

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ACCELIGHT TECHNOLOGIES, INC.,
Petitioner,

v.

APPLIED OPTOELECTRONICS, INC.
Patent Owner.

IPR2026-00093
U.S. Patent No. 9,523,826

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT 9,523,826**

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	PRIOR ART REFERENCES, GROUNDS, AND PETITIONER’S STIPULATION	3
	A. Prior Art References and Grounds	3
	B. Petitioner’s Stipulation for the Parallel District Court Action.....	4
III.	TECHNICAL BACKGROUND OF THE ’826 PATENT	4
	A. The ’826 Patent	4
	B. Prosecution History of the ’826 Patent	8
IV.	LEVEL OF ORDINARY SKILL	9
V.	CLAIM CONSTRUCTION	9
VI.	GROUND 1 BASED ON MIZUE.....	10
	A. Mizue (Ex. 1004).....	10
	B. Mizue Anticipates Claims 1-7.....	13
	1. Independent claim 1	13
	a. Claim 1[preamble]	13
	b. Claim term 1[a][1]	16
	c. Claim term 1[a][2]	17
	d. Claim term 1[b][1]	18
	e. Claim term 1[b][2]	21
	f. Claim term 1[b][3]	22
	g. Claim term 1[b][4]	24
	h. Claim term 1[c].....	26

2.	Claim 2	29
3.	Claim 3	31
4.	Claim 4	32
5.	Claim 5	33
6.	Claim 6	34
7.	Independent claim 7	35
a.	Claim 7[preamble]	35
b.	Claim term 7[a][1]	35
c.	Claim term 7[a][2]	37
d.	Claim term 7[b][1]	37
e.	Claim term 7[b][2]	39
f.	Claim term 7[b][3]	40
g.	Claim term 7[c]	40
VII.	GROUND 2 AND 3 BASED ON LI	43
A.	Li (Ex. 1005)	43
B.	Liu (Ex. 1006)	47
C.	Li in View of Liu Renders Claims 1-6 Obvious	49
1.	A POSITA would have been motivated to combine the teachings of Li and Liu, and would have reasonably expected success in doing so.....	49
2.	Independent claim 1	50
a.	1[preamble]	50
b.	Claim term 1[a][1]	53

c.	Claim term 1[a][2]	55
d.	Claim term 1[b][1]	57
e.	Claim term 1[b][2]	59
f.	Claim term 1[b][3]	61
g.	Claim term 1[b][4]	65
h.	Claim term 1[c]	66
3.	Claim 2	70
4.	Claim 3	73
5.	Claim 4	75
6.	Claim 5	76
7.	Claim 6	77
D.	Li Renders Claim 7 Obvious	78
1.	Independent claim 7	78
a.	7[preamble]	78
b.	Claim term 7[a][1]	79
c.	Claim term 7[a][2]	81
d.	Claim term 7[b][1]	83
e.	Claim term 7[b][2]	84
f.	Claim term 7[b][3]	85
g.	Claim term 7[c]	86
VIII.	MANDATORY NOTICES	89
A.	Real Parties-in-Interest	89
B.	Related Matters	89

C.	Lead and Back-Up Counsel.....	89
D.	Service Information.....	90
IX.	STANDING.....	90
X.	CONCLUSION.....	90

TABLE OF AUTHORITIES

CASES

<i>Blue Calypso, LLC v. Groupon, Inc.</i> , 815 F.3d 1331 (Fed. Cir. 2016)	14
<i>In re Kuhle</i> , 526 F.2d 553 (C.C.P.A. 1975)	67
<i>In re Rice</i> , 341 F.2d 309 (C.C.P.A. 1965)	67
<i>Kennametal, Inc. v. Ingersoll Cutting Tool Co.</i> , 780 F.3d 1376 (Fed. Cir. 2015)	passim
<i>Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.</i> , 868 F.3d 1013 (Fed. Cir. 2017)	9

STATUTES

35 U.S.C. § 102	3
35 U.S.C. § 103	3

TABLE OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 9,523,826 to Tsai et al. (“the ’826 patent”)
1002	Prosecution History of the ’826 patent
1003	Declaration of Dr. Michael Lebby
1004	U.S. Patent No. 7,201,520 to Mizue et al. (“Mizue”)
1005	Certified English translation of Chinese Utility Model No. CN 203026708 U to Li et al. (“Li”)
1006	Certified English translation of Chinese Utility Model No. CN 201749226 U to Liu et al. (“Liu”)
1007	Chinese Utility Model No. CN 203026708 U to Li et al.
1008	Chinese Utility Model No. CN 201749226 U to Liu et al.

LISTING OF CLAIMS

Claim Term	Claim Limitation
1[pre]	A pluggable optical transceiver module, for being inserted into a plugging slot of a socket, the socket comprising two first fastening parts located in the plugging slot, the pluggable optical transceiver module comprising:
1[a][1]	a main body having two side surfaces that are opposite to each other and two sliding slots located at the two side surfaces, respectively, wherein the main body is configured to be inserted into the plugging slot,
1[a][2]	wherein the main body has at least one limiting space and two bottom surfaces forming the two sliding slots, respectively, the two bottom surfaces are parallel to the two side surfaces, the at least one limiting space is located at one of the two side surfaces;
1[b][1]	a sliding component comprising a linkage arm and two extending arms, wherein the two extending arms are connected to two ends of the linkage arm, respectively, each extending arm has a second fastening part, the main body is between the two extending arms,
1[b][2]	the two extending arms are slidably disposed on the two sliding slots to have a fastening position and releasing position,
1[b][3]	the two first fastening parts are fastened to the two second fastening parts when the two extending arms are located at the fastening position, and the two second fastening parts

	press the two first fastening parts, respectively, to make the two first fastening parts be farther away from each other when the two extending arms are located at the releasing position,
1[b][4]	wherein each extending arm has a limited part configured to move in the at least one limiting space;
1[c]	an elastic component, wherein the main body has a first limiting surface and a second limiting surface forming the limiting space, the first limiting surface is closer to the head part than the second limiting surface, and the elastic component is located in the limiting space and between the first limiting surface and the limited part and is covered by the extending arm such that the elastic component is confined by the main body and the sliding component.
2	The pluggable optical transceiver module according to claim 1, wherein the main body comprises a head part and an inserted part connected to each other, the inserted part is configured to be inserted into the socket, the two side surfaces are located at two sides of the head part and the inserted part opposite to each other, respectively, wherein both the two sliding slots extend from the head part towards the inserted part, and the two extending arms are able to slide relative to the two sliding slots to have the fastening position which is farther away from the head part and the releasing position which is closer to the head part.

3	The pluggable optical transceiver module according to claim 2, wherein each second fastening part has a fastening surface, and a distance between one side of the fastening surface which is close to the side surface and the head part is less than a distance between another side of the fastening surface which is far away from the side surface and the head part.
4	The pluggable optical transceiver module according to claim 2, wherein the head part has at least one optical fiber terminal.
5	The pluggable optical transceiver module according to claim 1, further comprising two elastic components, wherein the number of the at least one limiting surface is two, the main body has two first limiting surfaces and two second limiting surfaces forming the two limiting spaces together, respectively, the two first limiting surfaces are closer to the head part than the two second limiting surfaces, the two elastic components are located in the two limiting spaces, respectively, and each elastic component is between the first limiting surface and the limited part.
6	The pluggable optical transceiver module according to claim 1, wherein the pluggable optical transceiver module further comprises a pull handle pivoted on the linkage arm of the sliding component.
7<pre>[pre]</pre>	A pluggable optical transceiver module, comprising:
7<pre>[a][1]</pre>	a main body having a head part and an inserted part that are connected to each other, wherein the main body further comprises opposite two side surfaces and two sliding slots

	which are located at two sides of the head part and the inserted part opposite to each other, respectively, the two sliding slots are located at the two side surfaces, and the two sliding slots extend from the head part to the inserted part, respectively,
7[a][2]	wherein the main body has at least one limiting space and two bottom surfaces forming the two sliding slots, respectively, the two bottom surfaces are parallel to the two side surfaces, the at least one limiting space is located at one of the two side surfaces;
7[b][1]	a sliding component comprising a linkage arm and two extending arms, wherein the linkage arm is connected between the two extending arms, each extending arm has a second fastening part, the main body is between the two extending arms,
7[b][2]	the two extending arms are able to slide relative to the two sliding slots to have a fastening position which is farther away from the head part and a releasing position which is closer to the head part,
7[b][3]	wherein each extending arm has a limited part configured to move in the at least one limiting space;
7[c]	an elastic component, wherein the main body has a first limiting surface and a second limiting surface forming the limiting space, the first limiting surface is closer to the head part than the second limiting surface, and the elastic component is located in the limiting space and between the

	first limiting surface and the limited part and is covered by the extending arm such that the elastic component is confined by the main body and the sliding component.
--	---

I. INTRODUCTION

Petitioner Accelight Technologies, Inc. (“Petitioner”) requests *inter partes* review of U.S. Patent No. 9,523,826 (“the ’826 patent”), which is directed to a basic component of optical networking—an optical transceiver module configured to be plugged in and unplugged from a socket in a host device—that has been routinely used in the optoelectronics industry for years before the effective filing date of the ’826 patent. During prosecution, the examiner correctly applied Mizue (Ex. 1004) as invalidity prior art. But Patent Owner Applied Optoelectronics, Inc. (“Patent Owner”) argued erroneously, based on a single drawing (Figure 9) in Mizue, that a claim limitation was not disclosed by Mizue. The examiner erred by not reviewing Mizue thoroughly and not realizing that Mizue’s Figure 8 indeed disclosed the claim limitation, and in fact, all limitations of the claimed invention. Mizue, which was filed almost a decade before the ’826 patent application was filed, therefore anticipates all claims of the ’826 patent. The other prior art references applied in this Petition, Li (Ex. 1005) and Liu (Ex. 1006), which were not considered by the examiner during prosecution, further demonstrate the obviousness of the purported invention of the ’826 patent.

The prior art references and grounds presented here clearly show that the challenged claims of the ’826 patent (claims 1-7) are unpatentable and should not have been granted. Yet, Patent Owner has asserted the ’826 patent against multiple

defendants in district court to monetize the patent—years after it was issued—by alleging infringement by defendants’ products that have been in the U.S. market for almost as long as the life of the patent, and pressing for quick settlements before the cases reach any significant milestone in district court and before *inter partes* review petition(s) are filed.¹

Patent Owner’s attempts to claim ordinary and conventional technologies as their “invention” and harassment of competitors by pressing for quick settlements without engaging in the merits of the so-called “invention,” which should not be allowed. The challenged claims should be found unpatentable.

¹ The undersigned counsel is representing Petitioner against Patent Owner’s claims in district court in Case No. 4:24-cv-09041-HSG (N.D. Cal.), which is currently stayed in view of pending IPRs. The same counsel is also representing another defendant, Eoptolink Technology USA Inc., against Patent Owner in Case No. 5:24-cv-08165-NW (N.D. Cal.) that asserts a different set of patents related to optical transceivers, and previously represented Molex, LLC against Patent Owner in Case No. 4:23-cv-04787-JST (N.D. Cal.), which has now been dismissed.

II. PRIOR ART REFERENCES, GROUNDS, AND PETITIONER'S STIPULATION

A. Prior Art References and Grounds

Claims 1-7 are challenged based on the following prior art references.

Prior Art	
Ex. 1004	U.S. Patent No. 7,201,520 to Mizue et al., filed May 27, 2004 and issued April 10, 2007 ("Mizue"); prior art under 35 U.S.C. § 102(a)(1).
Ex. 1005	Chinese Utility Model No. CN 203026708 U to Li et al., filed December 25, 2012 and issued June 26, 2013 ("Li"); prior art under 35 U.S.C. § 102(a)(1).
Ex. 1006	Chinese Utility Model No. CN 201749226 U to Liu et al., filed July 23, 2010 and issued February 16, 2011 ("Liu"); prior art under 35 U.S.C. § 102(a)(1).

The presented prior art grounds are:

Ground	Claims	Basis Under 35 U.S.C. §§ 102, 103
1	1-7	Anticipated by Mizue
2	1-6	Rendered obvious by Li in view of Liu
3	7	Rendered obvious by Li

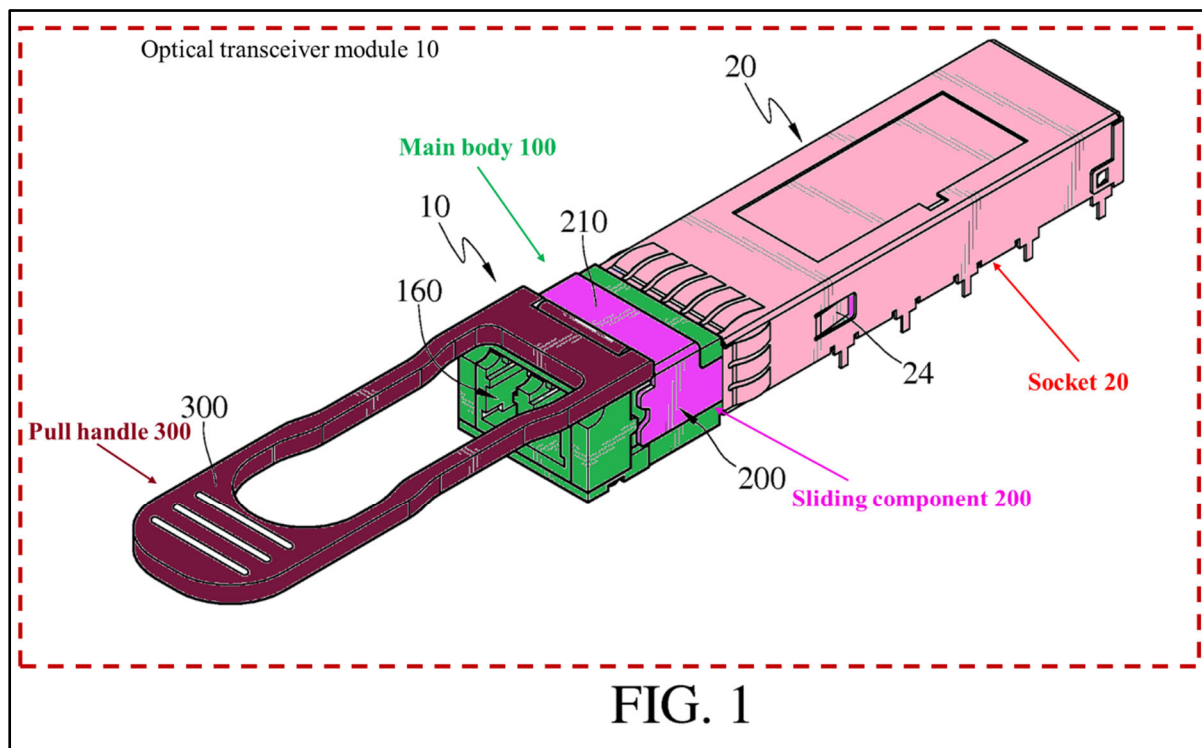
B. Petitioner's Stipulation for the Parallel District Court Action

If the Board institutes an IPR based on this Petition (and does not subsequently vacate or withdraw institution), Petitioner will not pursue in the parallel district court litigation (Case No. 4:24-cv-09041-HSG (N.D. Cal.)), (i) the specific grounds raised in this Petition, (ii) any other grounds that reasonably could have been raised under §§ 102 or 103 on the basis of prior art patents or printed publications, or (iii) any ground based on a combination of system prior art and the prior art references asserted in this Petition (identified in Section II.A, above).

III. TECHNICAL BACKGROUND OF THE '826 PATENT

A. The '826 Patent

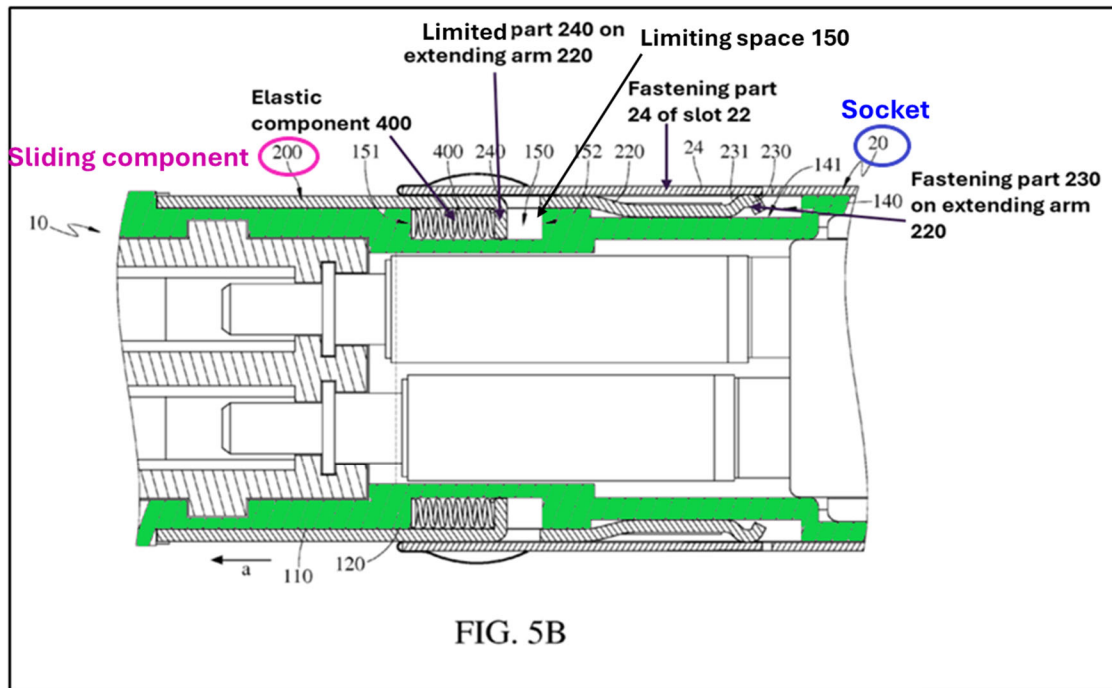
The '826 patent is directed to a pluggable optical transceiver module configured to be inserted into a plugging slot of a socket. Ex. 1001, Title, Abstract, 1:57-58, 2:47-58. A pluggable optical transceiver module 10 of the '826 patent comprises, among other things, a **main body 100** having a head part 110 and an inserted part 120, a **sliding component 200**, a **pull handle 300**, and two **elastic components 400**, as shown in Figure 3 (below). *Id.*, 2:59-3:1.



Ex. 1001, Fig. 1 (annotations added)

As described in the '826 patent, “[t]he main body 100 has two side surfaces 130, two sliding slots 140 and two limiting spaces 150. ... The two sliding slots 140 are located at the two side surfaces 130, respectively, and extend from the head part 110 to the inserted part 120. Each sliding slot 140 has a bottom surface 141 which is, but not limited to, parallel to the side surface 130. ... The two limiting spaces 150 are located at the bottom surfaces 141 of the two sliding slots 140, respectively. Each limiting space 150 has a first limiting surface 151 and a second limiting surface 152 ... [that] are connected to the bottom surface 141. The first limiting surface 151 is closer to the head part 110 than the second limiting surface 152.” *Id.*, 3:1-17.

optical transceiver module 10 is located in a stable position in plugging slot 22. *Id.*, 4:25-42, Fig. 5B (annotated below).



Ex. 1001, Fig. 5B (annotations added to show (1) engagement of **sliding component 200** with plugging slot 22 of **socket 20** via fastening parts 230 and 24 on extending arms 220 and slot 22, respectively; and (2) engagement of limited part 240 with elastic component 400 disposed in limiting space 150 on the side surface of **main body 100**)

But as discussed below, optical transceiver modules with same structure, function, and operation were well known before the effective filing date of the '826 patent. Ex. 1003, ¶44.

B. Prosecution History of the '826 Patent

U.S. Patent Application No.14/504,500, which issued as the '826 patent, was filed on October 2, 2014 and claims priority to Taiwanese patent application TW 102135723, filed October 2, 2013. Ex. 1001, cover page. The Patent Office issued a Non-Final Office Action dated March 31, 2016, rejecting claims 1-4 and 9 as anticipated by U.S. Patent Application Publication No. US 2011/0081114 to Togami et al. ("Togami"), and claims 5-8 as obvious over Togami in view of Mizue (Ex. 1004). Ex. 1002, pp. 68-79. In a Reply filed August 31, 2016, Patent Owner amended independent claims 1 and 9 to recite certain claim elements previously recited in claims 5 and 6, namely, "limiting space," "bottom surface," "limited part," and "elastic component." *Id.*, pp. 87-92. Patent Owner additionally argued that Mizue does not disclose that "the elastic component is covered by the extending arm such that the elastic component is confined by the main body and the sliding component" because "[e]ven if this structure in Mizue were combined with Togami, however, the **spring 30 is exposed and not covered by the arm 20a. See Mizue, FIG. 9.**" *Id.* (emphasis added).

A Notice of Allowance issued on August 12, 2016, including a Notice of Allowability stating that claims 1-4 and 7-9 were allowable because the prior art of record does not disclose "wherein the elastic component is located in the limiting space and between the first limiting surface and the limited part and is covered by

the extending arm such that the elastic component is confined by the main body and the sliding component,” as recited in independent claims 1 and 9. The ’826 patent issued on December 20, 2016. Ex. 1001, cover page.

But as discussed below, Mizue indeed discloses that the elastic components (springs 30) are covered by extending arms 20a and are confined by the main body and the arms. *See* Ex. 1004, Fig. 8; *see also* Sections VI.B.1.h and VI.B.7.g, below. The examiner erred by not considering Mizue fully, including Figure 8, and instead gave undue credit to Patent Owner’s incorrect argument premised solely on Mizue’s Figure 9. Ex. 1003, ¶82. As discussed below in Ground 1, Mizue discloses every limitation of claims 1-7.

IV. LEVEL OF ORDINARY SKILL

At the effective filing date of the ’826 patent, a person of ordinary skill in the art (“POSITA”) would have had (1) a bachelor’s degree in electrical or electronics engineering or an equivalent degree, and (2) 2-4 years of work experience in optoelectronics, optical networking, optical communications, or a closely related field. Ex. 1003, ¶39.

V. CLAIM CONSTRUCTION

Claims must be construed only to the extent necessary to resolve a controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). There are no claim terms that require construction to

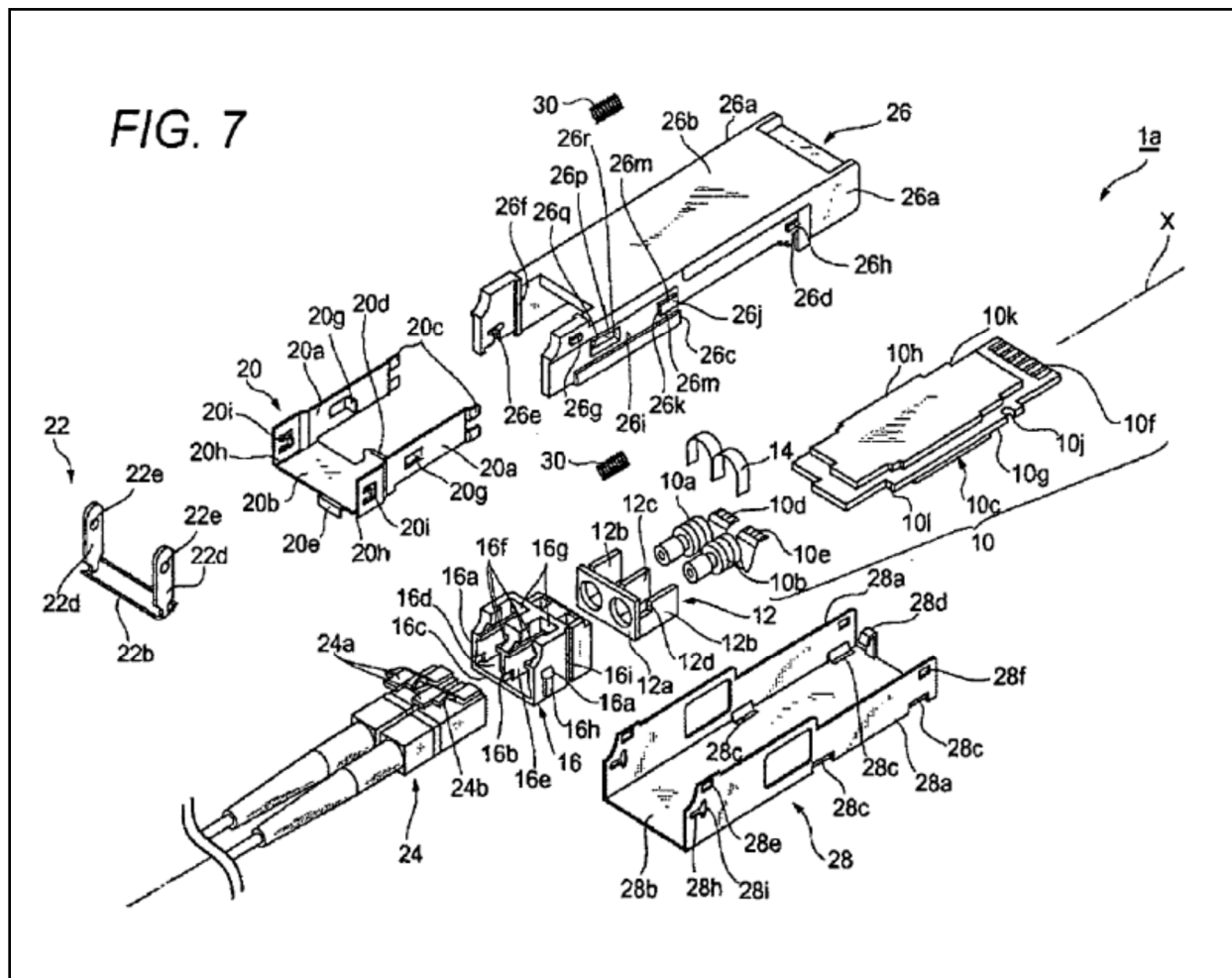
resolve the controversy in this forum. Ex. 1003, ¶45. Petitioner reserves the right to pursue claim construction of certain terms in the parallel district court litigation.

VI. GROUND 1 BASED ON MIZUE

A. Mizue (Ex. 1004)

Mizue discloses “an optical module having a pluggable configuration, which enables to latch with the cage” of a host device. Ex. 1004, Abstract; *see also id.*, 1:8-9, 1:34-36. Specifically, Mizue discloses that optical module 1 (and versions 1a, 1b thereof) are plugged into a cage 4 (socket) installed on a host board 2. *Id.*, Fig. 1, 3:19-21, 7:4-12, 8:2-10; *see also id.*, 3:31-35 (“The front end 4d of the cage 4 has an opening through which the optical module 1 is inserted into the space.”).

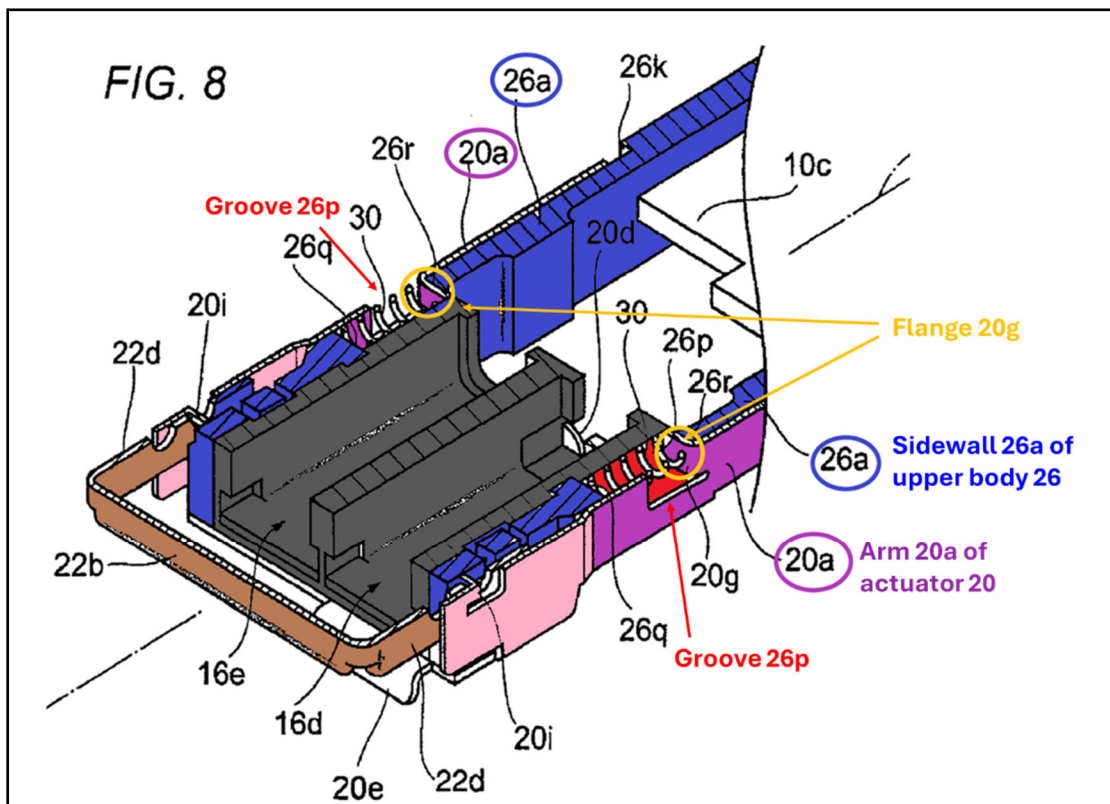
Mizue’s Figure 7 is an exploded view of optical module 1a, which “includes a primary unit 10, a holder 12, a bracket 14, a receptacle body 16, a housing 18, an actuator 20 and a bail 22 [for sliding actuator 20]” as well as “a spring 30.” Ex. 1004, 7:4-12. Housing 18 includes an upper body 26 and a lower body 28 that are assembled and primary unit 10 is housed in the space sandwiched between the upper and lower bodies. *Id.*, Fig. 7. Receptacle 16, holder 12, and bracket 14 are assembled to facilitate coupling of an optical connector 24 with the optical sub-assemblies within primary unit 10. *Id.*



Ex. 1004, Fig. 7

The actuator 20 includes arms 20a that slide on groove 26i of upper body 26 between a first position (fastening position) and a second position (releasing position). *Id.*, 1:51-2:12, Fig. 7. Arms 20a include flanges 20g that are configured to be inserted in respective grooves 26p provided in the sidewalls 26a of upper body 26. *Id.*, 7:26-37. Each “groove 26p has a pair of inner surfaces 26q and 26r, both extending in the direction intersecting the axis X. A spring 30 is inserted between the [] flange 20g and one of the inner surface 26q of the groove 26p.” *Id.*

Figure 8 of Mizue is a cross-sectional view of optical module 1a and “shows the state when actuator 20 is pushed therein,” i.e., when the actuator is set in the first (fastening) position. *Id.*, 7:39-47. Spring 30 “normally holds the actuator 20 in the [first] position such that the latch 4e of the cage 4 may not release from the projection in the upper body.” *Id.*



Ex. 1004, Fig. 8 (annotations added)

Figure 9 shows “the state that the actuator 20 is pulled out. The spring is shrank [*sic*] by the flange 20g, and the latch 4e of the cage 4 is released from the projection 26i of the upper body 26.” *Id.*, 7:48-54.



Ex. 1004, Fig. 9 (annotations added)

B. Mizue Anticipates Claims 1-7

1. Independent claim 1

Mizue discloses every limitation of claim 1.

a. Claim 1[preamble]

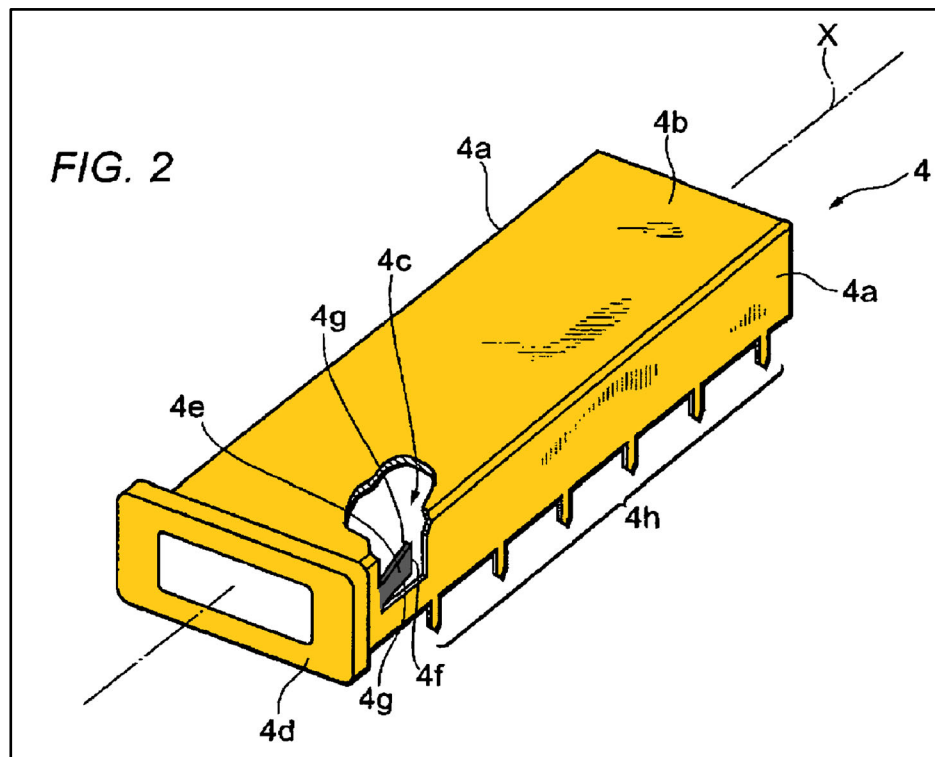
Mizue discloses “an optical module having a pluggable configuration, which enables to latch with the cage” of a host device. Ex. 1004, Abstract; *see also id.*, 1:8-9 (“This invention relates to an optical module, especially, an optical module having a hot-pluggable function”), 1:34-36. Specifically, Mizue discloses that optical module 1 (and versions 1*a*, 1*b* thereof), which are optical transceiver modules, are plugged into a slot, i.e., space, in cage 4 (socket) installed on a host board 2. *Id.*, Fig. 1, 3:19-21, 7:4-12, 8:2-10; *see also id.*, 3:32-34 (“The front end 4*d* of the cage 4 has

an opening through which the optical module 1 is inserted into the space [i.e., slot].”).

Even though Mizue does not include an express discussion of the combination of module 1*a* with cage 4, Mizue discloses that optical module 1*a* is “similar” to optical module 1 (*id.*, 7:4-80) and provides a common description of how the disclosed optical modules realize their “pluggable function” with a cage (*id.*, 1:34-58). Mizue also discusses engagement between module 1*a* and cage 4, thus indicating that module 1*a* is configured to be inserted into cage 4. *Id.*, 7:43-50 (discussing latches 4*e* of cage 4 engaging and disengaging projections 26*j* on the sidewalls 26*a* of main body 26 of module 1*a*). Accordingly, a POSITA would have readily envisaged from Mizue’s disclosure that optical module 1*a* plugs into cage 4 in the same manner as optical module 1. *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015) (“[A] reference can anticipate a claim even if it does not expressly spell out all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would at once envisage the claimed arrangement or combination.”) (citation and quotation marks omitted); *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1343-44 (Fed. Cir. 2016) (discussing *Kennametal*, and explaining that in *Kennametal*, “we noted that a reference need not always include an express discussion of the actual combination to anticipate. ... Instead, a reference may still anticipate if that reference teaches that

the disclosed components or functionalities may be combined and one of skill in the art would be able to implement the combination. ... Thus, in *Kennametal*, we found ... that the reference anticipated the claims even without a particular disclosure of the specific combination recited in the disputed claims.”) (citations omitted); *see also* Ex. 1003, ¶63.

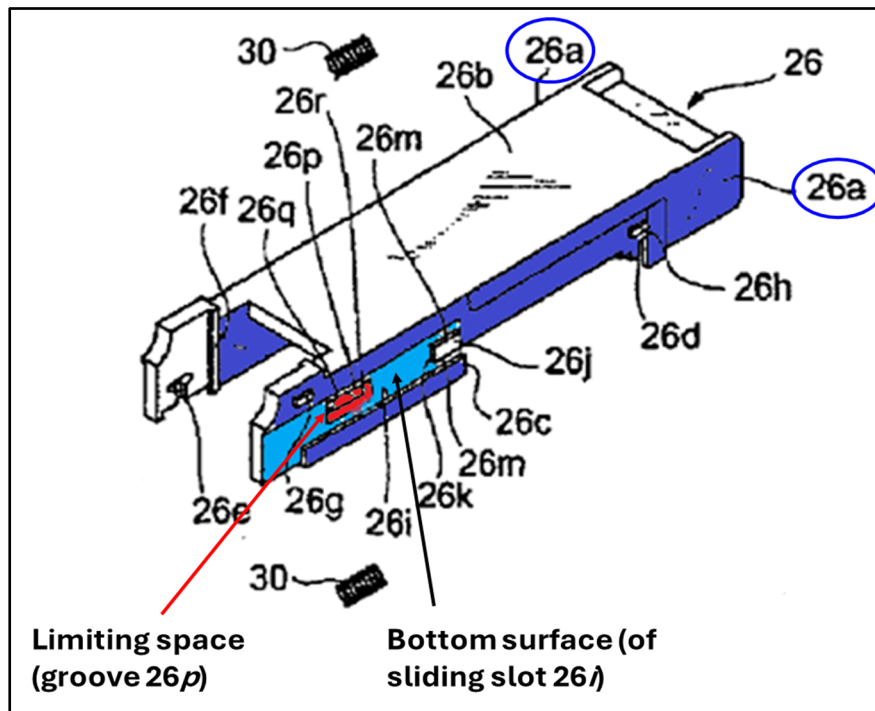
As Mizue discloses in relation to optical module 1, which is equally applicable to module 1a, cage 4 (socket having plugging slot) includes two latches 4e (first fastening parts) on the sidewalls 4a of the cage. Ex. 1004, 3:37-40, 3:29-35, Fig. 2.



Ex. 1004, Fig. 2 (showing **cage 4** having sidewalls 4a, each sidewall having a **latch 4e (first fastening part)** extending into space 4c inside the cage)

b. Claim term 1[a][1]

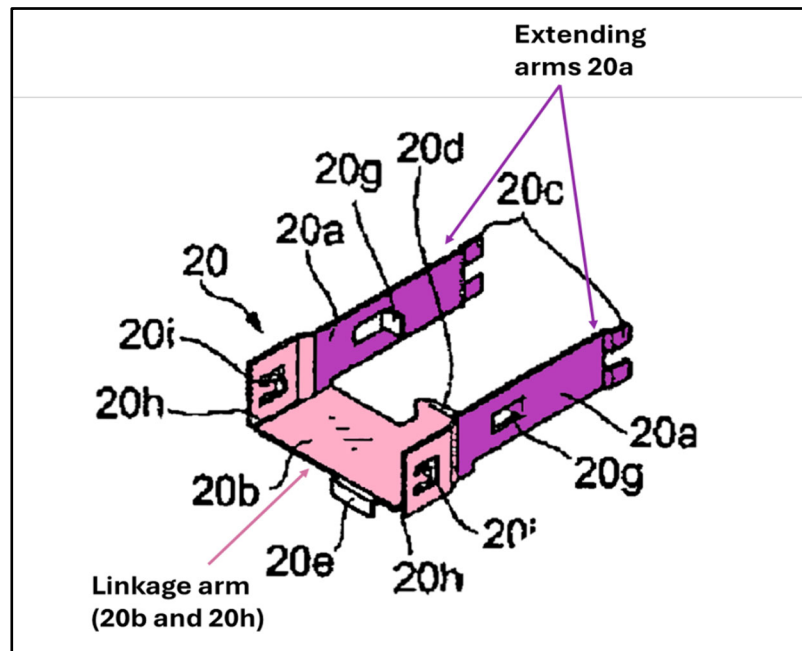
Mizue's optical module 1*a* (pluggable optical transceiver module) has an upper body 26 that serves as the main body of the optical module. Ex. 1004, 7:4-12, Figs. 7-9. As shown in annotated Figure 7, below, upper body 26 (main body) has two **side surfaces (sidewalls 26*a*)** that are opposite each other. *Id.*, Fig. 7. Each side surface has a **sliding slot (groove 26*i*)** located thereon. *Id.* The main body is configured to be inserted into space 4*c* (plugging slot) of cage 4 (socket). *Id.*, 1:37-40, 3:19-28, and 7:43-50 (discussing latches 4*e* of cage 4 engaging and disengaging projections 26*j* on the sidewalls 26*a* of upper body 26, thus indicating that the main body is configured to be inserted into cage 4), Fig. 1 (showing optical module 1, which is applicable to optical module 1*a*, being inserted into cage 4), 3:32-34 ("The front end 4*d* of the cage 4 has an opening through which the optical module 1 is inserted into the space."); Ex. 1003, ¶65.



Ex. 1004, Fig. 7 (excerpted and annotated to show upper body 26 (main body) of optical module 1a)

d. Claim term 1[b][1]

Optical module 1a includes an actuator 20 (sliding component) comprising two arms 20a (extending arms), and a center portion 20b and front side walls 20h that together form a linkage arm, and wherein the two extending arms are connected to two ends of the linkage arm. Ex. 1004, Fig. 7, 7:16-19.

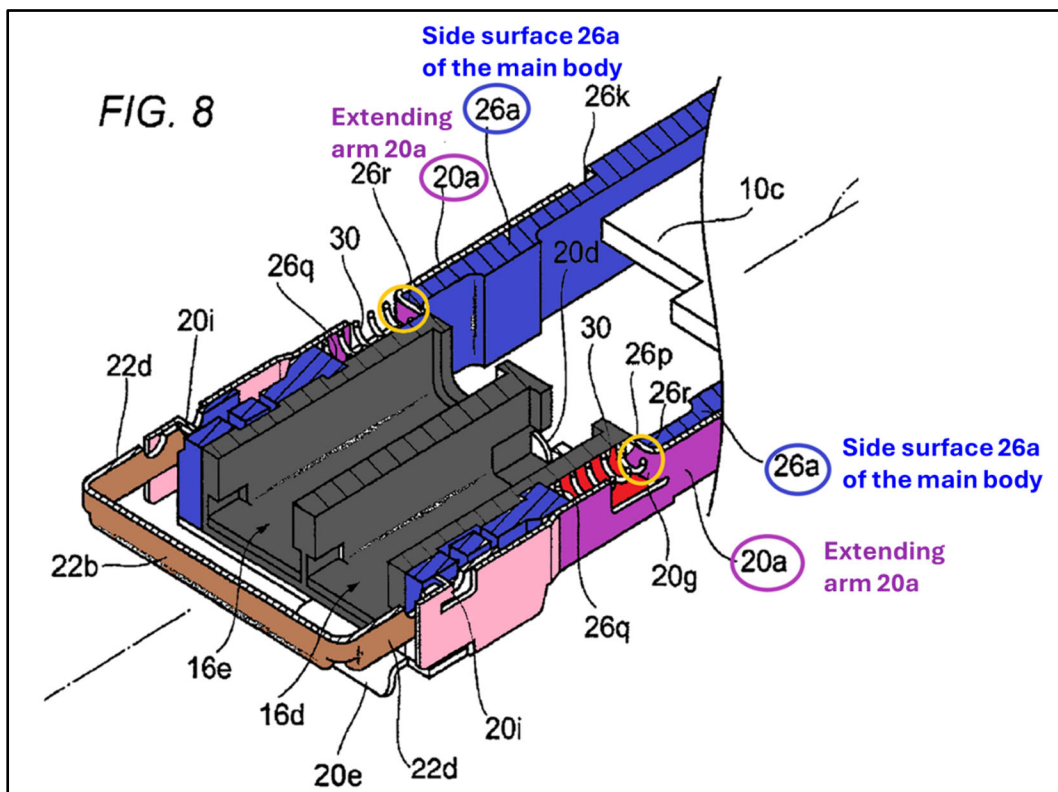


Ex. 1004, Fig. 7 (excerpted and annotated to show actuator 20)

Furthermore, each arm 20a (extending arm) has a second fastening part (slab 20c) at the tip of the arm. *Id.* Although Mizue does not expressly disclose the contact between slabs 20c (second fastening parts) and latches 4e (first fastening parts) of cage 4 with respect to optical module 1a, Mizue provides such details with respect to optical module 1 shown in Figure 4. *Id.*, 5:54-65 (“The forked slabs 20c is bent toward the outer side of the optical module such that, **when sliding the actuator 20 toward the front side, the forked slab 20c is in contact with the latch 4e and presses the latch** toward the outer side of the optical module 1.”) (emphasis added). That is, when sliding actuator 20 out, “the forked slab presses the latch 4e outward and releases the latching between the projection 26j and the latch 4e.” *Id.*

Given 1) the similarities in design between optical modules 1 and 1*a*, particularly the similarities in the arrangement of slabs 20*c*, projections 26*j*, and latches 4*e* of optical modules 1 and 1*a*, 2) Mizue's disclosure that optical modules 1 and 1*a* are indeed "similar," and 3) Mizue's disclosure that "[i]n the description and the drawings, the same symbols and numerals without overlapping explanations will refer [to the] same elements," a POSITA would "at once envisage" that contact between slabs 20*c* (second fastening parts) and latches 4*e* (first fastening parts) of optical module 1*a* is the same as the contact between those elements of optical module 1. Ex. 1004, 3:16-18, 7:4-8, Figs. 4, 7; Ex. 1003, ¶69; *Kennametal*, 780 F.3d at 1381 (a reference anticipates if a POSITA would envisage that disclosed embodiments or components may be combined). Thus, a POSITA would have readily recognized slabs 20*c* on extending arms 20*a* of optical module 1*a* as second fastening parts that engage with latches 4*e* (first fastening parts) of cage 4. Ex. 1003, ¶69.

Figures 8 and 9 of Mizue further show that the main body (upper body 26) is disposed between extending arms 20*a* of actuator 20 (sliding component).



Ex. 1004, Fig. 8 (annotations added) (showing **main body (upper body 26)** is disposed between **extending arms 20a** of actuator 20)

e. Claim term 1[b][2]

Extending arms 20a of actuator 20 are disposed on the sliding slots (grooves 26i) of the main body (upper body 26). Ex. 1004, 1:64-65, Figs. 7-9. As discussed regarding claim term 1[b][1], a POSITA would “at once envisage” that engagement between extending arms 20a and grooves 26i would be same as the engagement between those elements of optical module 1. Ex. 1003, ¶71; *Kennametal*, 780 F.3d at 1381. With respect to optical module 1, Mizue discloses that “[t]he arm 20a is received in the groove 26i provided in the side wall 26a of the upper body 26.” Ex.

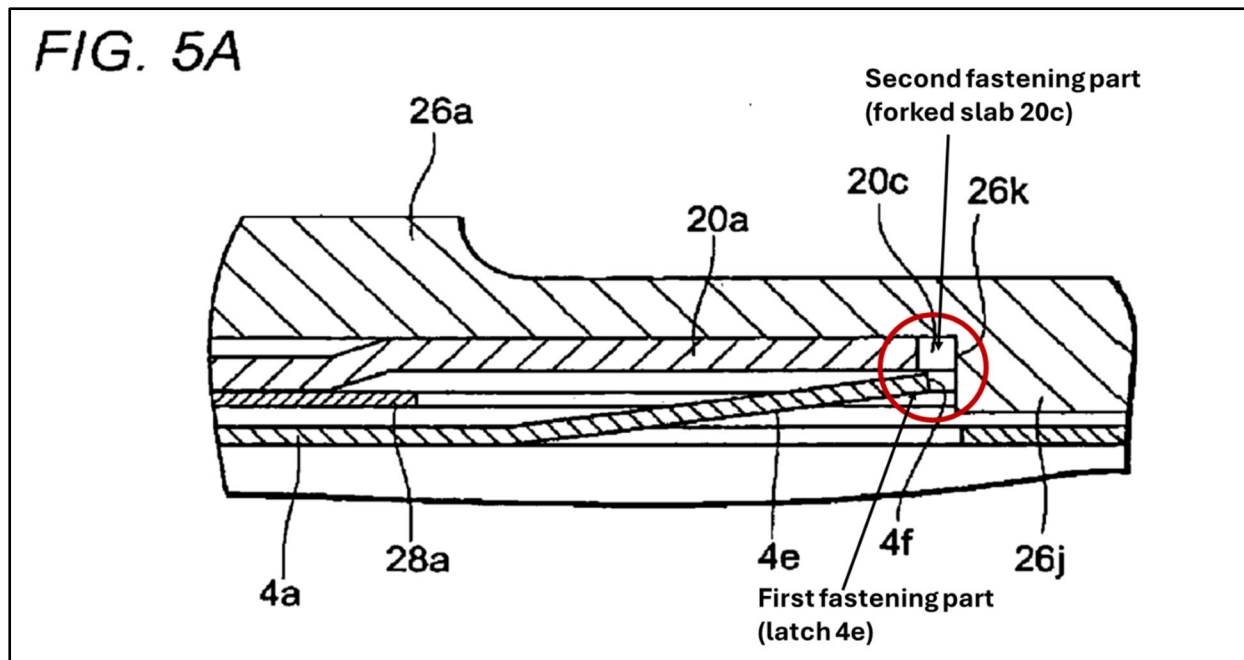
1004, 5:46-53. A POSITA would have understood that extending arms 20*a* of optical module 1*a* are disposed on the sliding slots (grooves 26*i*) in the same manner as in optical module 1. Ex. 1003, ¶71; *see also* Ex. 1004, 7:38-54 (discussing engagement of actuator 20 with upper body 26 of module 1*a*).

Extending arms 20*a* of optical module 1*a* are disposed on the sliding slots (grooves 26*i*) in a fastening position “when actuator 20 is pushed therein,” as shown in Figure 8, and in a releasing position when “the actuator 20 is pulled out,” as shown in Figure 9. Ex. 1004, 7:38-54. As Mizue explains, Figure 8 “shows the state when **actuator 20 is pushed therein**. The spring 30, in the ordinal position, presses the [] flange 20*g* to touch the other surface 26*r* of the groove 26*p*, and the flange 20*d*, provided in the center portion 20*b* of the actuator, is set **in the first [fastening] position**. ... FIG. 9 is also a partially cut perspective view showing the state that **the actuator 20 is pulled out**. The spring is shrank by the flange 20*g*, and the latch 4*e* of the cage 4 is released from the projection 26*i* of the upper body 26.” *Id.* (emphases added).

f. Claim term 1[b][3]

As discussed regarding claim term 1[b][1], a POSITA would “at once envisage” that contact between slabs 20*c* (second fastening parts) and latches 4*e* (first fastening parts) of optical module 1*a* is same as the contact between those elements of optical module 1. Ex. 1003, ¶73; *Kennametal*, 780 F.3d at 1381.

In the fastening position (i.e., when actuator 20 is pushed in), the forked slabs 20c (second fastening parts) are attached, i.e., fastened, to latches 4e (first fastening parts) of cage 4, as shown in Figure 5A (annotated below). Ex. 1004, 5:54-6:11. Because projections 26j, which are wedged between respective forked slab 20c, are also coupled to latches 4e, forked slabs 20c are further secured/fastened to latches 4e in the fastening position. *Id.*; Ex. 1003, ¶74.



Ex. 1004, Fig. 5A (annotations added) (showing attachment between the first and second fastening parts in the fastening position)

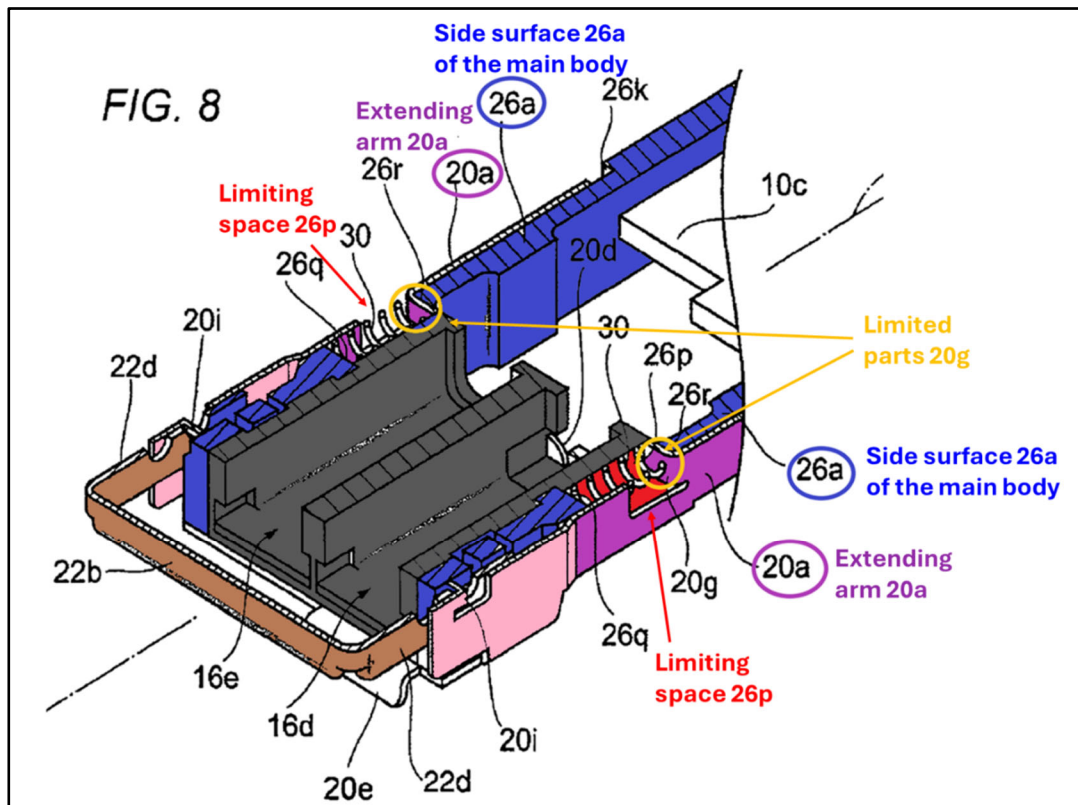
Mizue further discloses that in the releasing position, i.e., when actuator 20 is pulled out, each forked slab 20c, which “is bent toward the outer side of the optical module” and “is in contact with the latch 4e,” **“presses the latch toward the outer side of the optical module 1. ... [A]ccordingly, [when] sliding the actuator with the**

arms 20*a* in the groove 26*i*, **the forked slab presses the latch 4*e* outward and releases the latching between the projection 26*i* and the latch 4*e*.**” Ex. 1004, 5:54-65 (emphases added), Fig. 5B. That is, when extending arms 20*a* are in the releasing position, the two second fastening parts (forked slabs 20*c*) press apart the two first fastening parts (latches 4*e*) to make the two first fastening parts be farther away from each other. *Id.*; Ex. 1003, ¶75.

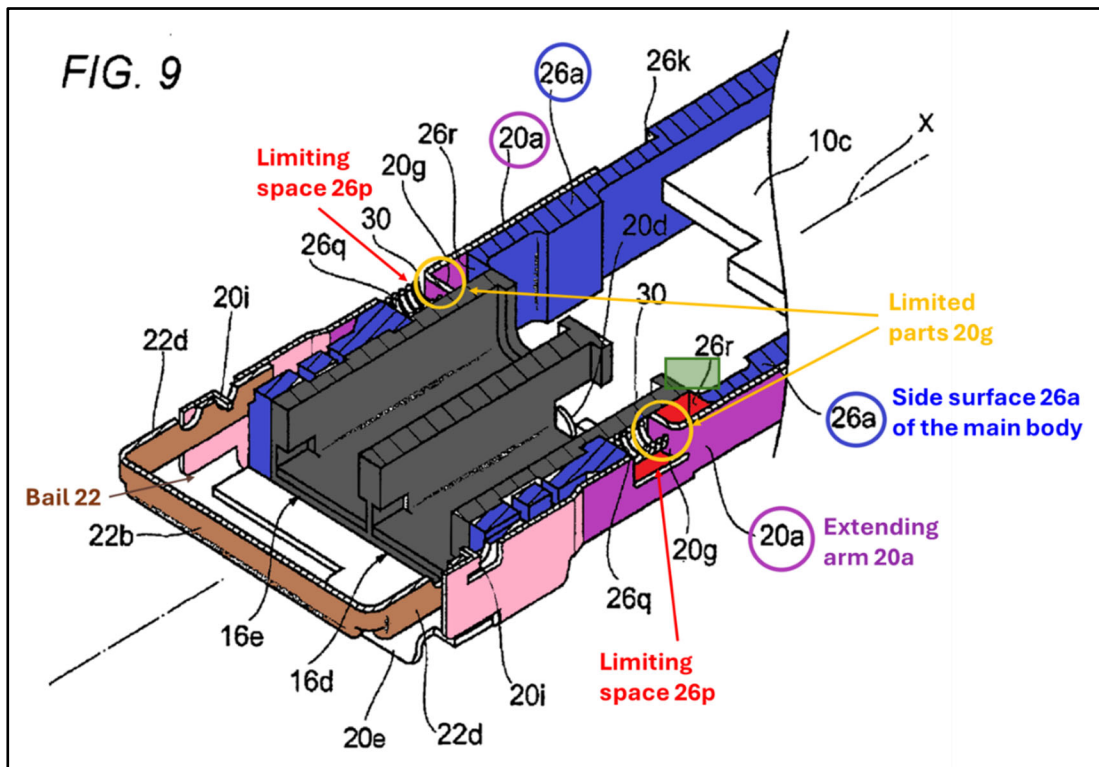
g. Claim term 1[b][4]

Each extending arm 20*a* has a flange 20*g* (limited part) that is configured to be inserted into groove 26*p* (limiting space). Ex. 1004, 7:27-35 (“**The actuator 20 further provides another flange 20*g* in the arm 20*a*. ... On the other hand, the side wall 26*a* of the upper body 26 further provides another groove 26*p* into which the other flange 20*g* of the actuator is inserted.**”) (emphases added).

Figures 8 and 9 of Mizue additionally show that flange 20*g* (limited part) is configured to move in groove 26*p* (limiting space) and shrink spring 30 when going from the fastening to the releasing position. Ex. 1004, 7:38-51, Figs. 8 and 9; Ex. 1003, ¶77.



Ex. 1004, Fig. 8 (annotations added) (showing **limited part (flange 20g)** in **limiting space (groove 26p)** when sliding component 20 is in the fastening position)



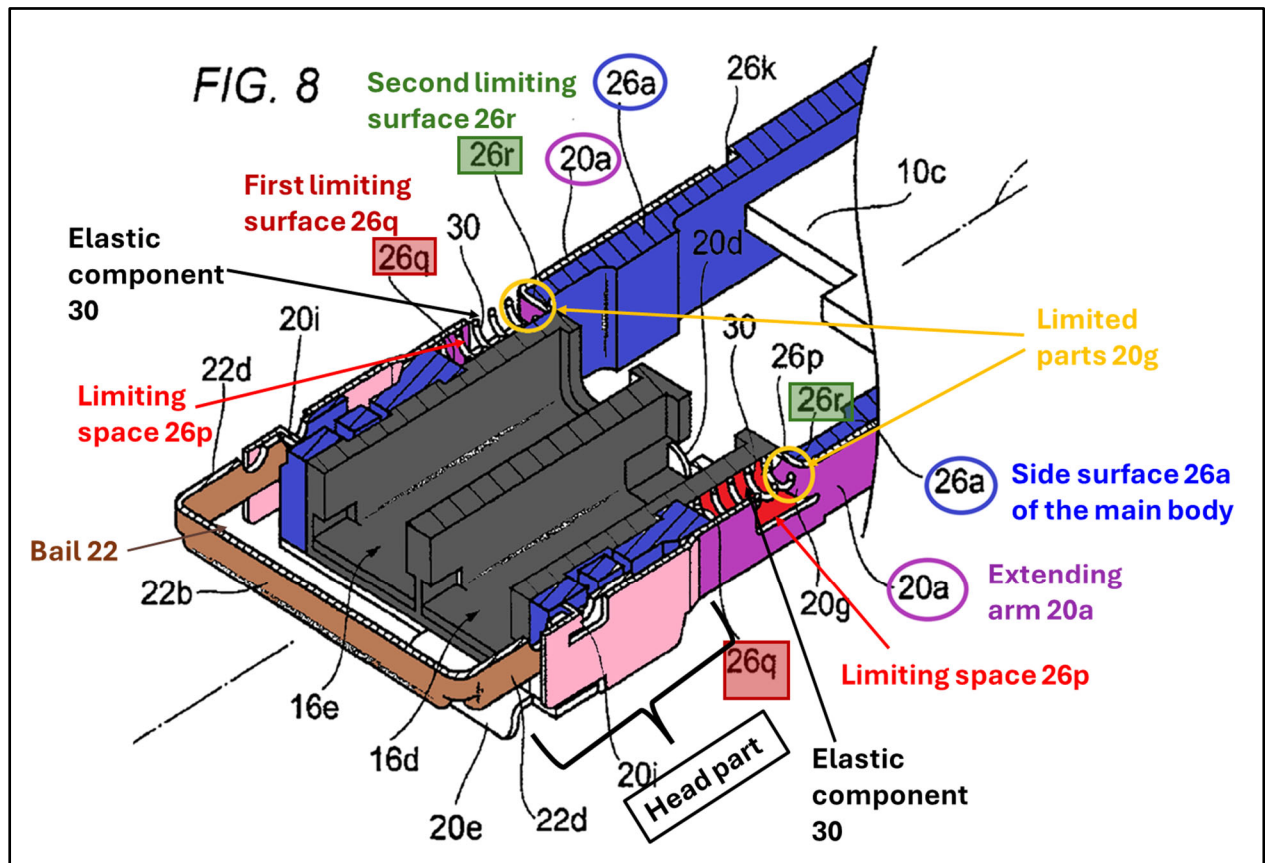
Ex. 1004, Fig. 9 (annotations added) (showing **limited part (flange 20g)** moving in the **limiting space (groove 26p)** when sliding component 20 is pulled out and is in the releasing position)

h. Claim term 1[c]

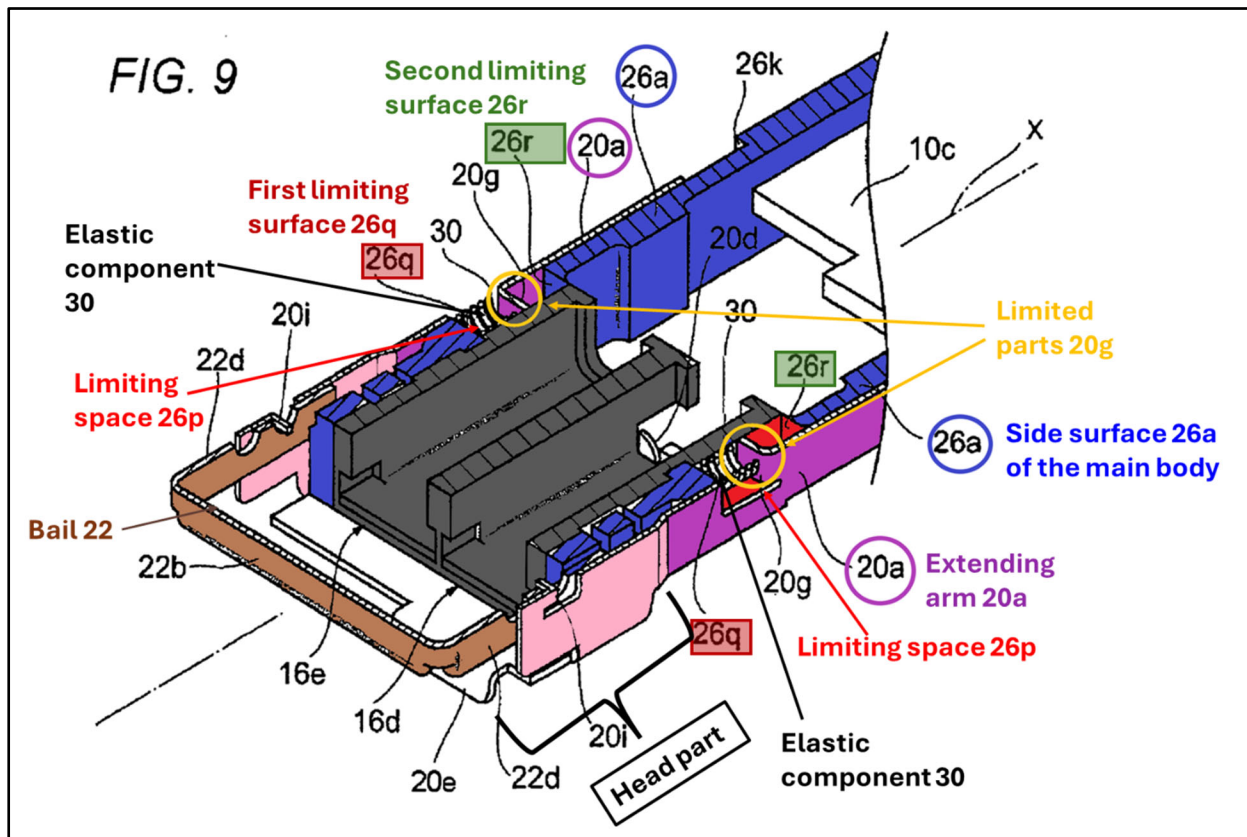
Optical module 1a includes two elastic components (springs 30) that are housed in respective grooves 26p (limiting spaces) located on the side surfaces (sidewalls 26a) of main body 26. Ex. 1004, Fig. 7, 7:11-12, 7:35-37.

As shown in Figures 8 and 9, annotated below, each **limiting space 26p** is formed by a **first limiting surface 26q** and a **second limiting surface 26r**. Ex. 1004, Figs. 7, 8, 9 and 7:30-35 (“[T]he side wall 26a of the upper body 26 further provides

another groove 26p into which the other flange 20g of the actuator is inserted. The other groove 26p has a pair of inner surfaces 26q and 26r, both extending in the direction intersecting the axis X.”) (emphasis added). The first limiting surface 26q is closer to the head part than the second limiting surface 26r, and each elastic component 30 is located between the first limiting surface 26q and the limited part (flange 20g). *Id.*, Figs. 8 and 9, 7:35-37 (“A spring 30 is inserted between the other flange 20g and one of the inner surface 26q of the groove 26p.”).



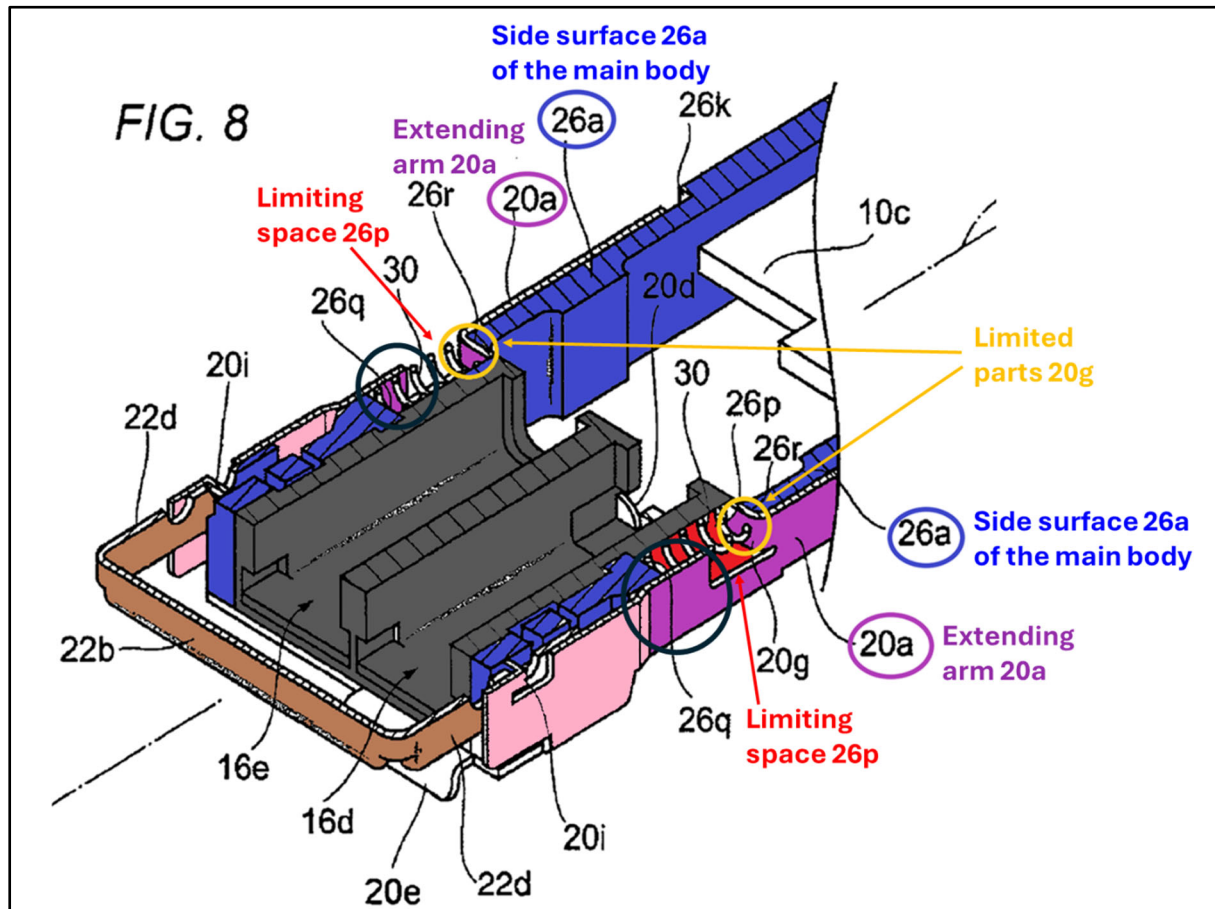
Ex. 1004, Fig. 8 (annotations added)



Ex. 1004, Fig. 9 (annotations added)

Furthermore, Figure 8 shows that each elastic component 30 is covered partially by extending arm 20a when the actuator is in the fastening position. Ex. 1003, ¶81. Nowhere does claim 1 require the elastic component to be always covered fully by the arms of the sliding component. *Id.* As such, each **elastic component 30** is confined, i.e., restricted or limited, by the **side surface 26a** of main body 26 and **extending arm 20a** of actuator 20 (sliding component) when optical module 1a is latched into cage 4. *Id.* More specifically, each elastic component 30 is confined in all directions longitudinally (i.e., along the X axis) by side surface 26a of the main body (i.e., on the sides and above and below limiting space 26p) and laterally by

extending arm 20a when installed. *Id.*; Ex. 1004, Fig. 8. That is, the elastic component is confined by the main body and the sliding component. Ex. 1003, ¶81.

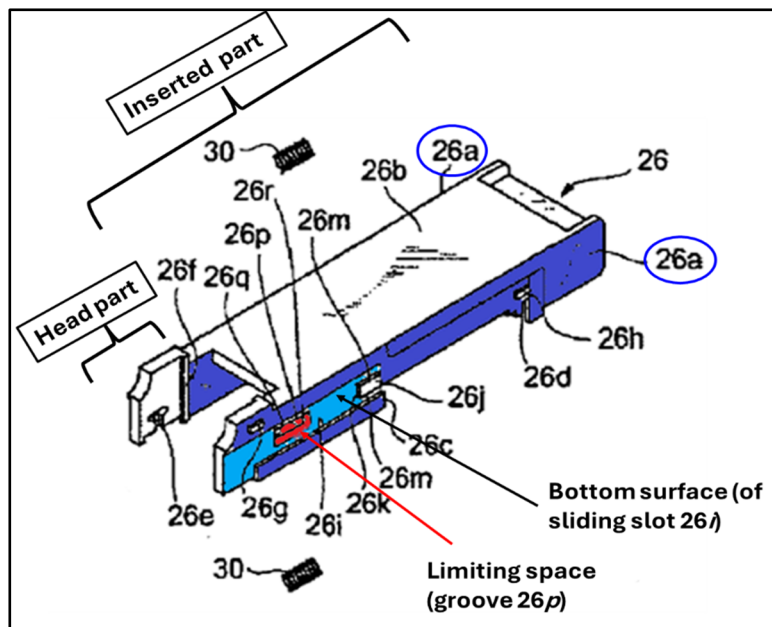


Ex. 1004, Fig. 8 (annotations added) (showing elastic component 30 is confined by **side surface 26a** of main body 26 and **extending arm 20a** of sliding component 20)

2. Claim 2

As shown in Figure 7, below, the main body of Mizue's optical module 1a comprises a head part and an inserted part connected to each other. As shown in Figure 1, and based on Mizue's discussion of "hot-pluggable function," a POSITA would have understood that the inserted part is configured to be inserted/plugged

into the corresponding plugging slot of the socket (cage 4). Ex. 1004, Abstract (“[A]n optical module having a pluggable configuration, which enables to latch with the cage” of a host device), 1:8-9 (“This invention relates to an optical module, especially, an optical module having a hot-pluggable function”), 1:34-36; Ex. 1003, ¶83.



Ex. 1004, Fig. 7 (excerpted and annotated to show upper body 26 (main body) of optical module 1*a*; showing head part and inserted part of the main body and that **sliding slots 26i** on opposite side surfaces of the main body extend from the head part towards the inserted part)

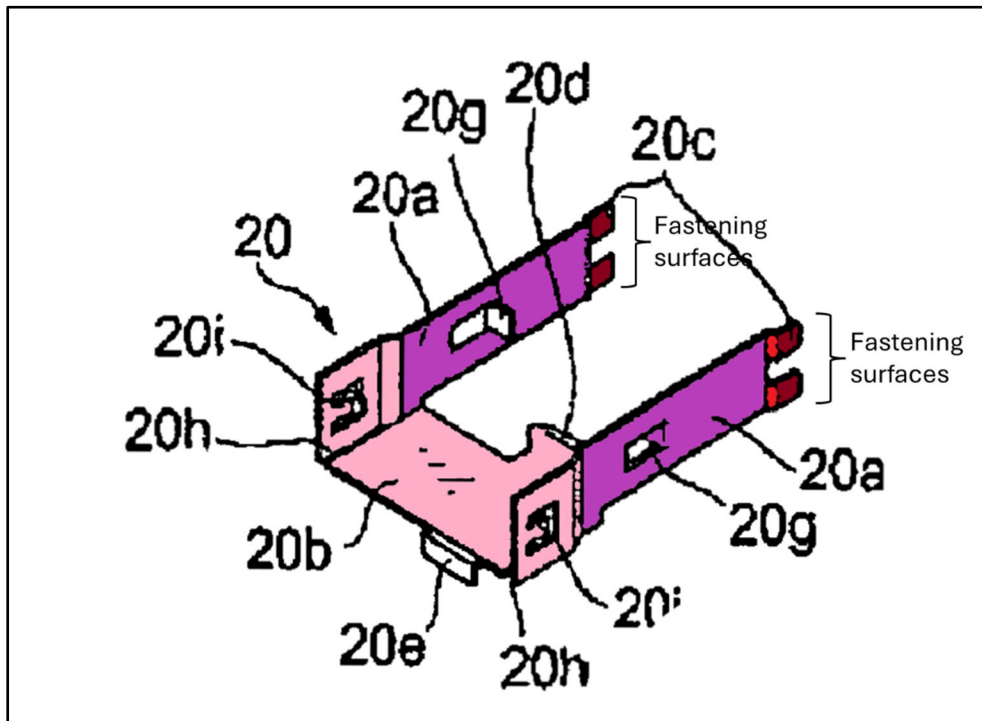
As further shown in Figure 7, above, two opposite **side surfaces 26a** are located at the sides of the head part and the inserted part, and the two **sliding slots 26i** extend from the head part towards the inserted part. Ex. 1003, ¶84.

As discussed regarding claim term 1[b][2], extending arms 20*a* of actuator 20 are slidably disposed on the sliding slots (grooves 26*i*) of the main body (upper body 26) to have a fastening position and releasing position. Ex. 1004, 1:64-65, Figs. 7-9; *see also* Section VI.B.1.e. Specifically, extending arms 20*a* of the sliding component slide along sliding slot 26*i* to have a **fastening position** “when actuator 20 is pushed therein,” as shown in Figure 8, and a **releasing position** when “the actuator 20 is pulled out,” as shown in Figure 9. Ex. 1003, ¶86. Because the sliding component (actuator 20) is pulled back towards the head part to release/disengage the optical module from cage 4, the fastening position of the sliding component is farther away from the head part compared to the releasing position (which is closer to the head part because the sliding component is pulled back to release it from the slot/socket). *Id.*

3. Claim 3

Mizue discloses that each forked slab 20*c* (second fastening part) has a fastening surface having two sides (shown in red and maroon). Ex. 1004, Fig. 7. Because each forked slab 20*c* is “bent toward the outer side of the optical module” (*id.*, 5:54-60, Fig. 7), **one side** (shown in red) is closer to the side surface 26*a* of the main body than **the other side** (shown in maroon). Moreover, a distance between the side closer to the side surface and the head part is less than a distance between

the other side (that is farther away from the side surface) and the head part. Ex. 1004, 5:54-60, Fig. 7; Ex. 1003, ¶87.



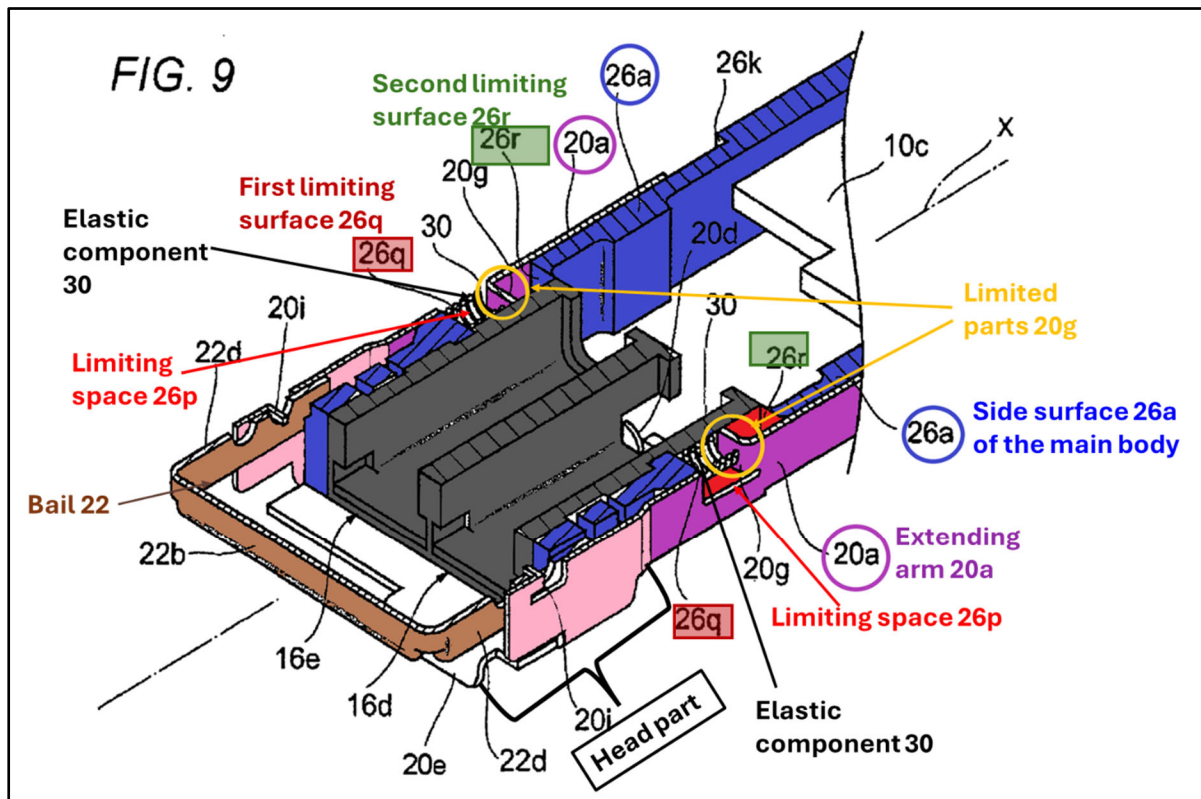
Ex. 1004, Fig. 7 (excerpted and annotated to show that each second fastening part 20c has two surfaces: one closer to the side surface (of the main body) and the head part and another farther away from the side surface and the head part)

4. Claim 4

The head part of optical module 1a houses receptacle body 16 having optical receptacles 16d and 16e, which are optical fiber terminals. Ex. 1004, Figs. 8, 9; Ex. 1003, ¶88. Terminals 16d and 16e receive an optical connector 24. Ex. 1004, Fig. 7.

5. Claim 5

As discussed regarding claim term 1[c] (Section VI.B.1.h), Mizue discloses an elastic component 30 disposed in a limiting space 26*p* between a first limiting surface 26*q* and a limited part 20*g*. As shown in Figures 7-9 of Mizue, there are two limiting spaces 26*p* on the two side surfaces of optical module 1*a* and there are two elastic components 30, each disposed in a respective limiting space 26*p* on each side of the module, between a respective limited part 20*g* and a first limiting surface 26*q*. Ex. 1004, Figs. 7-9. A POSITA would also have understood that each limiting space 26*p* is formed by a first limiting surface 26*q* and a second limiting surface 26*r*, as shown below. Ex. 1003, ¶89. That is, there are two first limiting surfaces and two second limiting surfaces, with the two first limiting surfaces being closer to the head part than the two second limiting surfaces. *Id.*; Section VI.B.1.h.



Ex. 1004, Fig. 9 (annotations added)

6. Claim 6

Mizue's optical module 1a includes a pull handle (bail 22) that is pivoted on the linkage arm (20b and 20h) of the sliding component (actuator 20). Ex. 1004, 7:63-67, Figs. 7-9. Specifically, bail 22 is pivoted “by the projection 20i [in the linkage arm] being inserted in the hole 22e in the arm 22d” of the bail. *Id.*, 7:20-26. “[W]hen the actuator 20 is in the first position at which the optical module 1a is latched to the cage 4, the bail 22 is set in one of the upward and the downward position relative to the optical module 1a.” *Id.*, 7:66-67.

7. Independent claim 7

Mizue discloses each and every limitation of claim 7.

a. Claim 7[preamble]

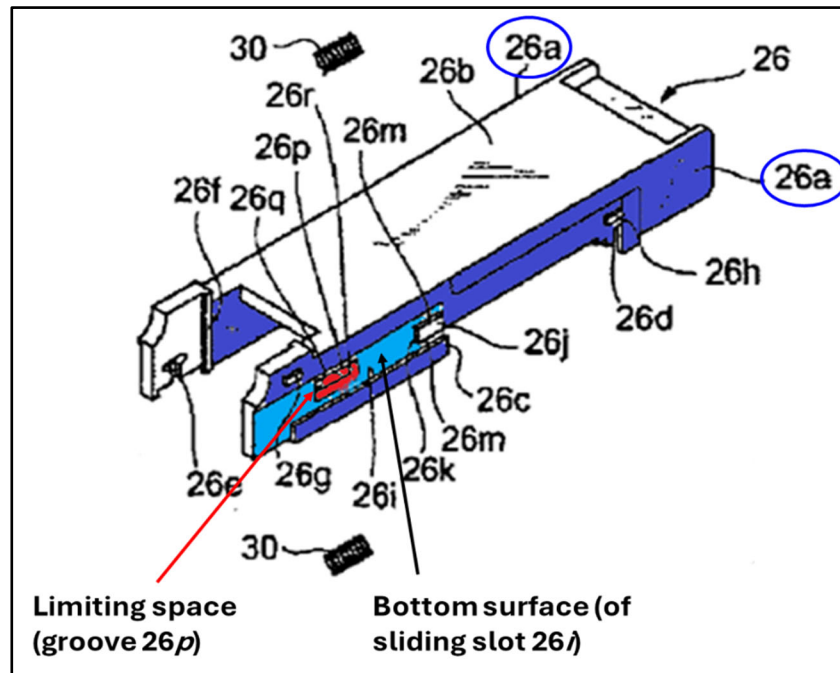
As discussed regarding claim 1, Mizue discloses a pluggable optical transceiver module. *See* Section VI.B.1.a. Specifically, Mizue discloses an optical module 1 (and versions 1*a*, 1*b* thereof) that are plugged into a cage 4 (plugging slot of a socket) installed on a host board 2. *Id.* As further discussed regarding claim 1, a POSITA would have “at once envisage[d]” from Mizue’s disclosure that optical module 1*a* plugs into a cage 4 in the same manner as optical module 1. *Id.*; *Kennametal*, 780 F.3d at 1381; Ex. 1003, ¶91.

b. Claim term 7[a][1]

As discussed regarding claim term 1[a][1], Mizue’s optical module 1*a* (pluggable optical transceiver module) has an upper body 26 that serves as the main body of the optical module. *See* Section VI.B.1.b. As shown in Figure 7, below, upper body 26 (main body) has a head part and an inserted part that are connected to each other. *See also* Section VI.B.2.

c. Claim term 7[a][2]

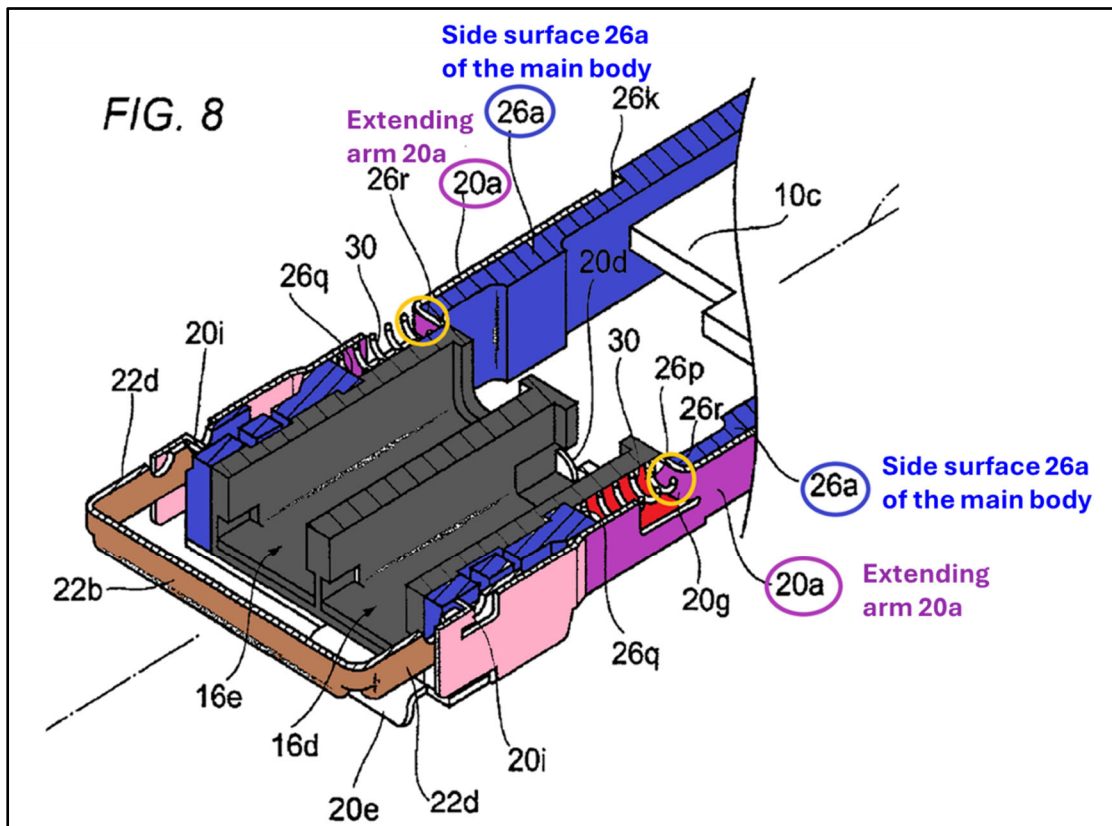
Main body (upper body 26) includes two **grooves 26p (limiting spaces)** formed within each **groove 26i (sliding slot)** of each **side surface (sidewall 26a)**. Ex. 1004, Fig. 7; *see* Section VI.B.1.c. Furthermore, each sliding slot 26i has a bottom surface that forms the sliding slot; the two bottom surfaces of the two sliding slots are parallel to the side surfaces 26a; and a limiting space 26p is located in a respective side surface. *See* Section VI.B.1.c.



Ex. 1004, excerpt of Fig. 7 (annotation added)

d. Claim term 7[b][1]

As discussed regarding claim term 1[b][1], optical module 1a includes an actuator 20 (sliding component) comprising two extending arms 20a and a linkage arm formed by a center portion 20b and front side walls 20h, and wherein the linkage



Ex. 1004, Fig. 8 (annotations added) (showing **main body (upper body 26)** is disposed between **extending arms 20a** of actuator 20)

e. Claim term 7[b][2]

As discussed with claim term 1[b][2], extending arms 20a of actuator 20 are slidably disposed on the sliding slots (grooves 26i) of the main body (upper body 26) to have a fastening position (when actuator 20 is pushed in) and a releasing position (when actuator 20 is pulled out). *See* Section VI.B.1.e; Ex. 1004, Figs. 8, 9 (showing the fastening and releasing positions of extending arms 20a, respectively). As further discussed regarding claim 2, because the sliding component (actuator 20) is pulled back towards the head part to release/disengage the optical module from

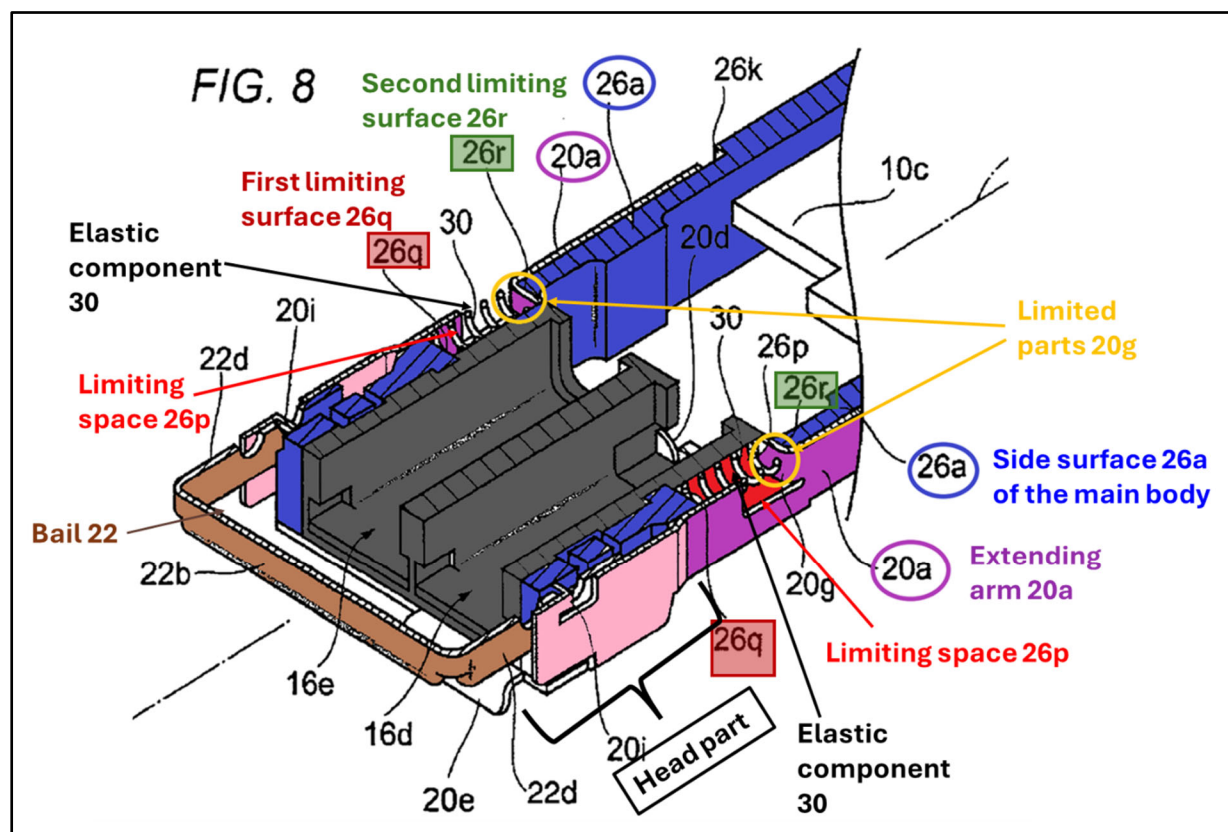
cage 4, the fastening position is farther away from the head part compared to the releasing position (which is closer to the head part because the sliding component is pulled back to release it from the slot/socket). *See* Section VI.B.2.

f. Claim term 7[b][3]

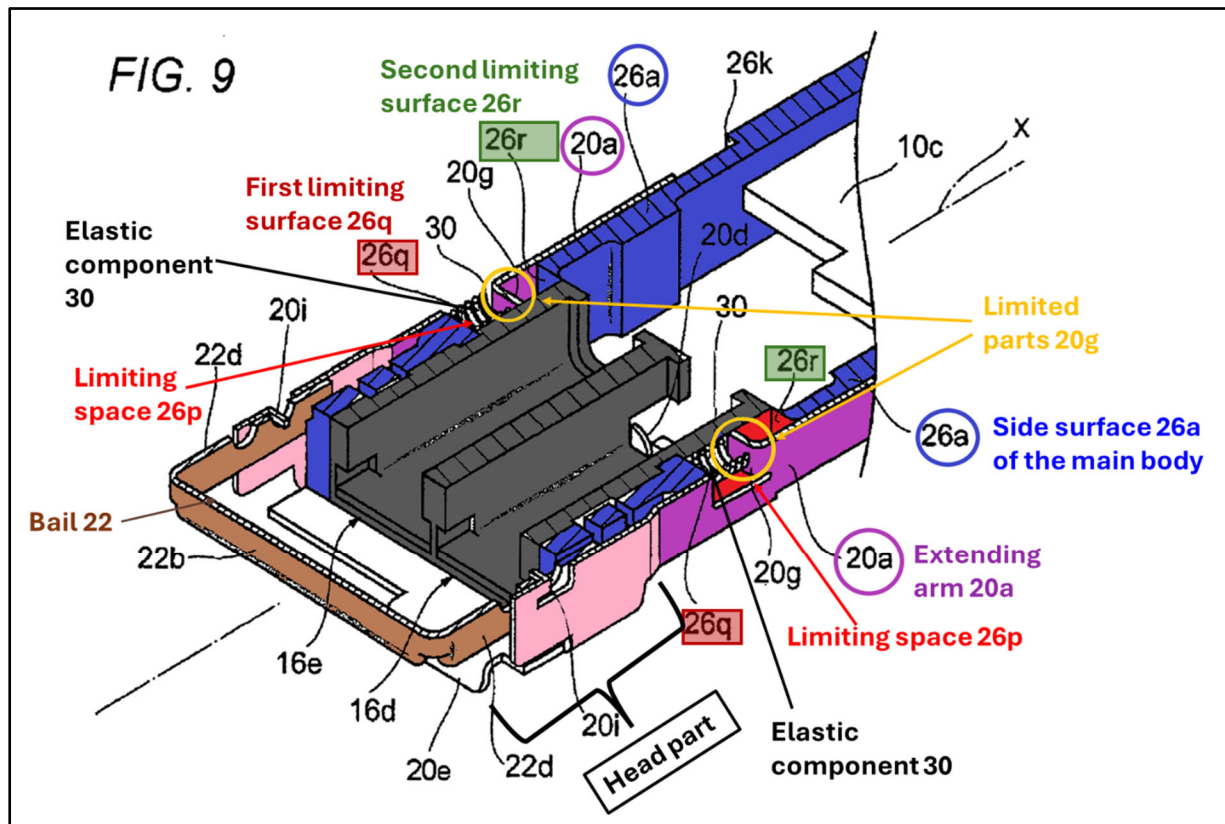
Claim term 7[b][3] is same as claim term 1[b][4]. As discussed regarding claim term 1[b][4], each extending arm 20*a* has a flange 20*g* (limited part) that is configured to move in a respective groove 26*p* (limiting space) when actuator 20 (sliding slot) goes from the fastening to the releasing position. *See* Section VI.B.1.g.

g. Claim term 7[c]

Claim term 7[c] is same as claim term 1[c]. As discussed regarding claim term 1[c], optical module 1*a* includes two elastic components (springs 30) that are housed in respective grooves 26*p* (limiting spaces) formed by a pair of limiting surfaces 26*q* and 26*r*. *See* Section VI.B.1.h. As further shown in Figures 8 and 9, below, first limiting surface 26*q* is closer to the head part than the second limiting surface 26*r*, and each elastic component 30 is located between the first limiting surface 26*q* and the limited part (flange 20*g*). *See id.*



Ex. 1004, Fig. 8 (annotations added)



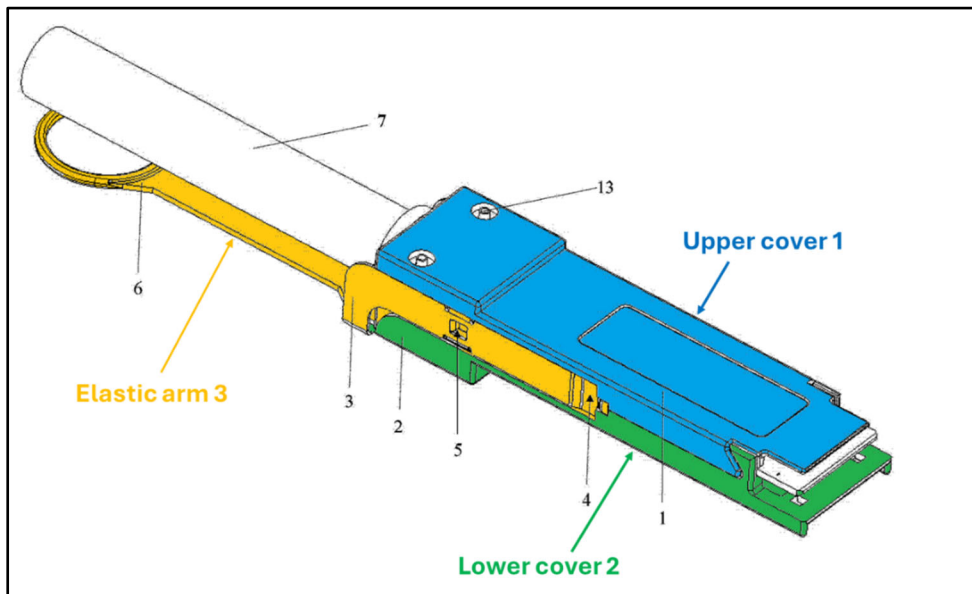
Ex. 1004, Fig. 9 (annotations added)

Furthermore, Figure 8 shows that each elastic component 30 is covered partially by extending arm 20a when the actuator is in the fastening position. Ex. 1003, ¶100. As such, each elastic component 30 is confined, i.e., restricted or limited, in all directions along the X-axis by side surface 26a of main body 26 and by extending arm 20a of actuator 20 in a direction perpendicular to the X-axis when optical module 1a is latched into cage 4. *Id.*; see also Section VI.B.1.h.

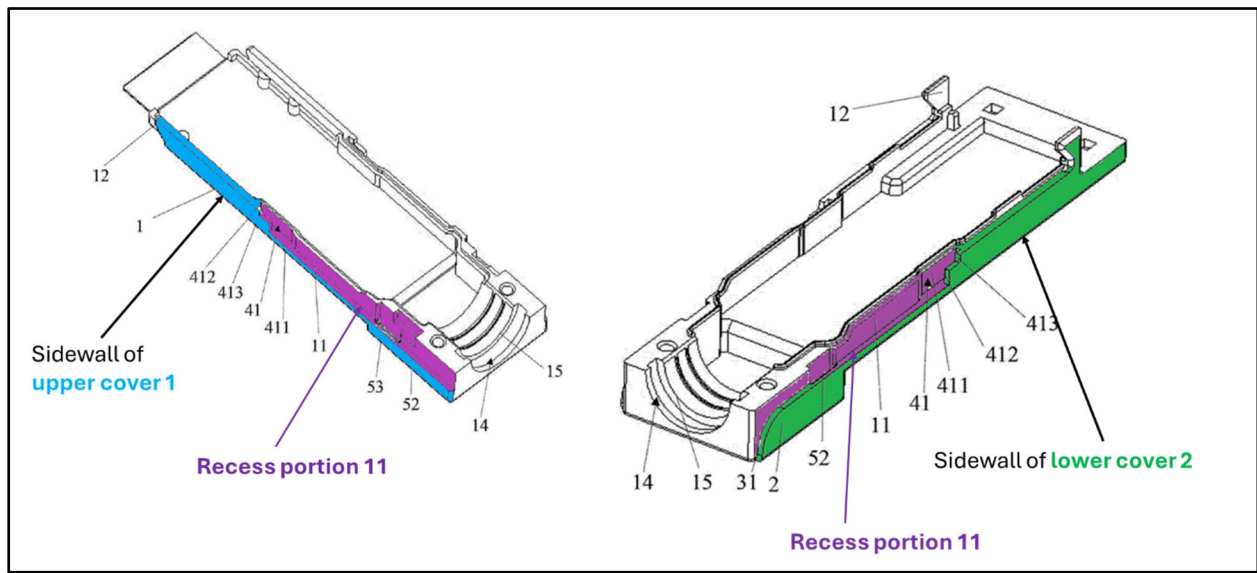
VII. GROUNDS 2 AND 3 BASED ON LI

A. Li (Ex. 1005)

Li discloses a QSFP module interface device that is capable of “conveniently and effectively achieving hot plugging.” Ex. 1005, Abstract, ¶¶[0002], [0003], Figs. 1, 2. Li’s QSFP module interface device includes “an upper cover 1, a lower cover 2, and elastic arms 3,” as shown in Figure 1 (annotated below). *Id.*, ¶[0022], Figs. 1, 2. “Two opposite sides of the upper cover 1 are connected to the lower cover 2 at connecting positions, and the connecting positions have first recess portions 11 recessed thereon.” *Id.*, ¶[0022], Figs. 1, 2, 4, 5. “The elastic arm 3 is engaged with the first recess portion 11 and capable of sliding along a track formed by the first recess portion 11.” *Id.*, ¶[0022].



Ex. 1005, Fig. 1 (annotations added) (showing the QSFP module interface device)

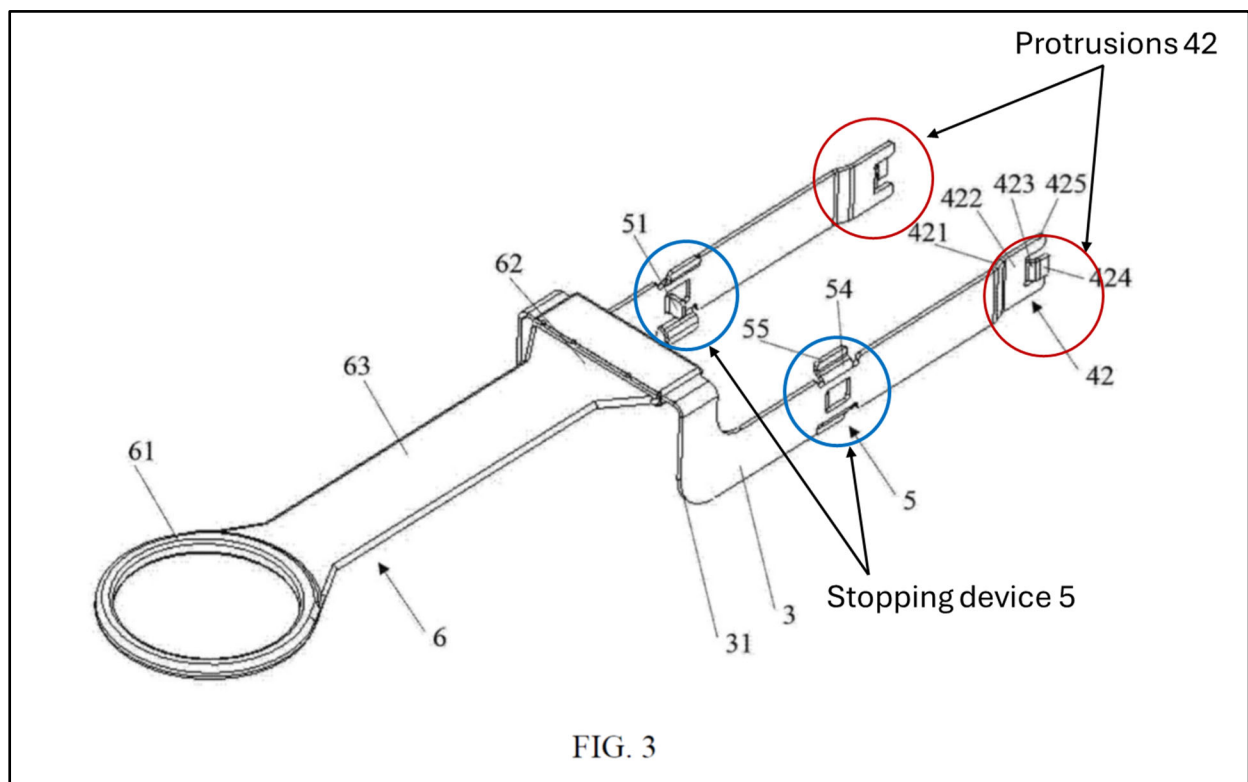


Ex. 1005, Figs. 4 and 5 (annotations added) (showing **recess portion 11** on the side walls of **upper cover 1** and **lower cover 2**)

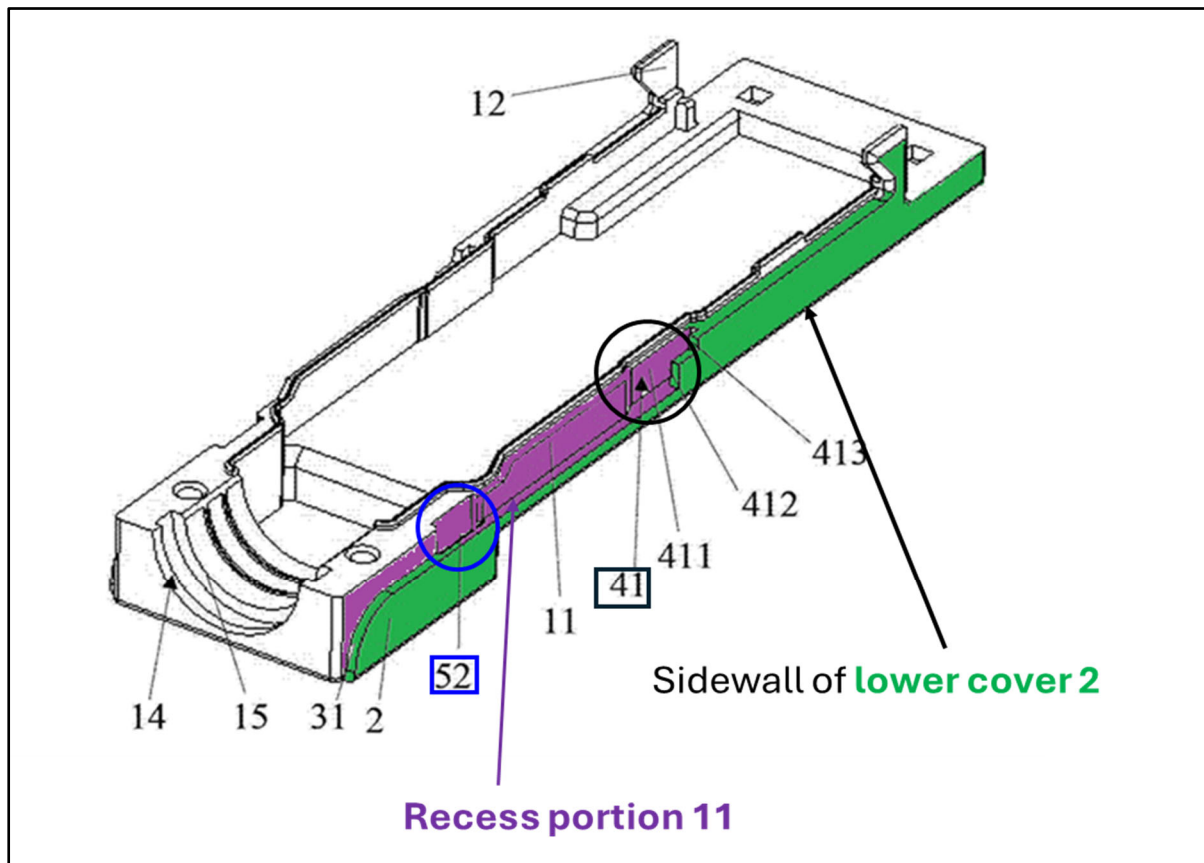
Li's QSFP module interface device includes an "unlocking device 4," which is "provided between the elastic arm 3 and the first recess portion 11. The unlocking device 4 includes a second recess portion 41 recessed within the first recess portion 11 and a protrusion 42 disposed on the elastic arm 3, and the second recess portion 41 and the protrusion 42 engage with each other." *Id.*, ¶[0023], Figs. 4, 5 (showing second recess portion 41 within the first recess portion 11). When "pulling ring 6 connected to the elastic arm 3" is pulled, "the elastic arm 3 can be driven to slide along the first recess portion 11, enabling the unlocking device 4 to achieve the unlocking operation" by disengaging protrusion 42 from the second recess portion 41. *Id.*, ¶¶[0023], [0028]. Meanwhile, second bent portion 423 of protrusion 42 "pushes away an elastic piece connected to a slot module," where the QSFP module

interface device is plugged in, thus “allowing the QSFP module interface device to be smoothly unplugged.” *Id.*, ¶[0023].

The QSFP module interface device further includes a stopping device 5, which includes, among other things, “a stopping member 51 vertically disposed on the elastic arm 3 and a third recess portion 52 recessed within the first recess portion 11.” *Id.*, ¶¶[0024], [0025], Figs. 4, 5 (showing third recess portion 52 within first recess portion 11). Stopping member 51 is configured to engage with third recess portion 52. *Id.*



Ex. 1005, Fig. 3 (showing protrusions 42 and stopping devices 5 on elastic arm 3)



Ex. 1005, Fig. 5 (annotations added) (showing **first recess portion 41** and **third recess portion 52** within the first recess portion 11)

Stopping device 5 further includes “a return spring device (not shown), which is connected between the stopping member 51 and the third recess portion 52.” Ex. 1005, ¶[0027]. The spring has “one end abutting against the stopping member 51 and the other end abutting against the side end of the third recess portion 52 opposite to the stopping member 51.” *Id.* After the QSFP module interface device is unlocked from the slot module, “the elastic arm 3 has a rebound force under the action of the spring. Driven by the rebound force, the elastic arm 3 slides back along the first

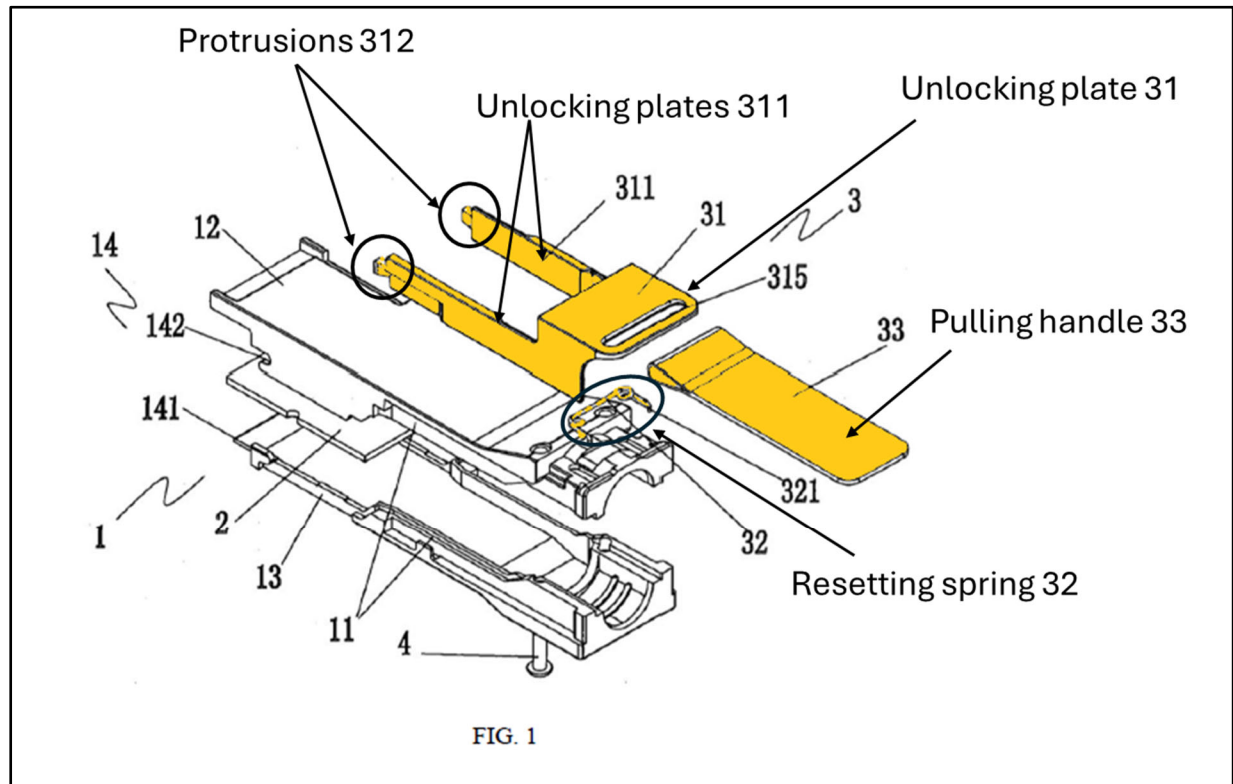
recess portion 11, and the protrusion 42 and the second recess portion 41 return to their engaged state, thereby achieving the reset of the QSFP module interface device.” *Id.*

B. Liu (Ex. 1006)

Liu discloses a QSFP interface module structure, comprising “a module housing and a PCB board installed inside the module housing.” Ex. 1006, Abstract, ¶[0006]. The module housing includes “a locking mechanism installed thereon to lock the module housing to an external interface. The locking mechanism includes an unlocking member and a resetting spring installed between the unlocking member and the module housing.” *Id.*

Specifically, the QSFP interface module structure includes “a housing 1 composed of an upper shell 12 and a lower shell 13, a PCB board 2 installed inside the housing 1, and a locking mechanism 3 installed on the housing 1 to facilitate quick plugging and unplugging of the entire module.” *Id.*, ¶[0017]. “[T]he locking mechanism 3 includes an unlocking member 31 and a resetting spring 32 installed between the unlocking member 31 and the housing 1. The front section of the unlocking member 31 includes two unlocking plates 311 located on two sides of the housing 1. The outer sides of the ends of the two unlocking plates 311 are provided with unlocking protrusions 312. ... The rear end of the unlocking member 31 is

connected to a pulling handle 33.” *Id.*, ¶[0019]. The “two sides of housing 1 are provided with grooves 11 to accommodate the unlocking plates 311.” *Id.*



Ex. 1006, Fig. 1 (annotations added) (showing components of Liu’s locking mechanism 3)

“When the present module is plugged into a corresponding socket of a connector, locking members pre-configured in the socket engage with the protrusions 312 on the outer walls of the two unlocking plates 311. When the present module needs to be unplugged, the pulling handle 33 can be simply pulled outward, so that the unlocking member 31 is pulled by the pulling handle 33 to move outward. Meanwhile, the protrusion 312 and the inclined surface 313 on the unlocking plate

311 push the locking member of the socket out, so that the module can be smoothly unplugged.” *Id.*, ¶[0020].

C. Li in View of Liu Renders Claims 1-6 Obvious

1. A POSITA would have been motivated to combine the teachings of Li and Liu, and would have reasonably expected success in doing so

Li and Liu are both in the same field of QSFP module interface devices, and therefore, a POSITA would have considered them together when designing or developing a pluggable transceiver module for hot-plugging into a host device. Ex. 1003, ¶101. The QSFP module interface devices of Li and Liu have similar structures, each having a sliding component with two extending arms that slide along grooves provided on the sidewalls of the main housing. Ex. 1005, ¶[0022]; Ex. 1006, ¶¶[0017], [0019]. Both QSFP module interface devices also include similar locking mechanisms, each having fastening components on the extending arms that engage with corresponding fastening components on a plugging socket. Ex. 1005, ¶¶[0023], [0028], Fig. 3; Ex. 1006, ¶¶[0017], [0019], [0020], Fig. 1. Moreover, the QSFP module interface devices of Li and Liu include resetting mechanisms comprising spring devices that reset the QSFP module interface device after it is unlocked from the plugging socket. Ex. 1005, ¶[0027]; Ex. 1006, ¶[0019].

Given the similarities between Li’s and Liu’s QSFP module interface devices, a POSITA would have readily understood the design compatibility between them,

and thus would have been motivated to consider them together to design an improved hot-pluggable transceiver module that is practical, durable, has an effective and reliable locking/unlocking mechanism, and “has a simple structure and is easy to assemble, compact in size, lightweight, reliable in operation, and capable of conveniently and effectively achieving hot plugging.” Ex. 1005, ¶[0029]; *see also* Ex. 1006, ¶¶[0004], [0005], [0007] (discussing improvement in the locking mechanism and being “structurally stable” and “easy to plug and unplug”), Abstract (discussing that the disclosed design provides a “simpler structure” and “enable[s] quick plugging and unplugging operations with reliable and stable performance and strong practicality.”); Ex. 1003, ¶102. Because of the similarities in design, purpose, and functionality between Li’s and Liu’s QSFP modules, a POSITA would also have reasonably expected success in using the teachings of Li and Liu together. *Id.* Indeed, combining Li and Liu would have required nothing more than the basic knowledge and skills of a POSITA, and a POSITA would have been able to make the combination with little to no experimentation. *Id.*

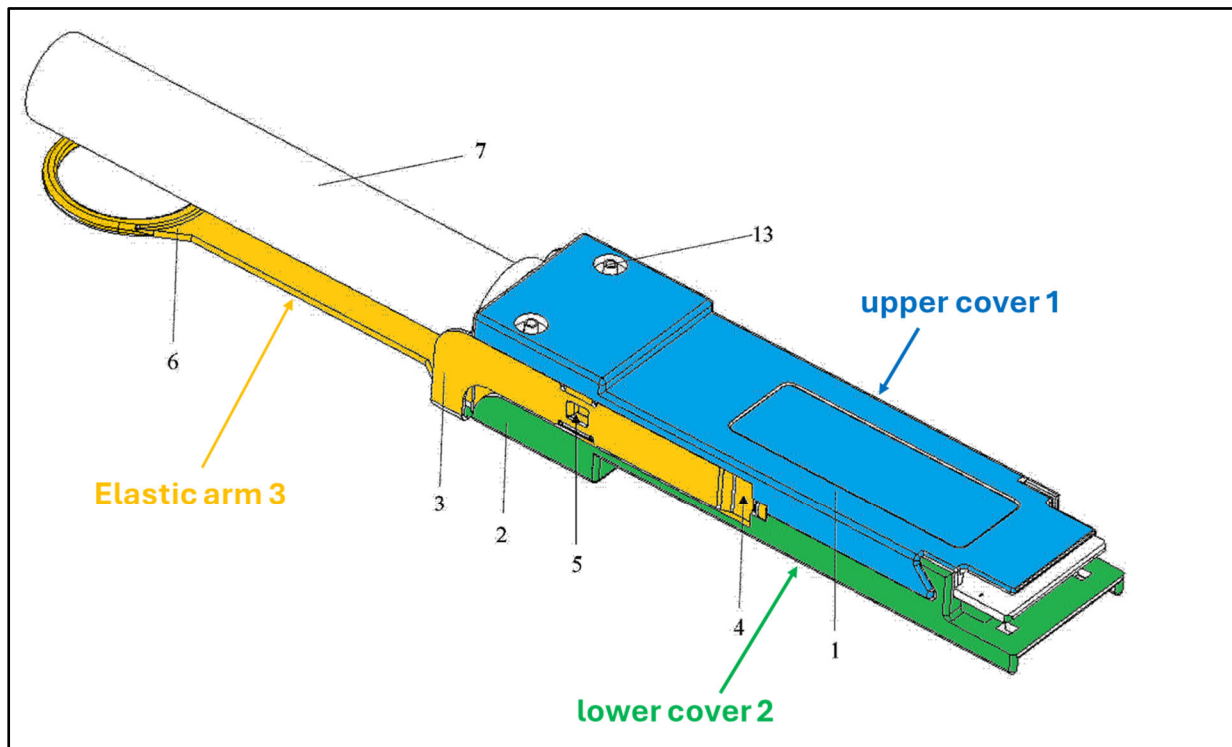
2. Independent claim 1

Li in view of Liu discloses every limitation of claim 1.

a. 1[preamble]

Li discloses a QSFP module interface device (pluggable optical transceiver module) capable of hot plugging. Ex. 1005, Abstract, ¶¶[0002], [0003], Fig. 1. Li

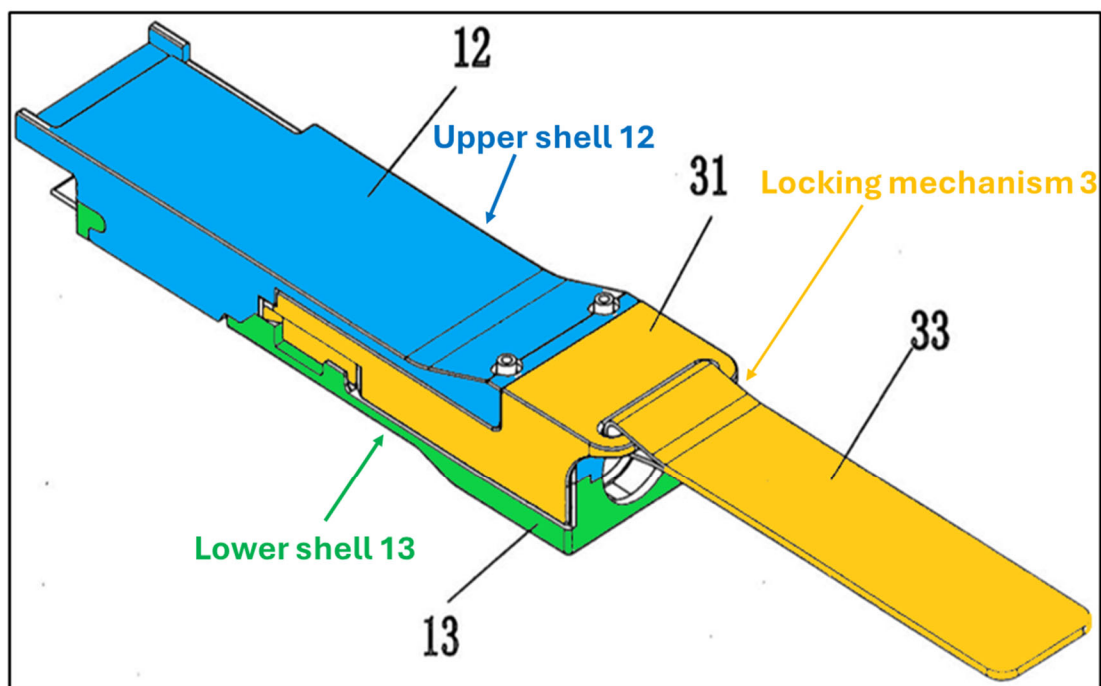
discloses that the module is capable of plugging into a slot module (socket) having a plugging slot/space, which contains elastic pieces (first fastening parts) connected to the slot module that allow the QSFP module interface device to be smoothly plugged in and out of the slot module. *Id.*, ¶[0023] (discussing “an elastic piece connected to a slot module (not shown) of the QSFP module interface device, allowing the QSFP module interface device to be smoothly unplugged.”); Ex. 1003, ¶104.



Ex. 1005, Fig. 1 (annotations added) (showing a QSFP module interface device comprising an **upper cover 1**, a **lower cover 2**, and an **elastic arm 3**)

Similarly, Liu discloses a QSFP module interface (pluggable optical transceiver module) that includes “a simpler structure to make plugging and

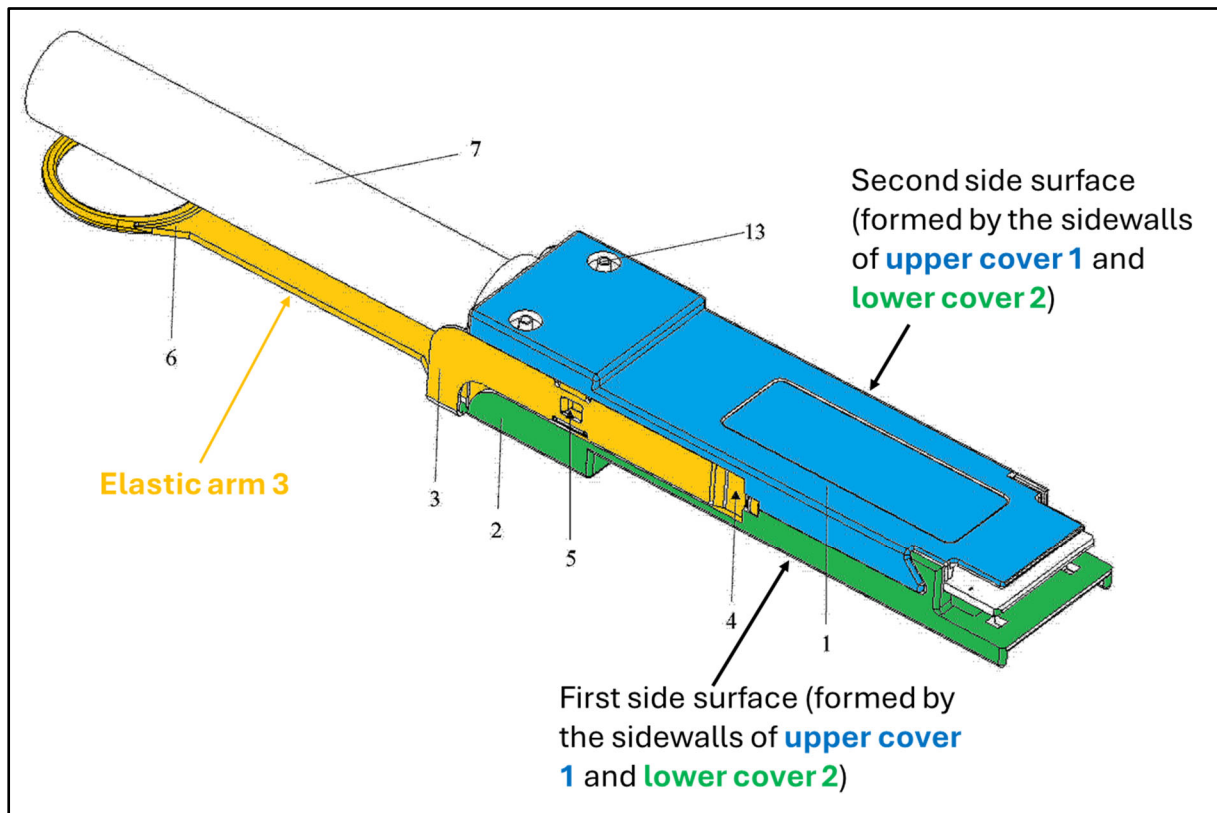
unplugging operations more convenient and enable quick plugging and unplugging operations with reliable and stable performance and strong practicality.” Ex. 1006, Abstract, ¶[0002], ¶[0006], Figs. 1 and 4. Additionally, Liu discloses that the module is capable of plugging into a socket, which contains pre-configured locking members (first fastening parts) that engage with features on the QSFP interface module device and enable the QSFP module interface device to be smoothly plugged in and out of the socket. *Id.*, ¶[0020].



Ex. 1006, Fig. 4 (annotations added) (showing a QSFP interface module formed by an **upper shell 12** and a **lower shell 13**, and comprising a **locking mechanism 3**)

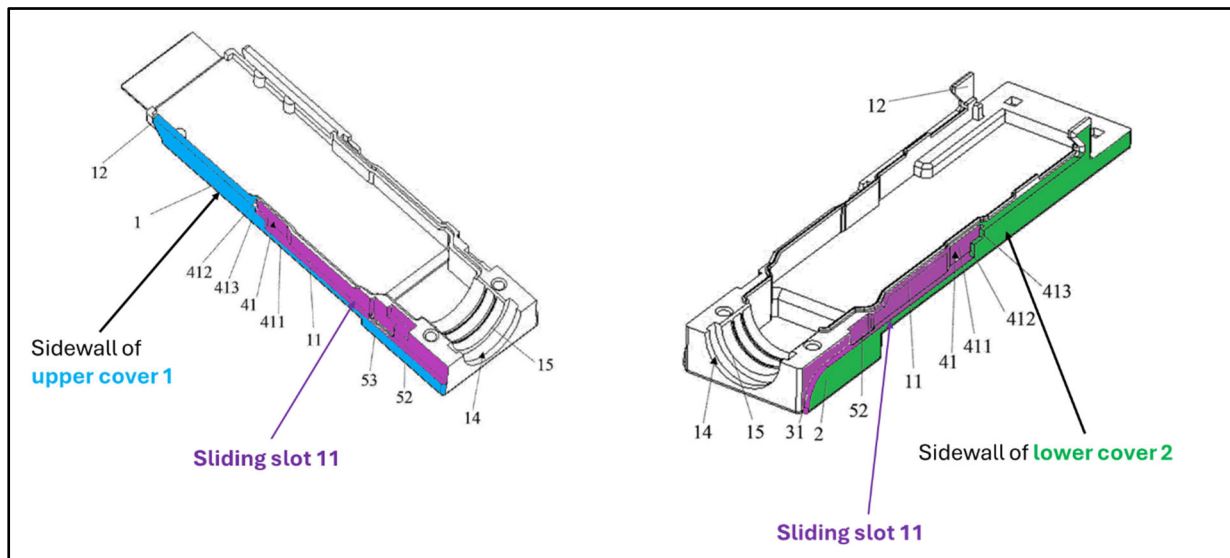
b. Claim term 1[a][1]

Li discloses a QSFP module interface device “including: an upper cover 1, a lower cover 2, and elastic arms 3.” Ex. 1005, ¶[0022]. Upper cover 1 and lower cover 2 together form the main body of the QSFP module interface device. “Two opposite sides of the upper cover 1 are connected to the lower cover 2 at connecting positions, and the connecting positions have first recess portions 11 recessed thereon.” *Id.*; *see also id.*, Figs. 1, 4, 5. As shown in Figure 1 (annotated below), the main body includes two side surfaces, wherein each side surface is formed by a sidewall of upper cover 1 and a sidewall of lower cover 2 that interlock with each other. As a POSITA would have understood, the two side surfaces would be opposite to each other. Ex. 1003, ¶106.



Ex. 1005, Fig. 1 (annotations added) (showing the main body having two side surfaces that are opposite to each other)

Each side surface of Li's QSFP module interface device includes a sliding slot formed by first recess portion 11 on the sidewalls of upper cover 1 and lower cover 2. Ex. 1005, ¶[0022]. That is, the QSFP module interface device includes two sliding slots, one on each side surface of the main body, and each slot is formed by first recess portion 11. *Id.* "The elastic arm 3 is engaged with the first recess portion 11 and capable of **sliding along a track formed by the first recess portion 11.**" *Id.* (emphasis added); *see also id.* Figs. 4, 5.



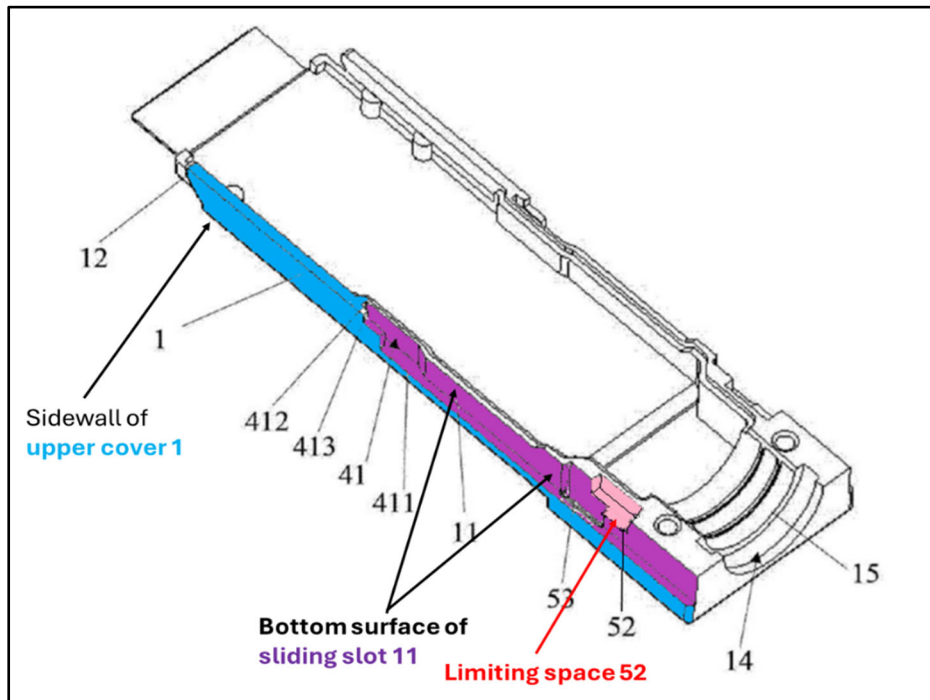
Ex. 1005, Figs. 4 and 5 (annotations added) (showing a **sliding slot** (formed by recess portion 11) on side surfaces of the **upper cover 1** and the **lower cover 2**, which are connected to form the main body)

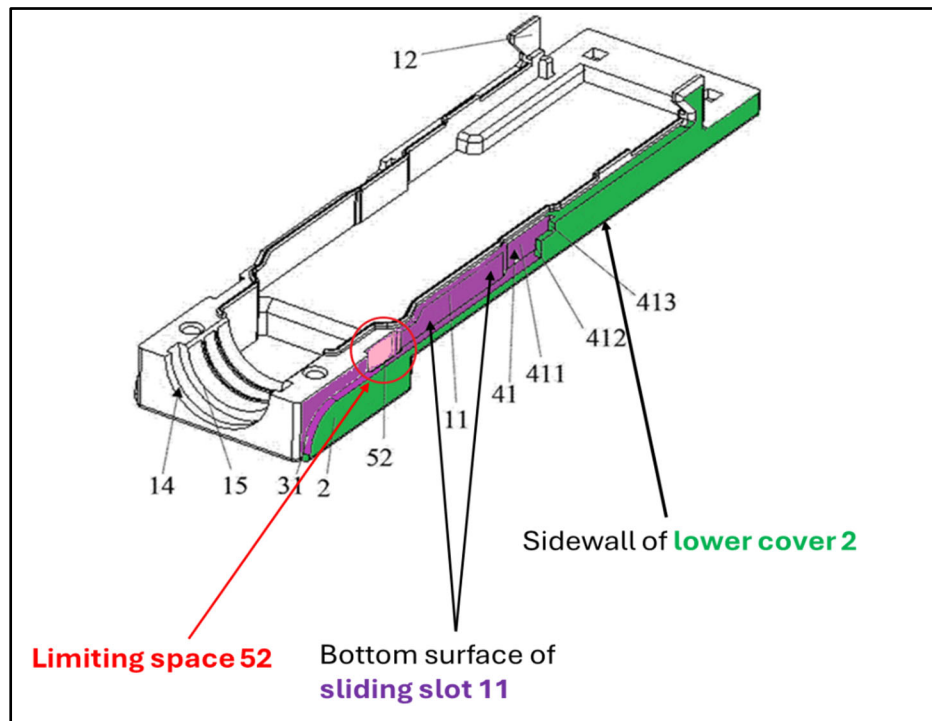
Li's QSFP module interface device is described as capable of "hot plugging." Ex. 1005, Abstract, ¶¶[0002], [0003]. Additionally, Li discloses that the QSFP module is configured to plug into a slot module (socket). *Id.*, ¶[0023]. It would have been obvious to a POSITA that at least a portion of the main body of the QSFP module interface device is configured to be inserted into the plugging slot, i.e., space, in the socket. Ex. 1003, ¶108; *see also* Ex. 1005, Abstract, ¶¶[0002], [0023], [0029].

c. Claim term 1[a][2]

Each sliding slot (first recess portion 11) on each side surface of Li's QSFP module interface device includes a limiting space (third recess portion 52) and a bottom surface forming the sliding slot. Ex. 1005, ¶[0025] (discussing that "a third

recess portion 52 [is] recessed within the first recess portion 11”), Figs. 4, 5. The bottom surface of each sliding slot is parallel to the adjacent side surface, and each third recess portion (limiting space) 52 is located at a side surface. *Id.*

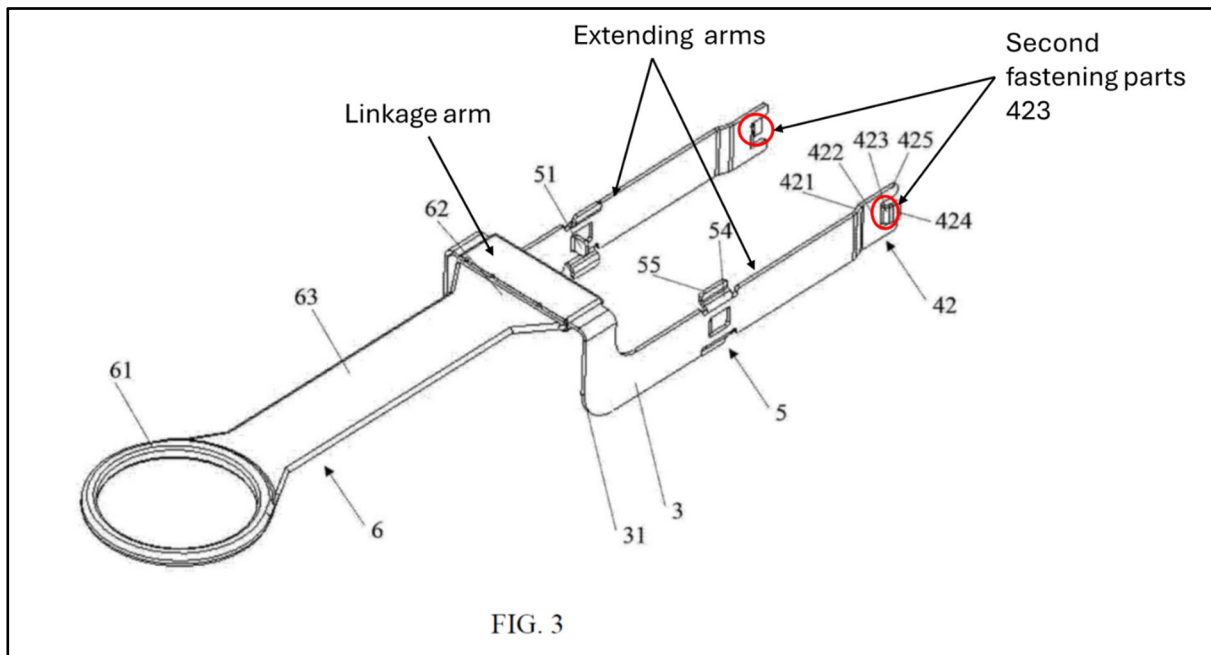




Ex. 1005, Figs. 4 and 5 (annotations added) (showing that the bottom surface of each **sliding slot 11** is parallel to the adjacent side surface, and that each **limiting space 52** is located at a side surface)

d. Claim term 1[b][1]

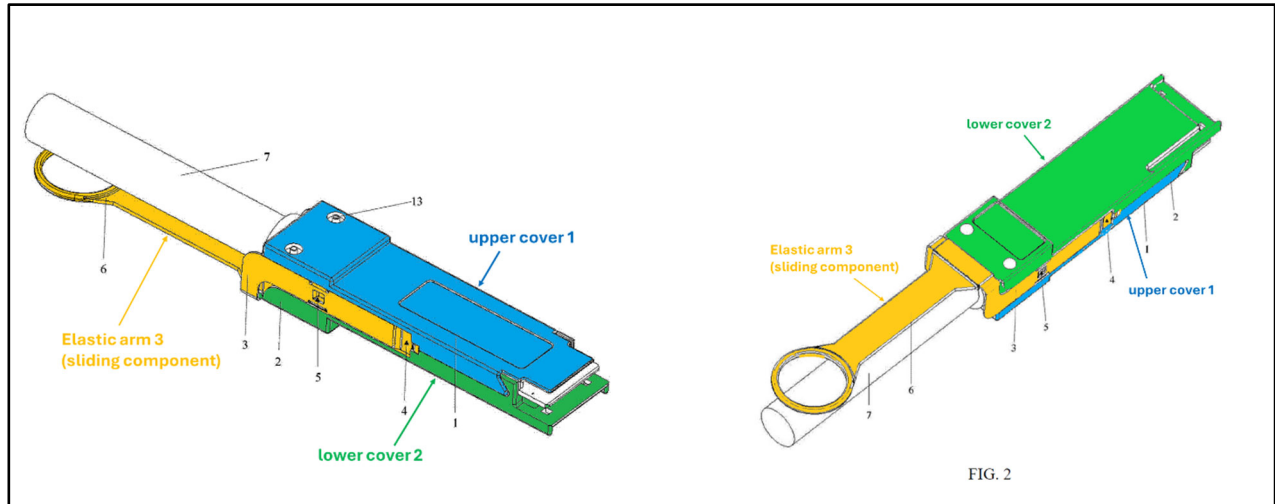
Li's QSFP module interface device includes an elastic arm 3 (a sliding component) comprising a linkage arm and two extending arms. Ex. 1005, Figs. 1-3. As shown in Figure 3, annotated below, two ends of the linkage arm are connected to the two extending arms, such that the linkage arm is disposed between the two extending arms. *Id.*



Ex. 1005, Fig. 3 (annotations added) (showing Li's sliding component (elastic arm 3) having two extending arms and a linkage arm, and a fastening part (part 423 of protrusion 42) provided at the end of each extending arm)

Each extending arm of the sliding component (elastic arm 3) includes a protrusion 42 provided at the end that is farthest away from the linkage arm. Ex. 1005, Fig. 3. Li further describes that “protrusion 42 [is] disposed on the elastic arm 3, and the second recess portion 41 [provided on the sliding slot] and the protrusion 42 engage with each other. **The protrusion 42 is provided at the end of the elastic arm 3** and includes ... **a second bent portion 423** connected to the parallel portion 422[.]” *Id.*, ¶[0023] (emphases added). Li further discloses that at least **second bent portion 423** (second fastening part) engages with elastic parts on the slot module to lock the QSFP module interface device to the slot. *See id.*

As shown in Figures 1 and 2 of Li, the main body (formed by upper cover 1 and lower cover 2) is disposed between the two extending arms of the sliding component (elastic arm 3).



Ex. 1005, Figs. 1 and 2 (annotations added) (showing the main body of Li's QSFP module interface device disposed between the two extending arms of sliding component 3)

e. Claim term 1[b][2]

Li discloses that each extending arm of the sliding component (elastic arm 3) is slidably disposed on a sliding slot (first recess portion 11) provided on a side surface of the main body. Ex. 1005, ¶[0022] (“Two opposite sides of the upper cover 1 are connected to the lower cover 2 at connecting positions, and the connecting positions have first recess portions 11 recessed thereon. **The elastic arm 3 is**

engaged with the first recess portion 11 and capable of sliding along a track formed by the first recess portion 11.”) (emphasis added), Figs. 1, 2.

The extending arms of the sliding component (elastic arm 3) slide along the sliding slot to have a **fastening position** **when protrusions 42 of the extending arms are engaged with first recess portions 41** provided on the sliding slots (formed by recess portions 11) on the sides of the main body. Ex. 1005, ¶[0023]. Specifically, Li’s QSFP module interface device includes an unlocking device 4 which “includes a second recess portion 41 recessed within the first recess portion 11 and a protrusion 42 disposed on the elastic arm 3, and the second recess portion 41 and the protrusion 42 engage with each other” in the fastening position. *Id.*

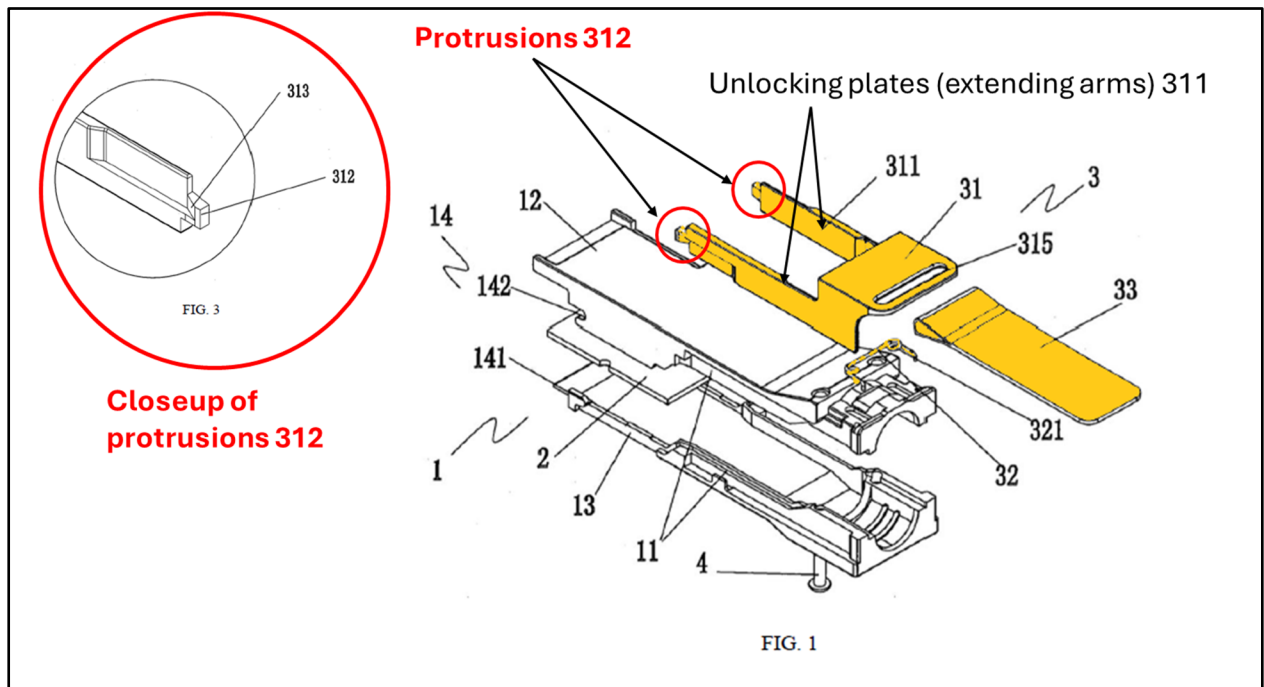
Similarly, when the sliding component (elastic arm 3) is pulled back, the unlocking device 4 is unlocked and elastic arm 3 slides backward “along the first recess portion 11 until it reaches the stopping device 5,” and therefore the sliding slot has a **releasing position**. Ex. 1005, ¶[0026]. In the releasing position, **the protrusions 42 of the extending arms are disengaged from the first recess portions 41** provided on the sliding slots. *Id.*, ¶[0023]. Specifically, “[w]hen the elastic arm 3 is pulled to slide along the first recess portion 11, the protrusion 42 disengages from the second recess portion 41 via the first bent portion 421 ... **the parallel portion 422 makes surface contact with the first recess portion 11 and slides along its track**, and the second bent portion 423 pushes away an elastic piece

connected to a slot module (not shown) of the QSFP module interface device, allowing the QSFP module interface device to be smoothly unplugged.” *Id.*, ¶[0023] (emphasis added).

f. Claim term 1[b][3]

Li discloses that when the sliding component (elastic arm 3) is pulled to unlock the QSFP module interface device, “the protrusion 42 disengages from the second recess portion 41,” the extending arms slide back along the tracks of first recess portion 11, and “**the second bent portion 423 pushes away an elastic piece connected to a slot module** (not shown) of the QSFP module interface device, allowing the QSFP module interface device to be smoothly unplugged.” Ex. 1005, ¶[0023] (emphasis added). Accordingly, a POSITA would have understood that in the fastening position of the sliding component (elastic arm 3), the elastic piece on each side of the slot module (first fastening part) engages with or fastens to the second bent portion 423 (second fastening part) of protrusion 42, which is a standard practice in the industry. Ex. 1003, ¶116. And when the sliding component is pulled and it slides backward along the sliding slot (first recess portion 11) to achieve a releasing position, the two second fastening parts (bent portion 423) of elastic arm 3 press the two first fastening parts (elastic pieces), such that the first fastening parts are pushed farther away from each other. *Id.*; Ex. 1005, ¶[0023].

Liu discloses a similar method of locking/unlocking between a QSFP interface module and a socket. Specifically, Liu teaches that when the QSFP interface module is “plugged into a corresponding socket of a connector, **locking members pre-configured in the socket engage with the protrusions 312 on the outer walls of the two unlocking plates 311 [extending arms]**” to fasten the module to the socket. Ex. 1006, ¶[0020] (emphasis added), Figs. 1, 3. When the QSFP module needs to be unplugged, “the pulling handle 33 can be simply pulled outward, so that the unlocking member 31 is pulled by the pulling handle 33 to move outward. Meanwhile, **the protrusion 312 and the inclined surface 313 on the unlocking plate 311 push the locking member of the socket out,**” so that the module is released from the socket and “can be smoothly unplugged.” *Id.* (emphasis added).



Ex. 1006, Figs. 1 and 3 (annotations added) (showing protrusions 312 on unlocking plates 311 of Liu's QSFP module that engage with locking members on a corresponding socket)

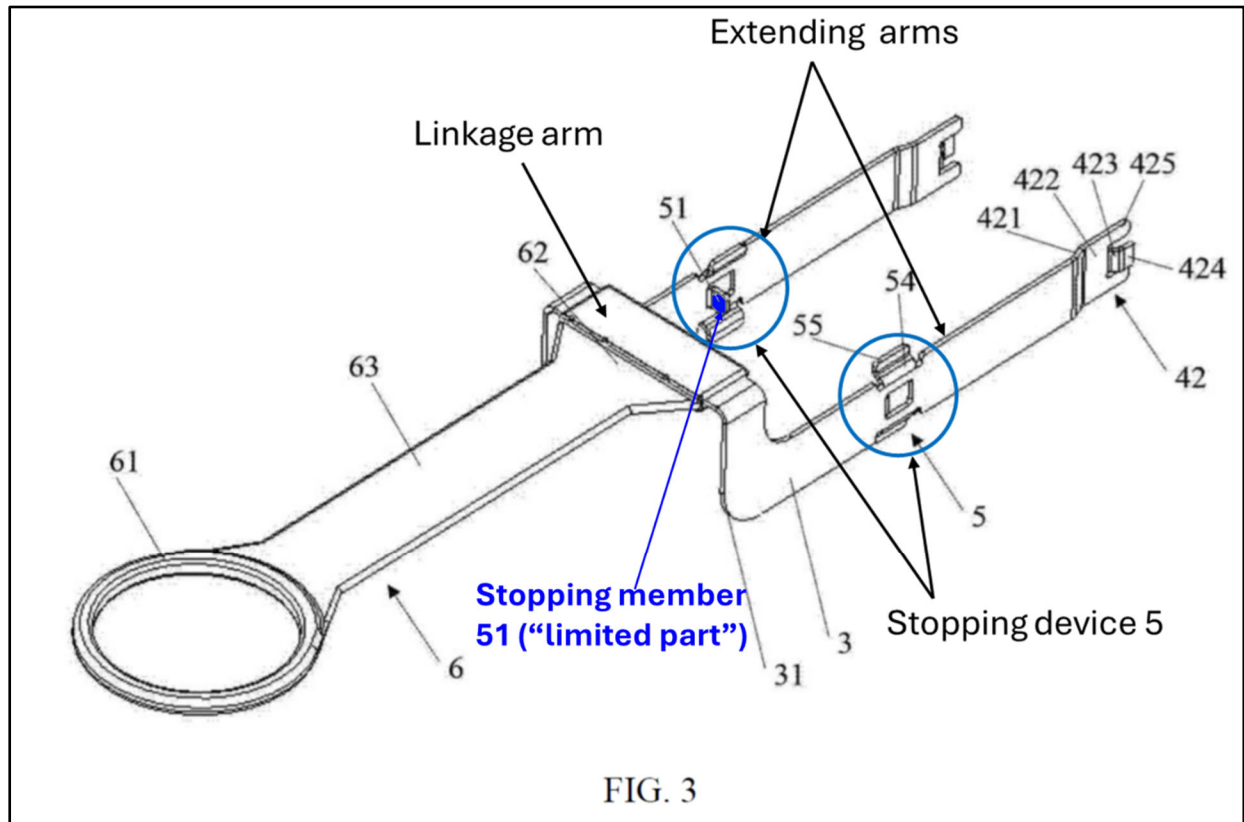
To the extent it is argued that Li does not explicitly disclose the locking/unlocking mechanism between the second fastening parts on Li's QSFP module interface device and the first fastening parts of the plugging slot, Liu describes a similar locking/unlocking mechanism in greater detail. For at least the reasons discussed in Section VII.C.1, above, a POSITA would have considered Li and Liu together to design a locking/unlocking mechanism that is efficient, reliable, and easy to plug in and out. Ex. 1003, ¶118. Specifically, a POSITA would have been motivated to combine the teachings of Liu with Li to design an effective hot-

pluggable mechanism between a QSFP module interface device and a plugging slot/socket and would have reasonably expected success in doing so. *See* Section VII.C.1.

More specifically, a POSITA would have been motivated to design Li's unlocking device 4 in view of Liu in such a way that when Li's QSFP module interface device is plugged into a slot and the sliding component is in the fastening position, the second bent portions 423 of protrusions 42 engage with the elastic pieces on the slot—in the same way as Liu's protrusions 312 engage with locking members on the socket—to achieve an effective and reliable fastening between the QSFP module and the slot. Ex. 1005, ¶[0023]; Ex. 1006, ¶[0020]; Ex. 1003, ¶119. When Li's QSFP module interface device is unplugged, second bent portions 423 push the elastic pieces on the slot to be farther away from each other—in the same way as Liu's protrusions 312 push the locking members of the socket outward—to release the device and allow it to be smoothly and reliably unplugged. Ex. 1005, ¶[0023]; Ex. 1006, ¶[0020]; Ex. 1003, ¶119. The locking mechanism of Li in view of Liu would thus have two first fastening parts (of the plugging slot) that are fastened to the two second fastening parts (second bent portions 423) when the extending arms are located at the fastening position, and the two second fastening parts press the two first fastening parts apart from each other when the extending arms are at the releasing position. Ex. 1003, ¶119.

g. Claim term 1[b][4]

Each extending arm of the sliding component (elastic arm 3) includes a stopping device 5, which further includes a stopping member 51 (limited part) extending from elastic arm 3. Ex. 1005, Fig. 3.



Ex. 1005, Fig. 3 (annotations added)

Stopping member 51 (limited part) is a “stopping plate” and engages with third recess portion 52 (the limiting space). Ex. 1005, ¶[0025]. Li additionally discloses that a return spring is disposed in third recess portion 52 (the limiting space) between stopping member 51 (limited part) and the side end of the third recess portion 52 opposite to the stopping member 51. *See id.*, ¶[0027]. “After the

unlocking device 4 is unlocked, the elastic arm 3 slides along the first recess portion 11 until it reaches the stopping device 5.” *Id.*, ¶[0026]. A POSITA would have understood from the disclosures of Li that stopping member 51 (limited part) is configured to move in the third recess portion 52 (limiting space) when elastic arm 3 (sliding component) is slid along first recess portion 11 (sliding slot) to achieve a fastening position and a releasing position. *Id.*, ¶[0025] (“stopping member 51 is engaged with the third recess portion 52, and the stopping member 51 is a stopping plate”), ¶[0026] (“After the unlocking device 4 is unlocked, the elastic arm 3 slides along the first recess portion 11 until it reaches the stopping device 5. Meanwhile, the third recess portion 52 forms a block against the side end of the stopping member 51, preventing the stopping member from moving.”); Ex. 1003, ¶121.

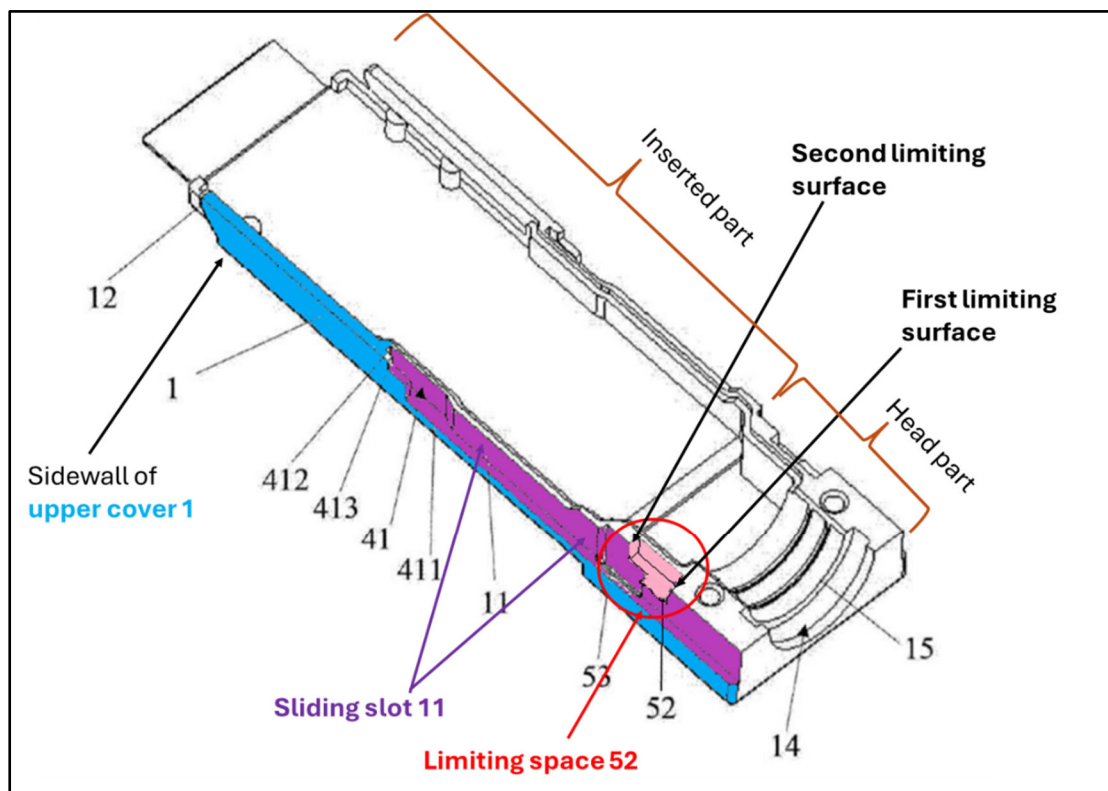
h. Claim term 1[c]

Li discloses that a return spring device (elastic component) is disposed in third recess portion 52 (limiting space) between the stopping member 51 (limited part) and the side end of the third recess portion 52 opposite to the stopping member 51. Ex. 1005, ¶[0027]. As discussed above, third recess portion 52 (limiting space) is formed in the first recess portion 11 (sliding slot) on the main body of the QSFP module interface device. *See* Section VII.C.2.c. Although Li shows that the third recess portion 52 (limiting space) is formed in the head part of the main body, a POSITA would have easily known and understood that the limiting space could have

been positioned anywhere along first recess portion 11 (sliding slot). Ex. 1003, ¶122. As shown in Figure 5, below, there is plenty of space along sliding slot 11 to reposition limiting space 52 to a portion of the sliding slot that is in the inserted part of the main body. *Id.* Indeed, positioning of the limiting space 52 anywhere along sliding slot 11 is an obvious matter of design choice because there are no distinct advantages associated with placement of limiting space 52 in the inserted part versus the head part. *Id.* Nowhere does the '826 patent disclose that the placement of the limiting space in the inserted part is critical, results in a difference in function, or achieves unexpected results. *Id.* Accordingly, positioning of Li's limiting space 52 in the inserted part instead of the head part would have been an obvious design choice. *Id.*; see *In re Rice*, 341 F.2d 309, 314 (C.C.P.A. 1965) ("Appellants have failed to show that the [differences in the claimed invention], as compared to [the prior art reference], result in a difference in function or give unexpected results."); *In re Kuhle*, 526 F.2d 553, 555 (C.C.P.A. 1975) ("Use of such a means of electrical connection in lieu of those used in the references solves no stated problem and would be an obvious matter of design choice within the skill of the art."). For example, Mizue discloses a similar limiting space that is located on a side surface of the insertable part. See Section VI.B.1.h. At a minimum, a POSITA would have found it obvious to try and reposition Li's limiting space 52 to the inserted part to free up space along the width of the head part to accommodate more electronic components

in that space, and thus meet the requirements of compactness and proper space utilization in the optical transceiver. Ex. 1003, ¶122.

As shown below, the side surfaces of third recess portion 52 (limiting space) form first and second limiting surfaces. Ex. 1005, Fig. 5. When limiting space 52 is repositioned to a portion of the sliding slot that is in the inserted part of the main body (as discussed above), the first limiting surface will be closer to the head part (portion that connects with an optical or electrical cable 7) than the second limiting surface. *Id.*, Figs. 4 and 5.



Ex. 1005, Fig. 4 (annotations added) (showing first and second limiting surfaces)

Li additionally discloses that the return spring (elastic component) is disposed in third recess portion 52 (limiting space) between the stopping member 51 (limited part) and a side end of the third recess portion 52 opposite to the stopping member 51. *Id.*, ¶[0027] (“The return spring device is a spring, **with one end abutting against the stopping member 51 and the other end abutting against the side end of the third recess portion 52 opposite to the stopping member 51.**”) (emphasis added). Although Li does not explicitly disclose that the return spring is disposed between stopping member 51 and the side surface closer to the head part (i.e., the first limiting surface), a POSITA would have understood that the return spring must necessarily be disposed between stopping member 51 and the first limiting surface to generate a rebound force under the action of the spring when unlocking device 4 is unlocked and elastic arm 3 (sliding component) is slid backward towards the head part, thereby compressing the spring between stopping member 51 and the first limiting surface. *See id.*; Ex. 1003, ¶124. That is, the elastic component (spring device) is confined or limited longitudinally by the first limiting surface of limiting space 52 and limited part 51. Ex. 1003, ¶124.

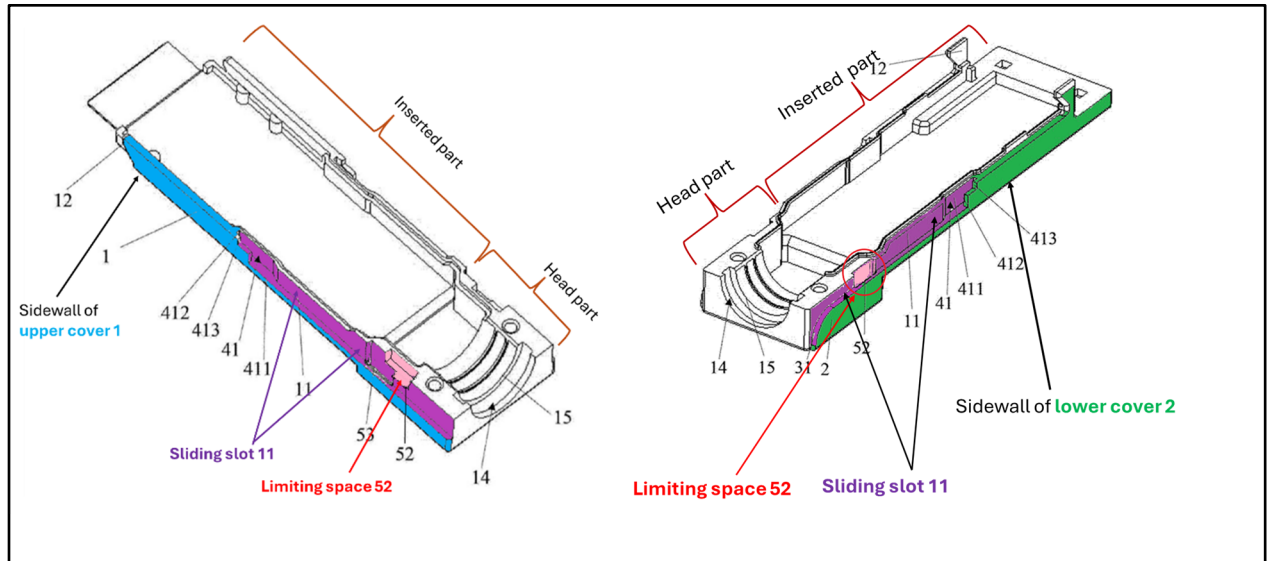
Additionally, as shown in Figures 1 and 3, the elastic component (spring device) is covered by the extending arm of the sliding component (elastic arm 3) such that the elastic component is confined, i.e., limited or restricted, by the main body and the sliding component. Ex. 1003, ¶125. Specifically, the elastic component

is housed in third recess portion 52 (limiting space), which is a recessed region within first recess portion 11 (sliding slot) of the main body, and Li discloses that elastic arm 3 (sliding component) slides along first recess portion 11. Ex. 1005, ¶[0022] (“The elastic arm 3 is engaged with the first recess portion 11 and capable of sliding along a track formed by the first recess portion 11”), ¶[0025] (discussing that “a third recess portion 52 [is] recessed within the first recess portion 11”). Accordingly, a POSITA would have understood that the elastic component (spring device) would have been confined laterally by the sliding slot of the main body on one side and the extending arm on the other side and further confined longitudinally by the first limiting surface (of the main body) and limited part 51. Ex. 1005, Figs. 1, 2; Ex. 1003, ¶125. That is, a POSITA would have understood that the elastic component is covered by the extending arm of the sliding component (elastic arm 3) and that the elastic component is confined by the sliding slot of the main body and the sliding component. Ex. 1003, ¶125.

3. Claim 2

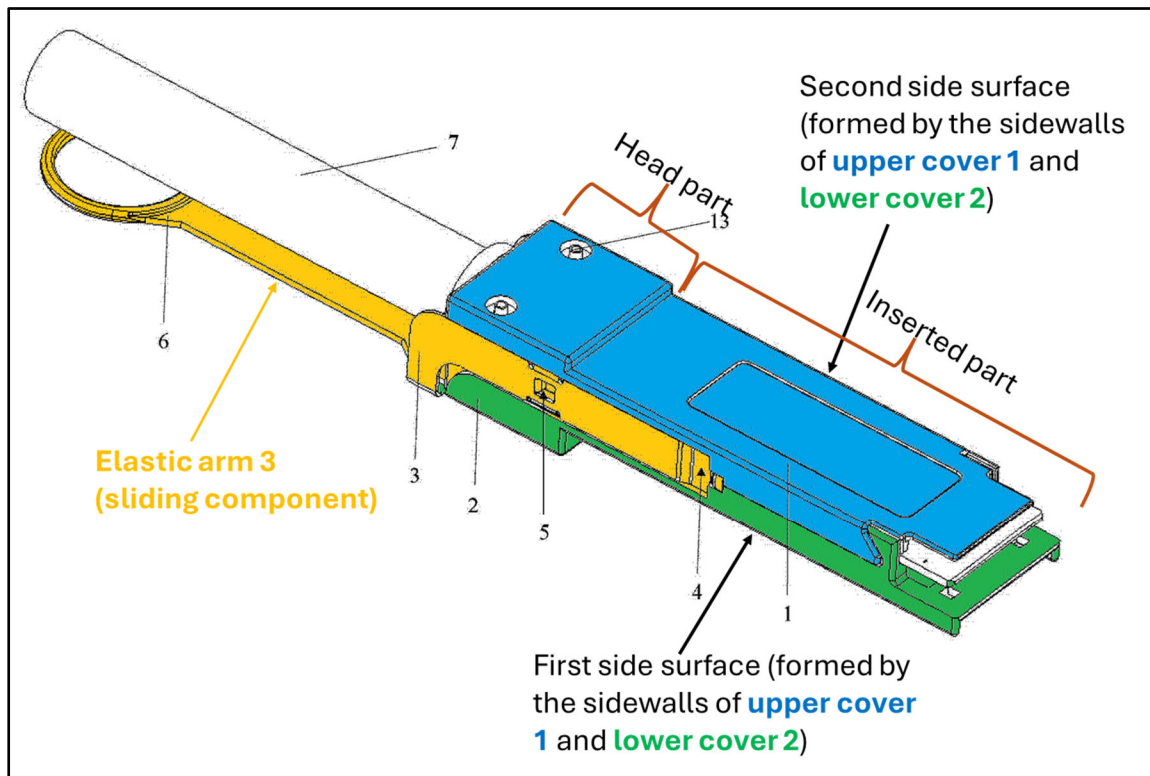
As shown in Figures 3 and 4, below, the main body of Li’s QSFP module interface device, which is formed by upper cover 1 and lower cover 2, comprises a head part and an inserted part connected to each other. The “head part” is the portion that connects with optical or electrical cable 7, and the remainder of the main body is the “inserted part” because it is inserted/plugged into a corresponding slot/socket.

Ex. 1005, Abstract, ¶¶[0002], [0003], [0029]. Based on Li's discussion of "hot plugging" and "slot module," a POSITA would have understood that the inserted part would have been configured to be inserted into the slot module (socket). *Id.*; Ex. 1003, ¶126.



Ex. 1005, Figs. 4 and 5 (annotations added) (showing head part and inserted part of the main body, and that **sliding slots 11** on opposite side surfaces of the main body extend from the head part towards the inserted part)

As further shown in Figure 1, annotated below, two opposite side surfaces, formed by the sidewalls of upper cover 1 and lower cover 2, are located at the sides of the head part and the inserted part. Ex. 1003, ¶127. Figures 3 and 4, annotated above, further show that the two sliding slots (first recess portions 11) extend from the head part towards the inserted part. *Id.*



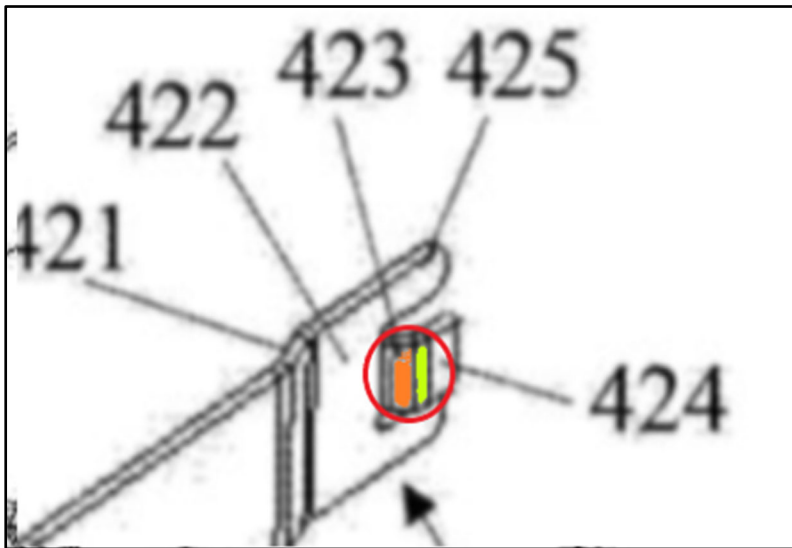
Ex. 1005, Fig. 1 (annotations added) (showing two opposite side surfaces located at the sides of the head part and the inserted part)

Li additionally discloses that the two extending arms of the sliding component (elastic arm 3) slide relative to the sliding slots formed by first recess portions 11. Ex. 1005, ¶[0022] (“The elastic arm 3 is engaged with the first recess portion 11 and capable of **sliding along a track formed by the first recess portion 11.**”) (emphasis added); *see also id.*, Figs. 4, 5. As discussed above in Section VII.C.2.e., the extending arms of the sliding component (elastic arm 3) slide along the sliding slot to have a **fastening position** when protrusions 42 of the extending arms are engaged with first recess portions 41 provided on the sliding slots (first recess portions 11)

on each side of the main body. Ex. 1005, ¶[0023]. When the sliding component (elastic arm 3) is pulled back, unlocking device 4 is unlocked and elastic arm 3 slides backward along the sliding slot until it reaches a stopping device 5, and thereby the sliding slot achieves a **releasing position**. Ex. 1005, ¶[0026]. Because the sliding component (elastic arm 3) is pulled back towards the head part to release/disengage the QSFP module interface device from the slot/socket, the fastening position of the sliding component is farther away from the head part compared to the releasing position (which is closer to the head part because the sliding component is pulled back to release it from the slot/socket). Ex. 1003, ¶128.

4. Claim 3

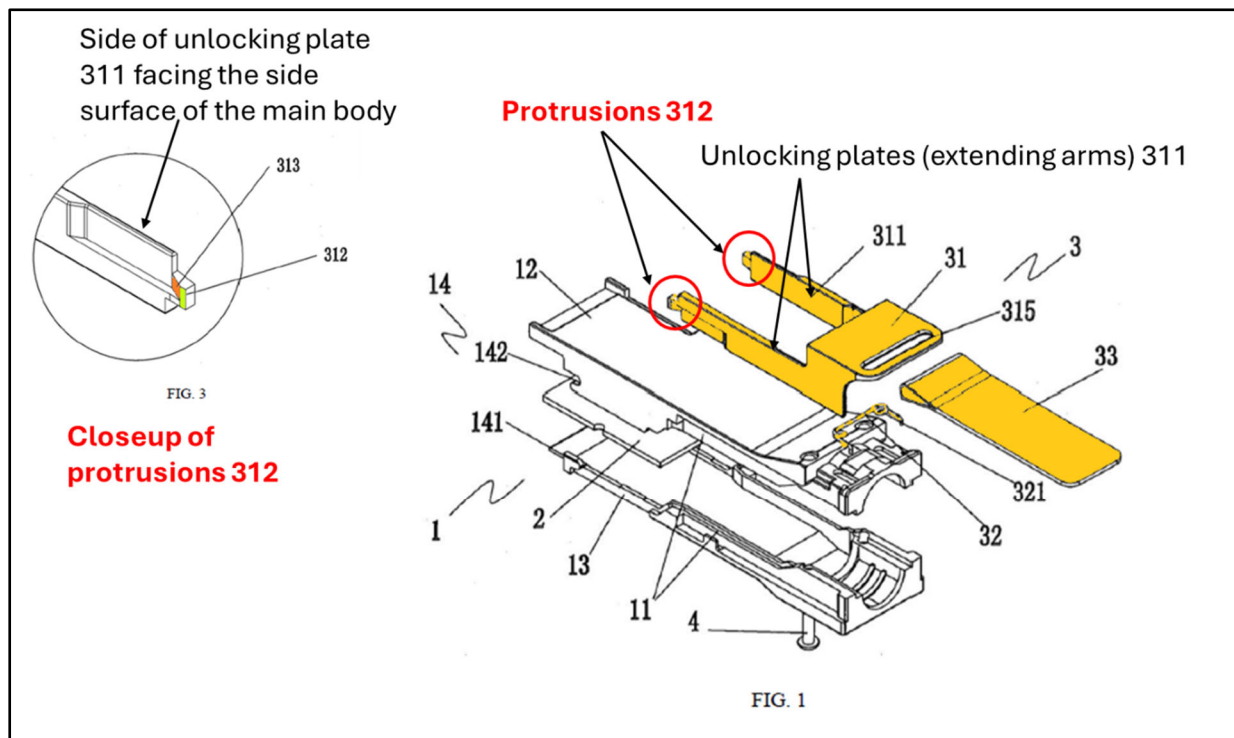
Li discloses that each second bent portion 423 (second fastening part) of protrusion 42 engages with a corresponding elastic part on the slot module to lock the QSFP module interface device to the slot. Ex. 1005, ¶[0023]. As shown below in annotated Figure 3, the second bent portion 423 has a fastening surface having two sides (shown in orange and lime green). *Id.*, Figs. 1 and 3. Because the second bent portion 423 bends away from the side surface of main body, one side (shown in orange) is closer to the side surface than the other side (shown in lime green). Ex. 1003, ¶129. Moreover, a distance between the side closer to the side surface and the head part is less than a distance between the other side (that is farther away from the side surface) and the head part. *Id.*



Ex. 1005, excerpt of Fig. 3 (showing that each second fastening part (second bent portion 423 of protrusion 42) has two surfaces: one closer to the side surface (of the main body) and the head part and another farther away from the side surface and the head part)

As discussed in Section VII.C.1, above, a POSITA would have been motivated to combine the teachings of Li and Liu to achieve an improved locking mechanism between the QSFP module interface device and the slot/socket. Ex. 1003, ¶130. Liu teaches that when the QSFP device is plugged into a corresponding socket of a connector, **“locking members [first fastening parts] pre-configured in the socket engage with the protrusions 312 [second fastening parts] on the outer walls of the two unlocking plates 311 [extending arms]”** to fasten the module to the socket. Ex. 1006, ¶[0020] (emphasis added), Figs. 1, 3. As shown in Figures 1 and 3 of Liu, each protrusion 312 bends away from the side surface of the main body, and

therefore one side of protrusion 312 (inclined surface 313, shown in orange) is closer to the side surface than the other side (shown in lime green). Moreover, a distance between the side closer to the side surface (i.e., **inclined surface 313**) and the head part is less than a distance between the **other side** (that is farther away from the side surface) and the head part. Ex. 1003, ¶130.



Ex. 1006, Figs. 1 and 3 (annotations added) (showing that each second fastening part (protrusion 312) has two surfaces: one closer to the side surface (of the main body) and the head part and another farther away from the side surface and the head part)

5. Claim 4

Li discloses that its design allows an optical cable, i.e., a cable having an optical fiber, or an electrical cable 7 to be fixed to the QSFP module interface device.

Ex. 1005, ¶[0022]. Figures 4 and 5 additionally show arc-shaped portions 14 on upper cover 1 and lower cover 2 that engage to form a circular portion in the head part of the QSFP device, which allows an optical cable 7 to be connected to the module. *Id.*, ¶[0022], Figs. 4, 5. Thus, it would have been obvious to a POSITA that the head part of Li's QSFP module interface device has at least one optical fiber terminal. Ex. 1003, ¶131.

6. Claim 5

As discussed regarding claim term 1[c] (Section VII.C.2.h), Li discloses that a return spring device (elastic component) is disposed in third recess portion 52 (the limiting space) between stopping member 51 (limited part) and the side end of the third recess portion 52 opposite to stopping member 51. Ex. 1005, ¶[0027]. As shown in Figure 3 of Li, a limited part 51 is provided on each extending arm of elastic arm 3. This would indicate to a POSITA that there are two third recess portions 52 (i.e., two limiting spaces) on the two side surfaces of the QSFP module interface device and that there are two elastic components, each disposed in a respective limiting space on each side of the module. Ex. 1003, ¶132. Accordingly, a POSITA would have understood that in Li's QSFP module interface device (modified to have each limiting space 52 in a portion of sliding slot 11 that is in the inserted part of the module), each limiting space 52 is formed by a first limiting surface and a second limiting surface, i.e., there are two first limiting surfaces and

two second limiting surfaces, with the two first limiting surfaces being closer to the head part than the two second limiting surfaces. *See* Section VII.C.2.h; Ex. 1003, ¶132.

As further discussed regarding claim term 1[c], Li discloses that the return spring (elastic component) is disposed in third recess portion 52 (limiting space) between stopping member 51 (limited part) and the first limiting surface to generate a rebound force under the action of the spring when unlocking device 4 is unlocked and elastic arm 3 (sliding component) is slid backward towards the head part. *See* Section VII.C.2.h. It would have been obvious to a POSITA that the same mechanism would have been applied to both elastic components on both side surfaces of the QSFP module interface device. Ex. 1003, ¶133. That is, it would have been obvious to a POSITA that each elastic component of Li is between a first limiting surface and a limited part 51. *Id.*

7. Claim 6

Li's QSFP module interface device includes a pull handle 6 connected to the linkage arm of elastic arm 3 (sliding component). Ex. 1005, ¶[0028], Figs. 1-3. Although Li does not disclose that pull handle 6 is pivoted on the linkage arm 6, it would have been obvious to design pull handle 6 to pivot on the linkage arm to 1) prevent breakage or damage of the pull handle if bent downwards or upwards when being pushed or pulled by a user, and thus to give more flexibility when

plugging/unplugging the device, and 2) move the pull handle out of the way when inserting/retracting optical cable 7. Ex. 1003, ¶134. Indeed, Liu teaches a pulling handle 33 that is “sleeved onto a hanging ear portion 315 pre-configured at the rear end of the unlocking member 31.” Ex. 1006, ¶[0019]. Figure 1 of Liu shows that pulling handle 33 is designed to pivot slightly about the rear end of unlocking member 31 (i.e., the linkage arm of Liu’s sliding component 3). Ex. 1003, ¶134. A POSITA would have been motivated to design Li’s pull handle 6 in view of Liu’s pulling handle 33 (that is sleeved through a hanging ear portion 315 of the Liu’s linkage arm) to allow Li’s pull handle 6 to pivot on the linkage arm to prevent breakage or damage of the pull handle when the QSFP module is inserted or disengaged from the slot module and/or to move it up or down when inserting cable 7 to get the handle out of the way. *Id.*

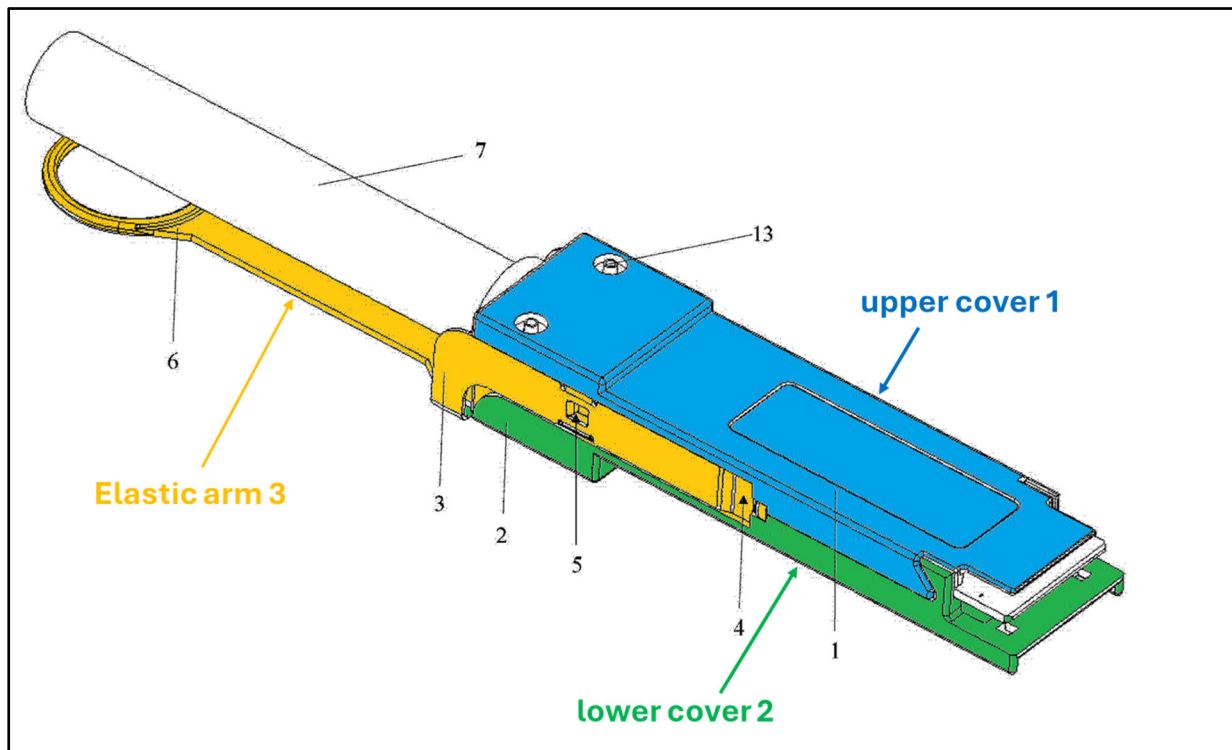
D. Li Renders Claim 7 Obvious

1. Independent claim 7

Li discloses or suggests every limitation of claim 7.

a. 7[preamble]

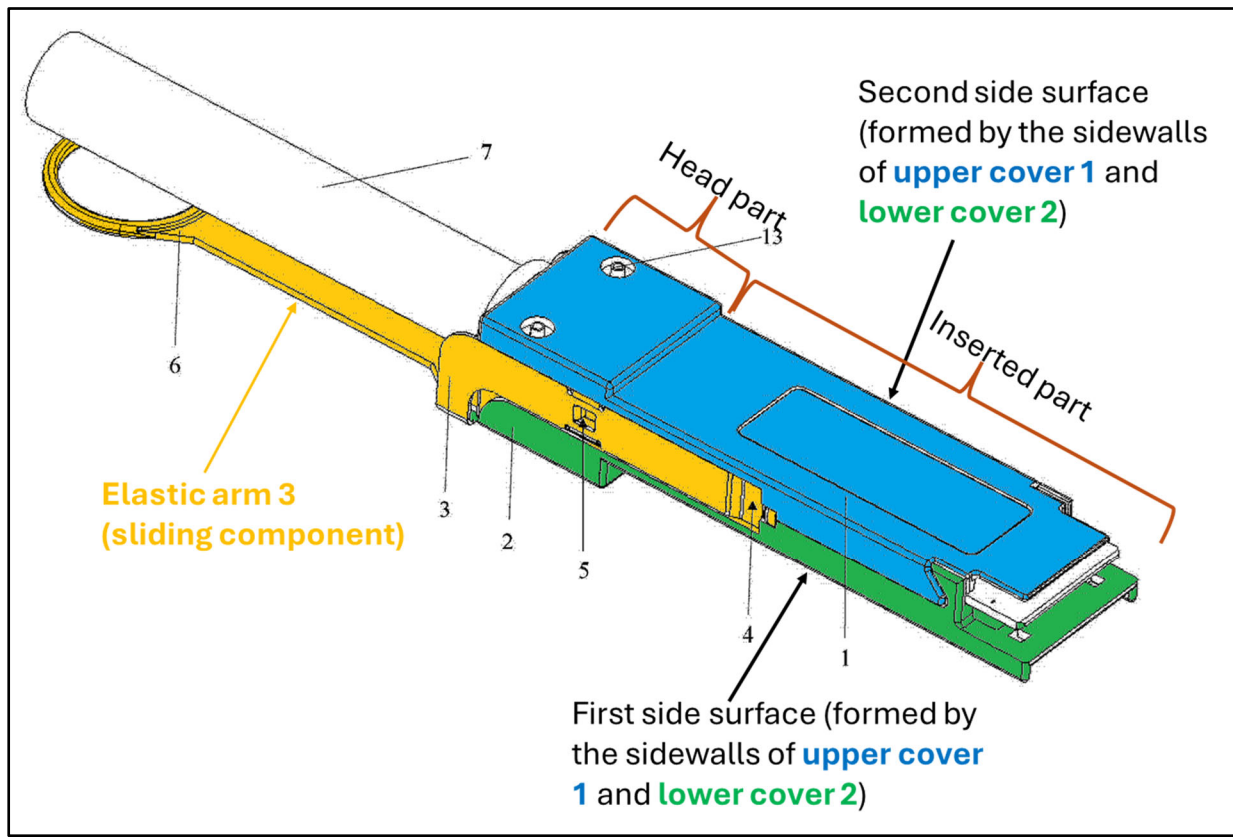
As discussed regarding claim 1, Li discloses a QSFP module interface device (i.e., an optical transceiver module) capable of plugging into a slot module. Ex. 1005, Abstract, ¶¶[0002], [0003], [0023], Fig. 1; *see* Section VII.C.2.a.



Ex. 1005, Fig. 1 (annotations added) (showing a QSFP module interface comprising an **upper cover 1**, a **lower cover 2**, and an **elastic arm 3**)

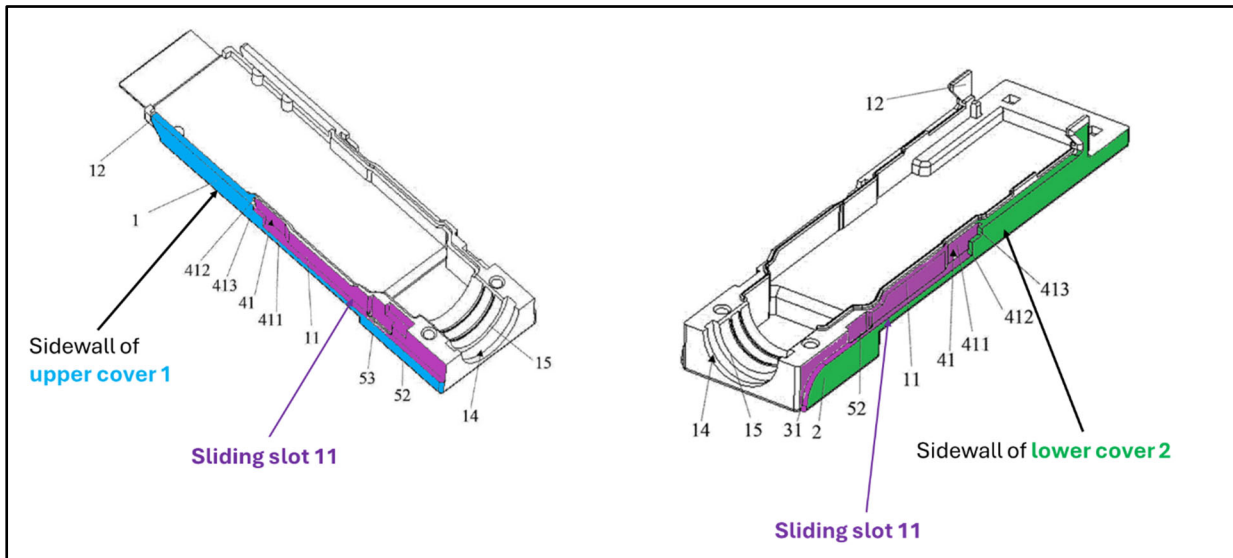
b. Claim term 7[a][1]

As discussed regarding claim term 1[a][1], Li discloses a QSFP module interface device “including: an upper cover 1, a lower cover 2, and elastic arms 3.” Ex. 1005, ¶[0022]. Upper cover 1 and lower cover 2 together form the main body of the QSFP module interface device, having a head part and an inserted part that are connected to each other, as shown in annotated Figure 1, below. *Id.*, Figs. 1, 4, 5. As shown in Figure 1, the main body includes two side surfaces at opposite sides, wherein each side surface is formed by a sidewall of upper cover 1 and a sidewall of lower cover 2 that interlock with each other. Ex. 1003, ¶137.



Ex. 1005, Fig. 1 (annotations added) (showing the main body having two side surfaces that are opposite to each other)

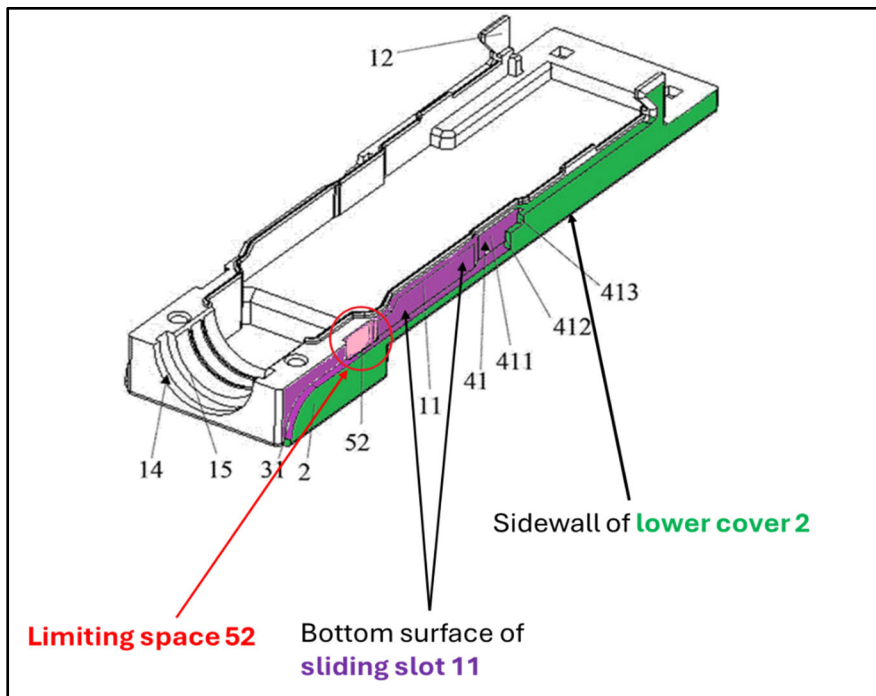
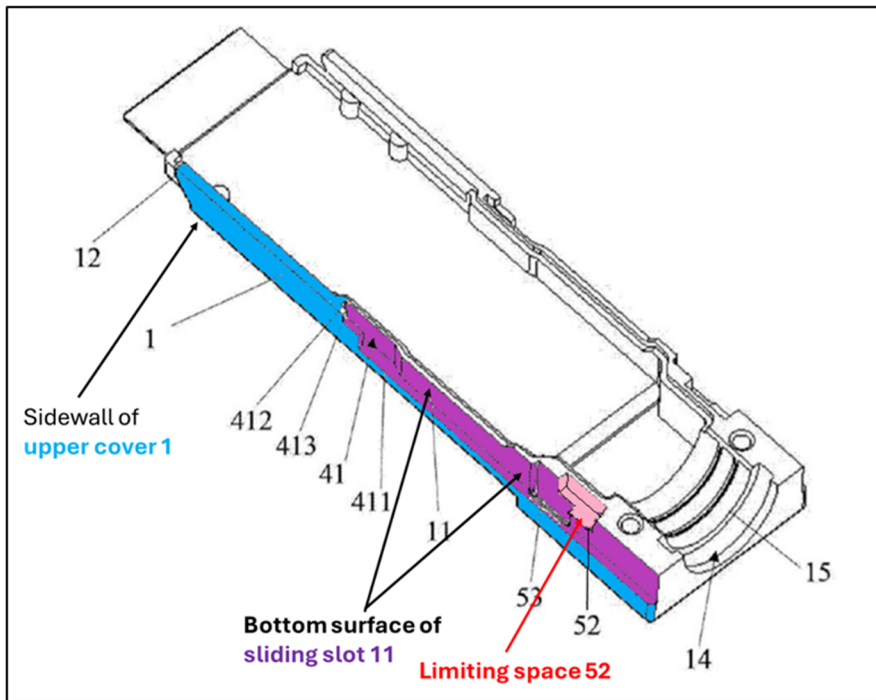
Each side surface of Li's QSFP module interface device further includes a sliding slot formed by first recess portion 11 on the sidewalls of upper cover 1 and lower cover 2. Ex. 1005, ¶[0022]. Because each side surface (including the head part and the inserted part) has a sliding slot, the two sliding slots of Li's QSFP module interface device are opposite each other. *Id.*, Figs. 4, 5. As shown in annotated Figures 4 and 5, below, each sliding slot extends from the head part to the inserted part. *See* Section VII.C.2.b.



Ex. 1005, Figs. 4 and 5 (annotations added) (showing a **sliding slot** (formed by recess portion 11) on each side surface of the main body when **upper cover 1** and **lower cover 2** are connected, and each sliding slot extends from the head part to the inserted part)

c. Claim term 7[a][2]

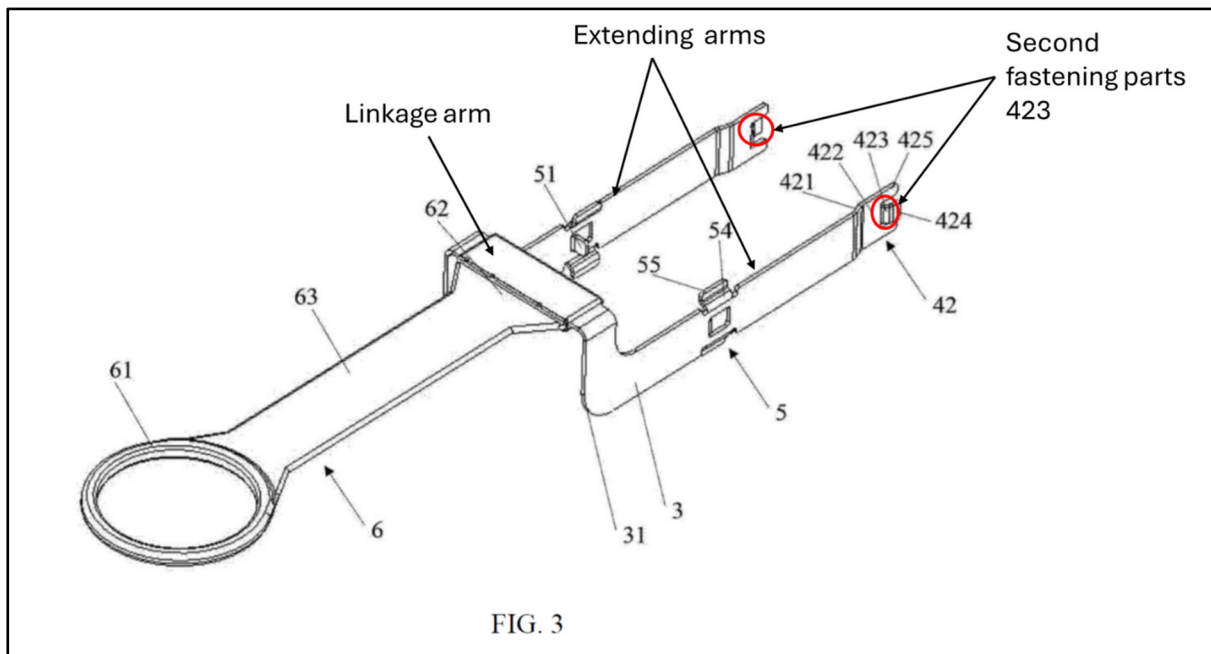
Each sliding slot (first recess portion 11) on each side surface of Li's QSFP module interface device includes a limiting space (third recess portion 52) and a bottom surface forming the sliding slot. Ex. 1005, ¶[0025], Figs. 4, 5. The bottom surface of each sliding slot is parallel to the adjacent side surface, and each third recess portion 52 (limiting space) is located at a side surface. *Id.*; Section VII.C.2.c.



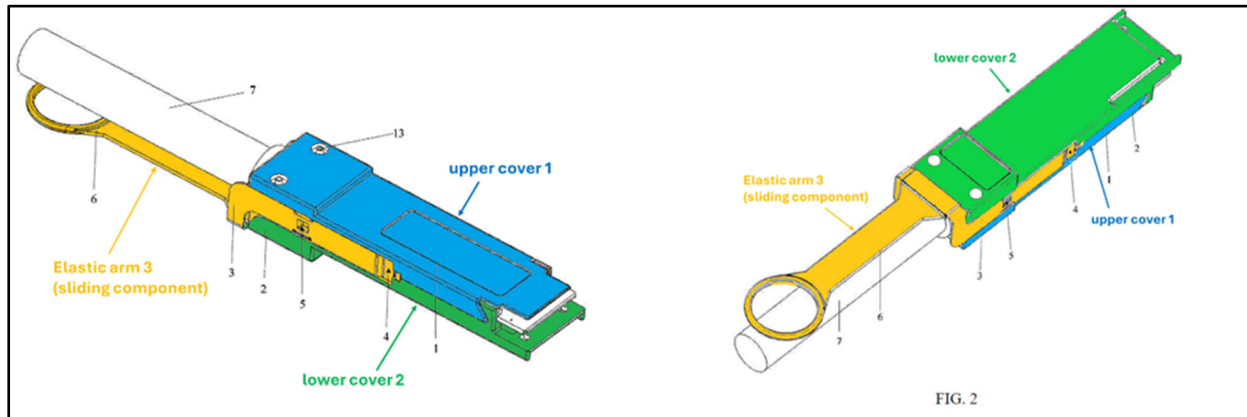
Ex. 1005, Figs. 4 and 5 (annotations added) (showing that the bottom surface of each **sliding slot 11** is parallel to the adjacent side surface, and that each **limiting space 52** is located at a side surface)

d. Claim term 7[b][1]

Li's QSFP module interface device includes an elastic arm 3 (sliding component) comprising a linkage arm and two extending arms. Ex. 1005, Figs. 1-3. As shown in Figure 3, below, the linkage arm is connected between the two extending arms. *Id.*



Ex. 1005, Fig. 3 (showing Li's sliding component (elastic arm 3) having two extending arms and a linkage arm, and a fastening part (part 423 of protrusion 42) provided at the end of each extending arm)



Ex. 1005, Figs. 1 and 2 (annotations added) (showing that the main body of Li's QSFP module interface device is disposed between the two extending arms of sliding component 3)

Furthermore, each extending arm has a second fastening part (part 423 of protrusion 42) at the tip of the arm. *Id.*, Fig. 3; *see also* Section VII.C.2.d. As shown in Figures 1 and 2 of Li, the main body (formed by upper cover 1 and lower cover 2) is disposed between the two extending arms. Ex. 1003, ¶142.

e. Claim term 7[b][2]

Li discloses that each extending arm of the sliding component (elastic arm 3) is disposed on a sliding slot (first recess portion 11) provided on a side surface of the main body of Li's QSFP module interface device and each extending arm slides relative to the sliding slot on which it is disposed. Ex. 1005, ¶[0022], Figs. 1, 2.

As discussed regarding claim term 1[b][2], the extending arms of the sliding component (elastic arm 3) slide along the sliding slots to have a **fastening position**

when protrusions 42 of the extending arms are engaged with first recess portions 41 provided on the sliding slots (recess portions 11) on each side of the main body. Ex. 1005, ¶[0023]; *see also* Section VII.C.2.e.

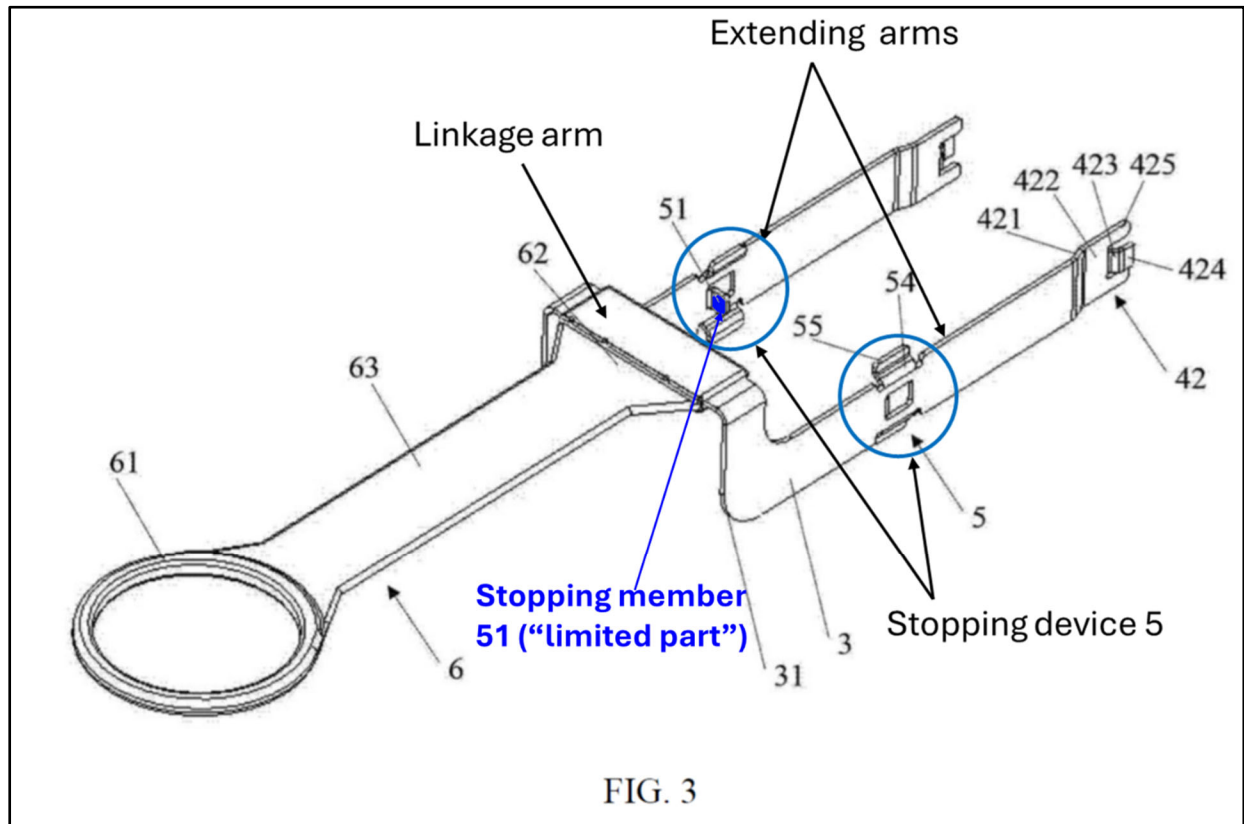
Similarly, when the sliding component (elastic arm 3) is pulled back, unlocking device 4 is unlocked and elastic arm 3 slides backward along the sliding slot until it reaches a stopping device 5, and therefore the sliding slot has a **releasing position**. Ex. 1005, ¶[0026]. In the releasing position, **protrusions 42 of the extending arms are disengaged from the first recess portions 41** provided on the sliding slots. *Id.*, ¶[0023].

Because the sliding component (elastic arm 3) is pulled back towards the head part to release/disengage the QSFP module interface device from the slot/socket, the fastening position of the sliding component is farther away from the head part compared to the releasing position (which is closer to the head part because sliding component is pulled back to release it from the slot/socket). *See* Section VII.C.2.e; Ex. 1003, ¶146.

f. Claim term 7[b][3]

As discussed regarding claim term 1[b][4], Li discloses that each extending arm of the sliding component (elastic arm 3) includes a stopping member 51 (limited part) that is configured to move in third recess portion 52 (limiting space) when elastic arm 3 (sliding component) is slid along first recess portion 11 (sliding slot)

to achieve a fastening position and a releasing position. Ex. 1005, ¶¶[0025], [0026], Fig. 3; *see* Section VII.C.2.g.



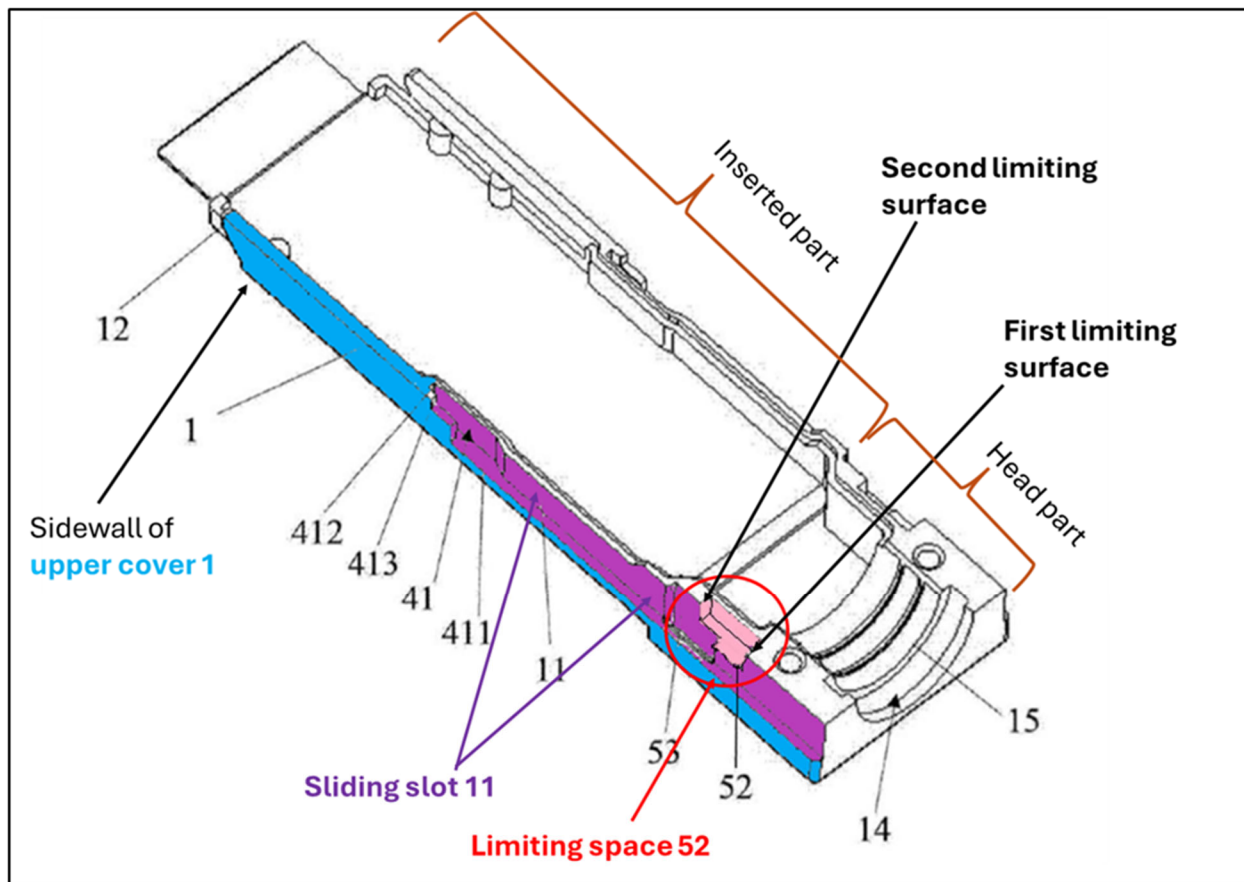
Ex. 1005, Fig. 3 (annotations added)

g. Claim term 7[c]

As discussed regarding claim term 1[c], Li discloses that a return spring device (elastic component) is disposed in third recess portion 52 (limiting space) between stopping member 51 (limited part) and the side end of the third recess portion 52 opposite to stopping member 51. Ex. 1005, ¶[0027]; Section VII.C.2.h. Although Li shows that third recess portion 52 (limiting space) is formed in first recess portion 11 (sliding slot) on a side surface in the head part of the main body, a

POSITA would have easily known and understood that the limiting space could have been positioned anywhere along the first recess portion 11 (sliding slot). *See* Section VII.C.2.h. For example, Mizue discloses a similar limiting space that is located on a side surface of the insertable part. *See* Section VI.B.1.h. At a minimum, it would have been obvious to a POSITA to try and reposition Li's limiting space 52 to the inserted part to free up space along the width of the head part to accommodate more electronic components in that space, thus meeting the requirements of compactness and proper space utilization in the optical transceiver. Ex. 1003, ¶149.

As shown below, the side surfaces of third recess portion 52 (limiting space) form first and second limiting surfaces. Ex. 1005, Fig. 5. When limiting space 52 is repositioned to a portion of the sliding slot that is in the inserted part of the main body, the first limiting surface is closer to the head part (portion that connects with an optical cable or electrical cable 7) than the second limiting surface. *Id.*, Figs. 4, 5; Ex. 1003, ¶150.



Ex. 1005, Fig. 4 (annotations added) (showing first and second limiting surfaces)

Li additionally discloses that the return spring (elastic component) is disposed in third recess portion 52 (limiting space) of the sliding slot between stopping member 51 (limited part) and the first limiting surface of third recess portion 52 opposite to the stopping member 51. *See* Ex. 1005, ¶[0027]; Section VII.C.2.h. That is, the elastic component (spring device) is confined, i.e., restricted or limited, longitudinally by the first limiting surface of limiting space 52 and limited part 51. Ex. 1003, ¶151. Additionally, as shown in Figures 1 and 2, the elastic component is covered by the extending arm of the sliding component (elastic arm 3) such that the

elastic component is confined laterally by the sliding slot (first recess portion 11) of the main body and the sliding component. *Id.*, ¶152; Ex. 1005, Figs. 1, 2; Section VII.C.2.h. That is, the elastic component is confined by the main body and the sliding component. Ex. 1003, ¶152.

VIII. MANDATORY NOTICES

A. Real Parties-in-Interest

The real parties-in-interest for this Petition are Accelight Technologies, Inc. and Accelight Technologies (Wuhan) Inc.

B. Related Matters

To Petitioner's knowledge, the '826 patent is involved in the following:

Name	Number	Court	Filed
<i>Applied Optoelectronics, Inc. v. Accelight Technologies, Inc.</i>	4:24-cv-09041	N.D. Cal.	Dec. 13, 2024
<i>Applied Optoelectronics, Inc. v. Cambridge Industries USA, Inc.,</i>	5:24-cv-01010	N.D. Cal.	Feb. 20, 2024

C. Lead and Back-Up Counsel

Lead Counsel	Back-Up Counsel
Arpita Bhattacharyya (Reg. No. 63,681) Bhattacharyya-ptab@perkinscoie.com PERKINS COIE LLP 3150 Porter Drive Palo Alto, CA 94304 Tel: 650.838.4300	Robert F. McCauley (<i>pro hac vice</i> to be filed) rmccauley@perkinscoie.com PERKINS COIE LLP 3150 Porter Drive Palo Alto, CA 94304

Lead Counsel	Back-Up Counsel
Fax: 650.838.4350	Tel: 650.838.4300 Fax: 650.838.4350 Nicholas Lipperd (Reg. No. 83,084) Lipperd-ptab@perkinscoie.com PERKINS COIE LLP 11452 El Camino Real, Suite 300 San Diego, CA 92130-2080 Tel: 858.284.5546 Fax: 858.720.5799

D. Service Information

Please address correspondence to counsel at the email addresses above.

Petitioner consents to service by e-mail.

IX. STANDING

The '826 patent is eligible for IPR and Petitioner is not barred or estopped from requesting IPR challenging the patent claims on the grounds identified herein.

X. CONCLUSION

For the foregoing reasons, Petitioner submits that the challenged claims of the '826 patent should be cancelled.

Dated: November 3, 2025

Respectfully submitted,

/Arpita Bhattacharyya/

Arpita Bhattacharyya, Reg. No. 63,681
Counsel for Petitioner

CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Pursuant to 37 C.F.R. § 42.24(a)(1)(i), the undersigned hereby certifies that the foregoing **Petition for *Inter Partes* Review** contains 13,992 words, excluding the parts of this Petition that are exempted under 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

/Arpita Bhattacharyya/

Arpita Bhattacharyya, Reg. No. 63,681
Counsel for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), the undersigned certifies that on November 3, 2025, a copy of the foregoing Petition for *Inter Partes* Review, the associated power of attorney, and Exhibits 1001-1008 were served by FedEx Priority Overnight on the correspondence address of record indicated in the Patent Office's website for U.S. Patent No. 9,523,826:

APPLIED OPTOELECTRONICS, INC.
13115 Jess Pirtle Blvd.
Sugar Land, TX 77478

Courtesy copies were provided to Patent Owner's litigation counsel via email at the following addresses:

Jo Dale Carothers, JCarothers@weintraub.com
Eric Caligiuri, ECaligiuri@weintraub.com

Date: November 3, 2025

By: /Arpita Bhattacharyya/
Arpita Bhattacharyya
Reg. No. 63,681
Bhattacharyya-ptab@perkinscoie.com