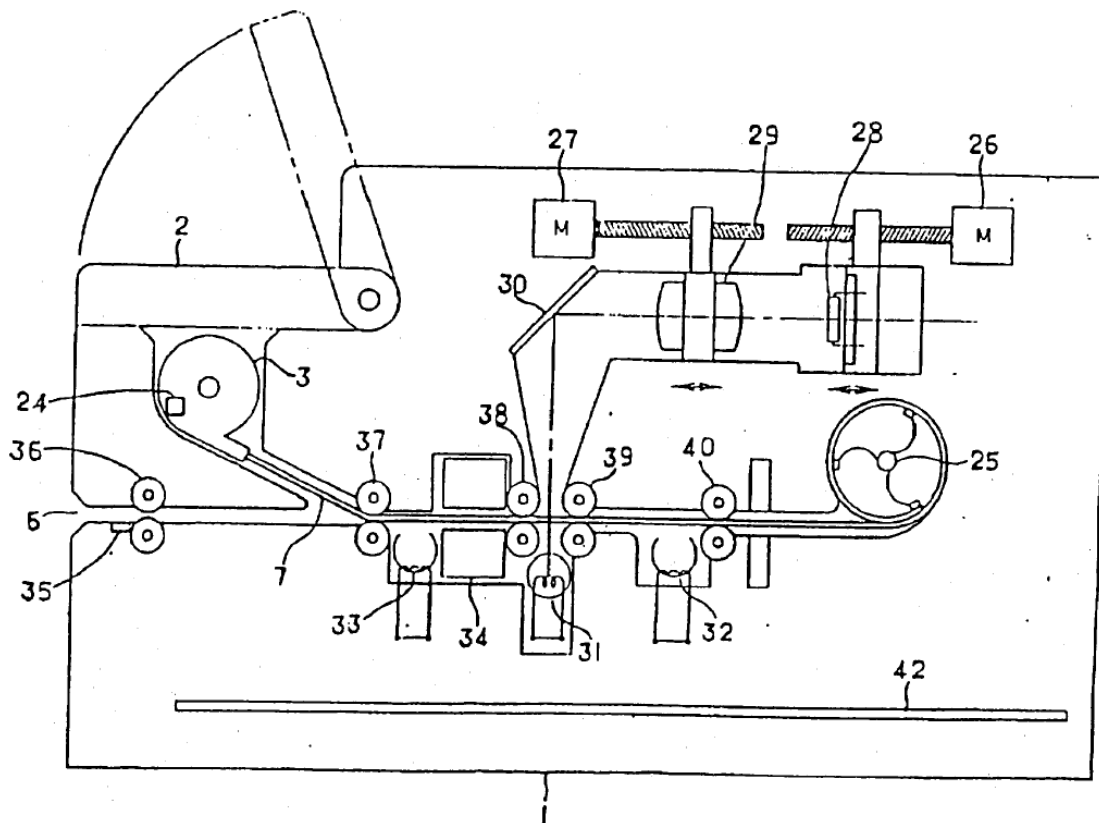


Figure 4 depicts one embodiment of an image reading apparatus during reading of roll film. *Id.* ¶ 22. Image reading apparatus 1 includes cartridge 3, used to house roll film, and insertion opening 6, used for inserting strip film and slide-mounted film. *Id.* ¶ 33. Image reading apparatus 1 further includes reading device motor 26, lens motor 27, line sensor 28, and reflective mirror 30. Lens 29 is supported by a worm that couples lens 29 to the rotating shaft of lens motor 27 so that it can move in accordance with rotation of the rotating shaft. *Id.* ¶ 59. Line sensor 28 is supported by a worm that couples line sensor 28 to rotating shaft of reading device motor 26 so that the position of the light-receiving surface can be moved in accordance with the rotation of the rotating shaft. *Id.*² Fujinawa further describes that an area-type sensor could be provided instead of line sensor 28. *Id.* ¶¶ 49, 112. A CPU (not depicted) determines the type of film inserted into image reading apparatus 1 from information provided by film information reading sensor 24 and film detection sensor 35. *Id.* ¶ 66. CPU separately drives reading motor 26 and lens motor 27 to adjust the reading scope and resolution according to the results of this determination. *Id.* ¶¶ 60, 66. Figure 4 depicts additional components of image reading apparatus 1 that are not described.

2. Scope and Content of Kokubo

Kokubo describes an image reading device which optically reads a text image by moving an image reading unit, on which a line sensor and a

² Because other sections of Fujinawa describe element 26 as “reading device motor” (see *e.g.*, Ex. 1004 ¶¶ 39, 60), we agree with Petitioner that Fujinawa mislabels reading motor 26 in paragraph 59 as “take-up motor 26.” See Pet. 25 n.2.

light source for text illuminating are mounted. Ex. 1005, 1:8–11. Figure 1 of Kokubo is reproduced below:

FIG. 1

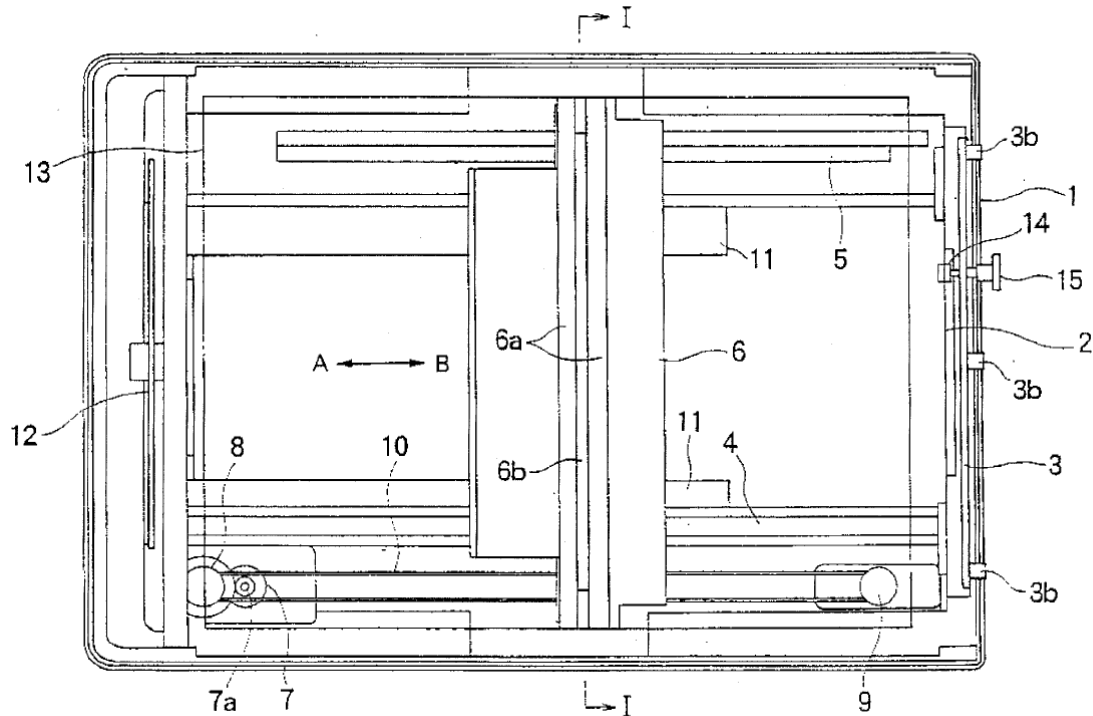


Figure 1 is a plan view showing features of an image reading device with the upper part of the chassis cut away. *Id.* at 5:66–6:1. The image reading device comprises chassis 1, reading unit 6, and motor 7. *Id.* at 8:52–57, 9:10–11. Reading unit 6 is supported by guide shaft 4 and rail 5, such that it is free to slide toward the front and rear of the image reading device. *Id.* at 8:56–59. Image reading unit 6 may include a movable mirror, a lens tube consisting of a series of lenses, and a line sensor (components not depicted). *Id.* at 11:63–12:6. Motor 7 is provided with drive gear 7a on a rotation shaft, drive pulley 8 rotated by the drive force of drive gear 7a, driven pulley 9, and timing belt 10 wound around drive pulley 8 and driven pulley 9, which is also fixed to reading unit 6. *Id.* at 9:10–15. Reading unit 6 is therefore

moved by timing belt 10, which moves due to the rotation of motor 7. *Id.* at 9:15–17. Figure 1 includes additional components not described.

3. *Independent Claim 1*

Petitioner contends the combination of Fujinawa and Kokubo teaches the limitations recited in independent claim 1. Pet. 18–30. In support of its arguments, Petitioner relies on the testimony of Mr. Senn. *See id.* (citing Ex. 1002).

- a. *digital microform imaging apparatus, chassis, fold mirror, first elongated and substantially straight lead member, first motor, and first carriage limitations*

Petitioner asserts Fujinawa discloses a digital microform imaging apparatus “nearly identical” to the claimed digital microform imaging apparatus. *Id.* at 19. Petitioner further asserts Fujinawa discloses the claimed chassis, fold mirror, first elongated and substantially straight lead member, first motor, and first carriage limitations. *Id.* at 20–22, 25–26.

We have reviewed Petitioner’s analysis of these limitations recited in claim 1 and the supporting evidence. We are persuaded Petitioner establishes Fujinawa discloses these limitations for the reasons set forth by Petitioner. *See id.* For example, we agree with Petitioner that Fujinawa discloses a “digital microform imaging apparatus” through its description of an image reading apparatus that reads images and “digitizes” the images. *Id.* at 20 (citing Ex. 1004 ¶¶ 3, 64). As another example, we are persuaded by the analysis set forth by Petitioner and Mr. Senn that Fujinawa meets the first carriage limitation through its depiction of a carriage in Figure 4 (structure to which sensor 28 is attached) and description that the position of sensor 28 can be moved in accordance with the rotation of the rotating shaft of the motor, which causes the first carriage to move along the lead member

along a trajectory substantially parallel to the second optical axis. *See id.* at 25–26 (citing Ex. 1004, Fig 4, ¶ 59); Ex. 1002 ¶¶ 55, 56. Patent Owner has not raised arguments against these limitations in its Patent Owner Response; therefore, those arguments are waived. *Novartis AG v. Torrent Pharm. Ltd.*, 853 F.3d 1316, 1330 (Fed. Cir. 2017); *In re NuVasive*, 842 F.3d 1376, 1381 (Fed. Cir. 2016).³

b. first drive mechanism, area sensor, and lens limitations

Petitioner asserts the combination of Fujinawa and Kokubo discloses “a first drive mechanism supported by the chassis and extending alongside and spaced apart from the first lead member.” *See* Pet. 21–25. Petitioner asserts Fujinawa discloses a drive mechanism where a motor turns a rotating shaft, which turns a lead screw (worm) threaded to a carriage, and when the lead screw rotates, it guides and drives the carriage along the optical axis. *Id.* at 23 (citing Ex. 1004 ¶ 59). Petitioner further asserts Kokubo discloses a drive mechanism (timing belt 10 and pulleys 8, 9) spaced apart from the first lead member (guide rail 5) and that the belt/pulley system is used to drive a carriage along a lead member (guide rail). *Id.* at 23–24 (citing Ex. 1005, Fig. 1, 9:11–17). Petitioner argues that Kokubo discloses the entire lead member limitation and the entire drive mechanism limitation in a way that its pulley and belt drive mechanism and its guide rail lead member could be simply substituted for Fujinawa’s lead screw (worm) drive mechanism. *Id.* at 24. Petitioner contends one of skill in the art at the time of the invention of the ’019 patent would have known to simply substitute one well-known drive mechanism for moving a carriage along an optical

³ As in *NuVasive*, the Scheduling Order in this proceeding cautioned Patent Owner that “any arguments for patentability not raised in the response will be deemed waived.” Paper 7, 6.

path (Fujinawa's motor that turns a lead screw) for another well-known drive mechanism for moving a carriage along an optical path (Kokubo's belt and pulley drive mechanism) to achieve a predictable result. *Id.* at 24–25; *see also id.* at 23 (asserting that one of skill in the art would recognize that Kokubo's drive mechanism could be simply substituted for Fujinawa's drive mechanism to achieve the same, predictable, result). Petitioner's contentions are supported by the testimony of Mr. Senn. *See* Ex. 1002 ¶¶ 76, 77, 101–104.

Petitioner further contends that the combination of Fujinawa and Kokubo discloses the area sensor and lens limitations. *Pet.* 26–30. Petitioner asserts Fujinawa discloses the sensor limitation through its description that the image reading apparatus comprises sensor 28, which may be a line sensor or an area sensor, and that it is aligned for movement along the second optical axis. *Id.* at 26–27 (citing Ex. 1004, Fig. 4, ¶¶ 39, 49, 59). Petitioner asserts Fujinawa also discloses a lens (lens 29) supported by a carriage, which is positioned between the area sensor (sensor 29) and fold mirror (reflective mirror 30). *Id.* at 28. Petitioner asserts that in Fujinawa the lens (lens 29) and area sensor (sensor 28) are both located on the first lateral side of the first lead member and the first drive mechanism, as illustrated in the annotated version of Figure 4. *Id.* at 28–29 (citing Ex. 1004, Fig. 4). Petitioner also asserts that Kokubo discloses a lens and area sensor located on a first lateral side of the first lead member and a first lateral side of the first drive mechanism. *Id.* at 29–30 (citing Ex. 1005, Fig. 1, 8:61–64).

Patent Owner contends the prior art does not disclose the use of a belt system to move carriages containing optical elements, or the optical elements themselves, along an optical path for focusing an image. *PO Resp.*

9. Patent Owner argues Fujinawa does not disclose “a first drive mechanism . . . extending alongside and spaced apart from the first lead member” and the “lens and area sensor are located on a first lateral side of the first drive mechanism.” *Id.* Patent Owner asserts Fujinawa teaches the sensor and lens are moved along the optical path using threaded worms and Kokubo discloses a flatbed scanner that moves the reading unit 6 and its components as a whole and does not move the lens relative to the sensor. *Id.* at 10–11.

Patent Owner argues Petitioner’s proposed modification of Fujinawa in light of Kokubo is not a simple substitution because the substituted components would not be performing the same function that was disclosed in the prior art, namely moving elements critical to optical focusing. *Id.* at 12–13. In particular, Patent Owner asserts the function of Fujinawa’s threaded worms is to precisely position a lens relative to an image sensor and that any components substituted for the threaded worm must also be able to perform that function. *Id.* at 14–15. Patent Owner argues, with support from testimony of Dr. Ellis, that the function of the worms in Fujinawa is fundamentally different from the function of the belt and pulley system of Kokubo and that the belt/pulley system of Kokubo does not need the same precision as the worms in Fujinawa because the image is already in focus when the belt and pulley system moves the reading unit. *Id.* at 16 (citing Ex. 2007, 23:10–19; Ex. 2005 ¶¶ 30, 37). Patent Owner further argues that the device resulting from the proposed combination would not have worked for its intended purpose because smooth timing belts like those disclosed in Kokubo are prone to slipping, which would not allow for movement sufficiently precise to focus an image. *See id.* at 20–22.

Additionally, Patent Owner contends Kokubo teaches away from the proposed combination. *Id.* at 22–27. Patent Owner argues Kokubo

discourages the use of the prior art system depicted in Figure 49, which uses a wire rope and drive pulley system to move the lens relative to the sensor, because it states that if the drive pulleys and wire ropes in the system should slip, an error occurs in the displacement amount, which would give rise to distortion in the image reading by the line sensor. *Id.* at 24–26 (citing Ex. 1005, 2:48–56). Patent Owner asserts that Kokubo teaches its device depicted in Figures 14–16 overcomes the deficiencies of the prior art because optical parts can be moved with high precision and distortion of the image read is consequentially prevented. *Id.* at 26–27 (citing Ex. 1005, 13:55–61). Patent Owner argues these teachings would have discouraged one of skill in the art from making the combination proposed by Petitioner. *Id.* at 27.

Petitioner replies the function of the drive mechanism in the claims is not to provide precision focusing, but to move the carriage. Reply 3–4. Petitioner argues Kokubo is relied upon as disclosing a type of drive mechanism and that the combination of Fujinawa and Kokubo discloses the use of a belt and pulley to move a lens and sensor along an optical path. *Id.* at 14. Petitioner argues that there are a finite number of ways to translate movement and reiterates its assertion that the replacement of one known drive mechanism for another is nothing more than a simple substitution that yields predictable results. *Id.* at 12.

Petitioner further argues that even if the claims require a level of precise movement only achieved by using a toothed belt, Kokubo’s teaching of a timing belt would be understood by those of skill in the art to be a toothed belt capable of precise movement. *See id.* at 4–7 (citing Ex. 2007, 18:24–19:4; Ex. 1012, 9:25–10:2, 32:3–33:9; Ex. 1011, 755). Petitioner asserts that Patent Owner’s expert acknowledges a toothed belt, as opposed

to a smooth belt, is capable of providing the precise movement it alleges is required by the claims. *Id.* at 3 n.1 (citing Ex. 1012, 20:2–17). Petitioner additionally argues that, even assuming Kokubo’s belt is smooth, Mr. Senn testified that a control system could capture any errors that might arise from the use of smooth belts if designed to do so and would not prevent precision focusing. *See id.* at 8 (citing Ex. 2007, 20:8–12). Petitioner argues that Kokubo does not discourage the use of a belt, but rather discourages the use of an un-guided wire rope system as opposed to the use of a timing belt and guide rail. *See id.* at 9.

We have reviewed Petitioner’s and Patent Owner’s analyses and the supporting evidence and find Petitioner establishes, by a preponderance of the evidence, that the combination of Fujinawa and Kokubo teaches the first drive mechanism limitation set forth in claim 1. *See* Pet. 21–25. We agree with Petitioner that Fujinawa discloses a drive mechanism through its description of a worm that supports sensor 28 and couples the sensor to the rotating shaft 26 of reading motor. *See* Ex. 1004, Fig. 4, ¶ 59. We also agree Kokubo discloses a drive mechanism (timing belt 10 and pulleys 8, 9), which moves reading unit in direction A or B along rail 5. *See* Ex. 1005, Fig. 1, 9:11–17. We agree with Petitioner that when the guide rail and belt disclosed by Kokubo is substituted for the worm of Fujinawa, the drive mechanism is extending alongside and spaced apart from the first lead member (rail 5). Patent Owner’s arguments that neither reference individually discloses the use of a belt system to move carriages containing optical elements (PO Resp. 9–11) and that Fujinawa does not disclose a first drive mechanism “extending alongside and spaced apart from the first lead member” (*id.* at 9) are not persuasive because Petitioner relies on the combined teachings of the references to meet these limitations. *See In re*

Keller, 642 F.2d 413, 426 (CCPA 1981). We address Petitioner’s reason to combine the references below.

Petitioner also persuades us that the Fujinawa-Kokubo combination discloses the area sensor and lens limitations. Figure 4 of Fujinawa depicts a line sensor 28, supported by a carriage, and aligned with a horizontal axis (second optical axis) for movement along the axis, which adjusts the distance between the sensor and mirror 30. Ex. 1004, Fig. 4; *see also id.* ¶ 59 (describing sensor 28 is moved in accordance with the rotation of rotating shaft). Fujinawa also describes an area sensor can be used instead of line sensor 28. *Id.* ¶ 59. Figure 4 additionally depicts a lens supported by the chassis along the second optical axis (horizontal axis), which is positioned between sensor 28 and fold mirror 30. *Id.* at Fig. 4. Thus, we agree with Petitioner that Fujinawa discloses the area sensor and lens sensor limitations of claim 1. We disagree with Patent Owner’s conclusory assertion (PO Resp. 9) that Fujinawa does not discloses the lens and area sensor are located as set forth in claim 1. Rather, we agree with Petitioner (Pet. 28–29) that Fujinawa discloses that both components are on a first lateral side of the worm (lead member) and drive mechanism. *See* Ex. 1004, Fig. 4. We also agree with Petitioner that Kokubo discloses that lens and line sensor mounted on reading unit 6 are located on a first lateral side of the first lead member (guide rail 5) and a first lateral side of its drive mechanism. *See* Ex. 1005, Fig. 1, 8:61–64. Accordingly, we are persuaded that the proposed Fujinawa-Kokubo combination discloses the lens and area sensor “are located on a first lateral side of the first lead member and located on a first lateral side of the first drive mechanism.”

We have also considered Petitioner’s rationale for why one of ordinary skill in the art would have been motivated to combine Fujinawa and

Kokubo. Petitioner persuades us that replacing the worm drive mechanism disclosed by Fujinawa with the guide rail and belt/pulley configuration disclosed by Kokubo would have been a simple substitution of one known drive mechanism for another that yields predictable results. *See* Pet. 23–25; Reply 12. We credit the testimony of Mr. Senn that the proposed combination “would have been a simple substitution of the motor shaft mechanism of Fujinawa for the rod and belt configuration of Kokubo to obtain a predictable result, i.e., translation of rotational movement from the motor to linear movement of the carriage to enable the carriage to move along a lead member.” Ex. 1002 ¶ 102. Mr. Senn further testifies that “[t]here are a finite quite short list, means of converting rotary motion to linear motion.” Ex. 2007, 56:15–16. We determine Petitioner articulates sufficient reasoning for the proposed combination to support the legal conclusion of obviousness. *See KSR*, 550 U.S. at 398, 417–18.

We are not persuaded by Patent Owner’s arguments that the components would not be performing the same function. As noted by Petitioner, the claimed functionality is to cause the first carriage “to move along the first lead member” and not “precision focusing.” *See* Reply 3–4. We determine that the functionality of both Fujinawa’s threaded worm and Kokubo’s rail/belt system is the same—namely a drive mechanism to move the carriage. We are not persuaded that replacing the drive mechanism taught by Fujinawa with the drive mechanism taught by Kokubo would have been more than a simple substitution (as testified by Mr. Senn (Ex. 1002 ¶ 102)) or would otherwise have been challenging or difficult for one of ordinary skill in the art.

We are also not persuaded that the combination would not have worked for the intended purpose, which is asserted by Patent Owner to be to

allow movement sufficiently precise to focus an image. Patent Owner, through testimony of its expert Dr. Ellis, does convince us that the lens and area sensor need to be precisely positioned relative to the microform. See PO Resp. 5; Ex. 2005 ¶ 38. We note that Petitioner's expert, Mr. Senn, agrees the lens and area sensor must be precisely positioned. See Ex. 2007, 67:14–24. But, we are not persuaded that the proposed combination would not be capable of precisely focusing an image. Even assuming Kokubo's belt is smooth and prone to slipping, we are persuaded by Petitioner's argument that this would not prevent precision focusing. See Reply 8. We credit Mr. Senn's testimony that a smooth belt system would be acceptable because a control system could capture any errors that might arise from smooth belts. Ex. 2007, 20:6–12.

Although we are not persuaded a smooth belt is incapable of precision focusing, we additionally note that, as discussed below in the analysis of claim 5, we are persuaded by Petitioner's arguments that the timing belt disclosed by Kokubo would have been understood by those in the art to be a toothed belt. See Reply 4–7. We are further persuaded that toothed belt drive systems provide precision and are not prone to slipping. See *id.* at 7. The testimony of Dr. Ellis, Patent Owner's expert, supports Petitioner's assertion that a toothed belt system would have precision. See Ex. 1012, 20:2–5; Reply 3 n.1 (citing the same).

Finally, we are not persuaded that Kokubo teaches away from the proposed combination. The sections of Kokubo cited in support of Patent Owner's assertion describe that if the drive pulleys and wire ropes should slip in the conventional reading device shown in Figures 48 and 49, an error occurs in the displacement amount of the wire ropes, which would give rise to distortion in the image. Ex. 1005, 2:48–56. The cited sections of Kokubo

further describe that in the device of its fourth embodiment, the lens tube 40 moves along the guide shafts 50, 51 and that the optical parts can be thus moved with high precision and distortion of the image read by the line sensor is consequentially prevented. Ex. 1005, 13:55–61. As noted by Petitioner (Reply 9), the prior art system discussed by Kokubo is an unguided wire rope system. See Ex. 1005, Fig. 49, 2:1–6. We disagree with Patent Owner that Kokubo’s description of issues with a prior art unguided wire rope system would have discouraged one of skill in the art from making the combination proposed by Petitioner to replace Fujinawa’s worm with Kokubo’s timing belt and rail system.

For the foregoing reasons, we conclude Petitioner has demonstrated, by a preponderance of the evidence, that claim 1 would have been obvious over Fujinawa and Kokubo.

4. Claims 2, 3, 20, 22–25, 27, 28, and 31

Claim 2 depends from claim 1 and recites “wherein the lens and area sensor are located between the first drive mechanism and the first lead member.” We find Petitioner establishes Kokubo teaches this limitation through its depiction of lens and area sensor (located on reading unit 6) positioned between the first lead member (guide rail 5) and the first drive mechanism (belt 10 and pulleys 8, 9). See Pet. 30 (citing Ex. 1005, Figs. 1, 12). We note Patent Owner does not present separate arguments for this claim.

Claims 3 and 31 depend from claim 1 and set forth additional limitations regarding the fold mirror. Claim 3 recites “wherein the fold mirror has a top edge and wherein the first lead member is located at a height below the top edge of the fold mirror.” Claim 31 recites “wherein the fold mirror reflects the light such that an angle between the first optical axis

and the second optical axis is substantially 90 degrees.” Petitioner asserts that in the proposed Fujinawa-Kokubo combination, the lead member would be located at a height below the top edge of the fold mirror. *Id.* at 31.

Petitioner further asserts Figure 4 discloses the fold mirror reflects light as set forth in claim 31. *Id.* at 46; *see also id.* at 21 (depicting an annotated version of Fig. 4 illustrating the reflection of light by the fold mirror).

Patent Owner does not present separate arguments for these claims. Based on Petitioner’s analysis and evidence, we find Fujinawa and Kokubo teaches the limitations recited in claims 3 and 31.

Claim 20 depends from claim 1 and recites “wherein the lens is supported for movement within a second range along the second optical axis to change the position of the lens with respect to the fold mirror and the area sensor.” Petitioner asserts Fujinawa meets this limitation through its disclosure that fold mirror (reflective mirror 30) is fixed and, therefore, when the lens is moved in the second range, its position changes with respect to fold mirror and sensor 28. *Id.* at 36–37 (citing Ex. 1004, Fig. 4). Patent Owner does not present separate arguments for this claim. We are persuaded by Petitioner’s analysis and find Petitioner establishes Fujinawa discloses the limitations recited in claim 20.

Claims 22–24 and 27 depend, directly or indirectly, from claim 1. Claim 22 recites further including “a second elongated and substantially strait lead member supported by the chassis, the second lead member substantially parallel and spaced apart from the first lead member, the first carriage also coupled to the second lead member for motion there along.” Claims 23 depends from claim 22 and recites “wherein the second carriage is also supported by the first and second lead members.” Claim 24 depends from claim 23 and recites “wherein the first carriage is mounted to the first

and second lead members to slide there along.” Claim 27 depends from claim 22 and recites “wherein each of the first and second lead members includes first and second ends and wherein the fold mirror is supported adjacent the first ends of the lead members.” Patent Owner does not present separate arguments for these claims. We have reviewed the analysis of these claims set forth by Petitioner (Pet. 37–42) and find it persuasive. For instance, we agree with Petitioner that Kokubo discloses a second lead member (guide shaft 4) that assists in guiding the carriage (reading unit 6). See Ex. 1005, Fig. 1, 8:52–59. We find the Fujinawa-Kokubo combination teaches the limitations of claims 22–24 and 27 for the reasons set forth by Petitioner. See Pet. 37–42.

Claim 25 depends from claim 1 and recites “wherein the first motor is stationary with respect to the chassis while the first carriage moves along the second optical axis.” Petitioner asserts that in both Fujinawa and Kokubo, the motors are stationary with respect to the carriage. *Id.* at 41. Patent Owner does not separately argue this claim. We agree with Petitioner and find both Fujinawa and Kokubo depict the motor is stationary with respect to the chassis while the first carriage moves along the second optical axis. See *e.g.*, Ex. 1004, Fig. 4 (motors 26, 27); Ex. 1005, Fig. 1 (motor 7).

Claim 28 depends from claim 1 and further recites

a microform media support structure supported by the chassis and configured to support a microform media within a plane substantially orthogonal to first optical axis that is aligned with the fold mirror so that light along the first optical axis passes through supported microform media prior to reflecting off the fold mirror.

Patent Owner does not present separate arguments for this claim. We have reviewed Petitioner’s analysis (Pet. 43) and supporting evidence and find

Petitioner establishes Fujinawa discloses the microform media support structure set forth in claim 28. *See* Ex. 1004, Fig. 4, ¶¶ 55, 83.

For the foregoing reasons, we conclude Petitioner has demonstrated, by a preponderance of the evidence, that claims 2, 3, 20, 22–25, 27, 28, and 31 would have been obvious over Fujinawa and Kokubo.

5. *Claim 5–7 and 21*

Petitioner contends Kokubo teaches “the first drive mechanism includes a toothed belt,” as recited in dependent claim 5. *Pet. 32*. Petitioner also contends Kokubo teaches “a toothed pulley on the first shaft that engages the toothed belt,” as recited in dependent claim 6. *Id.* In particular, Petitioner asserts that one of ordinary skill in the art would have understood the timing belt disclosed by Kokubo is toothed. *Id.* Petitioner further asserts that Kokubo discloses the toothed belt interacts with a driven pulley, which one of skill in the art would have understood would also be toothed. *Id.* In support of its assertions, Petitioner relies on the testimony of its witness, Mr. Senn. *See id.* (citing Ex. 1002 ¶¶ 53, 77).

Patent Owner argues Kokubo depicts a smooth timing belt and a smooth pulley. *PO Resp. 27*. Patent Owner asserts that Petitioner’s expert, Mr. Senn, admits teeth are not a requirement of a timing belt. *Id.* (citing Ex. 2007, 19:18–20:12). Patent Owner further asserts that Petitioner concludes, without explanation, that the timing belt and pulley are toothed and such unsupported conclusion is insufficient to establish a *prima facie* case of obviousness. *Id.* at 27–28.

We disagree with Patent Owner that Petitioner does not provide sufficient explanation for why Kokubo teaches a toothed belt. Rather, we determine Petitioner establishes, by a preponderance of the evidence, that Kokubo teaches a toothed belt and a toothed pulley that engages the toothed

belt. Kokubo discloses a timing belt 10 wound around the drive pulley 8 and driven pulley 9. Ex. 1005, Fig. 1, 9:10–14. Mr. Senn testifies that one of ordinary skill in the art would have recognized that based on the disclosure of Kokubo, “timing belt 10” and “driven pulley 9” would be toothed. Ex. 1002 ¶ 53. As pointed out by Petitioner (Reply 11), Mr. Senn further testifies that the generally accepted terminology of a timing belt is a belt with teeth. Ex. 1007, 19:20–23. We are persuaded by Mr. Senn’s testimony that one of skill in the art would have understood Kokubo’s description of a “timing belt” to be a toothed belt and the driven pulley 9, with which timing belt interacts, would include teeth for mating with teeth on the belt. See Ex. 1002 ¶ 53.

Claim 7 depends from claim 6 and recites further second carriage, second motor, and second drive mechanism limitations. Petitioner asserts Fujinawa discloses two carriages, which each include an independent drive mechanism, lead member, and motor. Pet. 33 (citing Ex. 1004, Figs. 3–6, ¶ 59). Petitioner asserts that one of ordinary skill in the art would have known to simply substitute a second Kokubo drive mechanism and lead member for Fujinawa’s second drive mechanism and lead member and that this combination would result in the second carriage supported for movement along an axis substantially parallel to the second optical axis, a second motor having a second motor shaft, and a second drive mechanism coupled to the second carriage, the lens mounted to the second carriage and the second drive mechanism coupling the second motor shaft to the second carriage so that rotation of the second shaft causes the lens to move along the second optical axis, as set forth in claim 7. *Id.* at 33–34. Patent Owner does not present separate arguments for claim 7.

We are persuaded Petitioner establishes the Fujinawa-Kokubo discloses the limitations set forth in claim 7 for the reasons set forth by Petitioner. Fujinawa depicts a second carriage (structure to which lens 29 is attached) and describes lens 29 is supported by a worm that couples the lens to rotating shaft of lens motor 27 (second motor) so that it moves in accordance with rotation of the rotating shaft. Ex. 1004, Fig. 4, ¶ 59. We are persuaded by Petitioner's analysis that in the proposed substitution of Kokubo's belt/pulley drive mechanism for Fujinawa's drive mechanism, the combination teaches the recited second carriage, second motor, lens mounted to the second carriage, and second drive mechanism coupling the second motor shaft to the second carriage so that rotation of the second shaft causes the lens to move along the second optical axis. See Pet. 34–35. For similar reasons discussed previously, we are also further persuaded by Petitioner and its expert that the combination would have been a simple substitution of one drive mechanism for another drive mechanism to move a carriage along an optical path to achieve a predictable result. See *id.* at 35 (citing Ex. 1002 ¶ 104).

Claim 21 depends from claim 7 and recites “wherein rotation of the first motor affects a zoom adjustment and rotation of the second motor affects a focus adjustment.” Petitioner asserts Fujinawa discloses operation of the motors is to adjust reading scope (focus) and resolution (zoom) through its description that CPU 11 separately drives reading motor 26 and lens motor 27 and that this control adjusts the reading scope and resolution. Pet. 37 (citing Ex. 1004 ¶ 60). Therefore, Petitioner asserts Fujinawa discloses rotation of the first motor (motor 26) affects a zoom adjustment, while rotation of a second motor (motor 27) affects a focus adjustment. Patent Owner does not present separate arguments for this claim. We agree

with Petitioner that Fujinawa teaches the limitation recited in claim 21 for the reasons set forth by Petitioner.

For the foregoing reasons, we conclude Petitioner has demonstrated, by a preponderance of the evidence, that claims 5–7 and 21 would have been obvious over Fujinawa and Kokubo.

6. *Claim 26*

Claim 26 depends from claim 1 and recites “wherein the first motor shaft is substantially parallel to the first lead member.” Petitioner asserts that Fujinawa discloses the first motor shaft is parallel to the first lead member, while Kokubo discloses the first motor shaft is perpendicular to the first lead member. Pet. 41. Petitioner further asserts one of ordinary skill in the art at the time of the invention would have understood that the motor shaft could be aligned in either a parallel or perpendicular manner and would have understood how to design the Fujinawa-Kokubo drive mechanism such that the motor shaft was parallel to the first lead member. *Id.*

Patent Owner contends that it would not have been obvious to reorient the motor shafts of Kokubo to extend parallel to the first lead member for the same reasons why we previously found in the Institution Decision that Petitioner failed to prove it would have been obvious to reorient the motor shafts to extend parallel to the second optical axis (which extends parallel to the first lead member). See PO Resp. 28. Patent Owner argues that in the Fujinawa-Kokubo combination, the motor shafts would extend perpendicular to the direction of travel of the carriages and would not be parallel to the first lead member. *Id.* at 29. Patent Owner argues that to meet the limitations of claim 26, one of skill in the art would have needed to modify Fujinawa to incorporate Kokubo’s drive mechanism and then modify Kokubo’s drive mechanism to reorient the motor shafts and pulleys. *Id.* at

30. Patent Owner argues that Petitioner has offered no reason why one of skill in the art would have reoriented the motors of Kokubo. *Id.*

We determine Petitioner fails to meet its burden to establish claim 26 would have been obvious over Kokubo and Fujinawa. As discussed previously in the analysis of claim 1, Petitioner proposes to substitute the drive mechanism disclosed by Fujinawa (motor that turns a rotating shaft) with Kokubo's belt and pulley drive mechanism. *See* Pet. 24–25. Petitioner acknowledges, and we agree, that Kokubo discloses the first motor shaft is perpendicular to the first lead member. *Id.* at 41 (citing Ex. 1005, Fig. 1). Therefore, we agree with Patent Owner that in the proposed substitution of Kokubo's drive mechanism for Fujinawa's drive mechanism, the motor shaft would be perpendicular to the first lead member and a further modification would be needed to meet the limitation of claim 26 to rotate the motor shaft to be parallel to the first lead member. Petitioner states one of skill in the art would have understood how to design the combination to align the motor shaft parallel to the first lead member (Pet. 41–42), but does not offer a reason for why one of ordinary skill in the art would make the modification. Such conclusory statements are insufficient reasoning to support the legal conclusion of obviousness. *See KSR*, 550 U.S. at 418.

In the Reply, Petitioner provides new reasoning that the combination is nothing more than a simple design choice that does not impact the function of the motor drive mechanism. *See* Reply 11–12. We decline to consider Petitioner's newly asserted reason to modify the prior art because it raises a new issue and exceeds the scope of a proper reply. *See* 37 C.F.R. § 42.23(b) (“A reply may only respond to arguments raised in the . . . patent owner response.”); *see also* Office Practice Trial Guide, 77 Fed. Reg. 48,765, 48,767 (Aug. 14, 2012) (a reply that raises a new issue will not be

considered). Moreover, we observe that Petitioner's assertions that the combination is a simple rearrangement of parts or design choice is not supported by the testimony of Mr. Senn. Mr. Senn merely states one skilled in the art would have understood the motor could be aligned in either manner and would have understood how to design the Fujinawa-Kokubo modification so that the motor shaft would be parallel to the first lead member, but also offers no adequate reason for the proposed modification. *See* Ex. 1002 ¶ 78.

For the foregoing reasons, we conclude that Petitioner has not demonstrated, by a preponderance of the evidence, that claim 26 is unpatentable under 35 U.S.C. § 103(a) over Fujinawa and Kokubo.

7. Claims 41, 43, 44, 53, and 63

Petitioner contends independent claim 41 does not set forth any additional limitations that were not claimed in claim 1 or its dependent claims, and asserts the obvious combination of Fujinawa and Kokubo discussed previously discloses every limitation of this claim. Pet. 47. Petitioner sets forth a specific analysis of the limitations appearing in claim 41 that cites to the previous analysis of claims 1, 3, 7, and 27. *See* Pet. 47–50. Patent Owner does not present separate arguments for claim 41, but instead relies on the same arguments discussed *supra* in section II.D.3.b. *See* PO Resp. 9–28.

We have reviewed Petitioner's analysis and are persuaded, for the reasons set forth in the analysis, that Petitioner establishes sufficiently the combination of Fujinawa and Kokubo discloses the limitations of claim 41. *See* Pet. 47–50. Claim 41 sets forth limitations substantially the same as those set forth in claim 1 and its dependent claims 3, 7, and 27. As discussed *supra* with reference to claims 1, 3, 7, and 27, we find that the

Fujinawa-Kokubo combination teaches each of the limitations recited in these claims and that Petitioner explains sufficiently why one of ordinary skill in the art would have substituted the rod and belt mechanism of Kokubo for the first and second drive mechanisms of Fujinawa. *See id.* at 18–34. We are not persuaded by Patent Owner’s arguments for the same reasons discussed previously.

Claims 43, 44, and 53 depend from claim 41. Claims 43 and 44 set forth limitations substantially the same as that set forth in the “wherein” clause of claim 1. Claim 53 sets forth a limitation identical to that of claim 28. Patent Owner does not present separate arguments for these claims. We are persuaded by Petitioner’s analysis (Pet. 50–52) and find that the limitations of claims 43, 44, and 53 are taught by the Fujinawa-Kokubo combination for the same reasons given above for the similar limitations set forth in claims 1 and 28.

Independent claim 63 is identical to claim 44, with the exception of the wherein clause. Petitioner cites to its analysis of claims 41, 43, and 44 for its analysis of claim 63. *See id.* at 52–53. Patent Owner does not present separate arguments for this claim. We find Petitioner establishes, by a preponderance of the evidence, the Fujinawa-Kokubo teaches each limitation of claim 63 for the same reasons given above and set forth in Petitioner’s analysis of claims 41, 43, and 44. *See id.* at 47–52. We note that Petitioner shows sufficiently in the illustration on page 52 that the first drive mechanism is located at a height below the top edge of the fold mirror as additionally set forth in claim 63. *See id.* at 52; *see also id.* at 31 (asserting the drive mechanism of Kokubo would be positioned such that it would be located at a height below the top edge of the fold mirror).

For the foregoing reasons, we conclude Petitioner has demonstrated, by a preponderance of the evidence, that claims 41, 43, 44, 53, and 63 would have been obvious over Fujinawa and Kokubo.

III. PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner moves to exclude the illustrations on pages 11 and 51 of the Petition, paragraphs 28, 61, 66–71, 78, 85–98, and 108–117 of Exhibit 1002 (Senn Declaration), and Exhibits 1006, 1007, 1008, 1009, and 1010. Paper 17, 1–3. Petitioner opposes this motion and asserts the evidence is admissible. *See* Paper 20.

We do not rely on the illustrations on pages 11 and 51 of the Petition, paragraphs 28, 61, 66–71, 85–98, and 108–117 of Exhibit 1002, or Exhibits 1006, 1007, 1008, 1009, and 1010 in our Final Written Decision to reach our conclusion that Petitioner has met its burden in demonstrating the challenged claims are unpatentable. Accordingly, we deny Patent Owner's motion to exclude this evidence as moot.

With respect to paragraph 78 of Exhibit 1002, Patent Owner asserts this evidence is irrelevant and inadmissible because it relates to claims on which the Board did not institute review. Paper 17, 5. We are not persuaded this evidence is inadmissible. We agree with Petitioner (Paper 20, 5) that the cited paragraph explains how Kokubo discloses a motor and a rotational shaft that engages a drive mechanism. *See* Ex. 1002 ¶ 78. These are elements that appear in independent claims 1, 41, and 63; therefore, paragraph 78 of Exhibit 1002 is directly relevant to the instituted grounds. Petitioner cites this evidence in support of its assertion that the Kokubo belt/pulley drive mechanism is driven by a motor having a motor shaft and links the first carriage to the chassis and that Kokubo discloses using a motor with a motor shaft that engages the belt/pulley drive mechanism. *See*

Pet. 48–49 (analyzing limitations that appear in claim 41). Petitioner additionally cites this evidence in its analysis of claim 26. *See id.* at 42. Accordingly, we disagree with Patent Owner that the evidence is not relevant and deny Patent Owner’s motion to exclude paragraph 78 of Exhibit 1002.

For the foregoing reasons, Patent Owner’s Motion to Exclude is *denied*.

IV. CONCLUSION

Petitioner has demonstrated by a preponderance of the evidence that claims 1–3, 5–7, 20–25, 27, 28, 31, 41, 43, 44, 53, and 63 of the ’019 patent are unpatentable under 35 U.S.C. § 103(a) over Fujinawa and Kokubo, but has not proved that claim 26 is unpatentable under 35 U.S.C. § 103(a) over Fujinawa and Kokubo.

V. ORDER

It is

ORDERED that, based on a preponderance of the evidence, claims 1–3, 5–7, 20–25, 27, 28, 31, 41, 43, 44, 53, and 63 of U.S. Patent No. 9,179,019 are unpatentable under 35 U.S.C. § 103(a);

FURTHER ORDERED that, based on a preponderance of the evidence, claim 26 of U.S. Patent No. 9,179,019 has not been shown to be unpatentable; and

FURTHER ORDERED that Patent Owner’s Motion to Exclude (Paper 17) is *denied*.

This is a final written decision of the Board under 35 U.S.C. § 318(a), and as such, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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