

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HEAD SPORT GMBH,
Petitioner

v.

VERMONT SAFETY DEVELOPMENTS LLC,
Patent Owner

Case IPR2024-01099
Patent No. 7,523,953

PETITION FOR *INTER PARTES* REVIEW

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LIST OF EXHIBITS

<u>HEAD Exhibit No.</u>	<u>Description</u>
Ex-1001	U.S. Patent No. 7,523,953 to Ettlinger et al. (“’953 patent”)
Ex-1002	Declaration of Maury Hull, Ph.D.
Ex-1003	Switzerland Patent No. 679213 A5 to Freudiger and Certified English Translation (“ <i>Freudiger-1</i> ”)
Ex-1004	European Patent Application Publication No. 1190746 A2 to Freudiger and Certified English Translation (“ <i>Freudiger-2</i> ”)
Ex-1005	United States Patent Application Publication No. 2002/0101063 A1 to Dodge (“ <i>Dodge</i> ”)
Ex-1006	German Patent Application Publication No. 2340420 A1 to Sittmann and Certified English Translation (“ <i>Sittmann</i> ”)
Ex-1007	United States Patent Application Publication No. 2004/0173994 A1 to Howell (“ <i>Howell</i> ”)
Ex-1008	David W. Gulick & C. D. Mote, <i>Design of a Learning Binding for Alpine Skiing</i> , in 13 SKIING TRAUMA AND SAFETY: THIRTEENTH VOLUME, ASTM STP 1397, 30-49 (Robert J. Johnson et al. eds., 2000) (“ <i>Gulick</i> ”)
Ex-1009	Prosecution History of the ’953 patent
Ex-1010	Patent Owner’s Proposed Claim Constructions served on April 23, 2024, in <i>Vermont Safety Developments LLC v. Head Sport GmbH</i> , No. 2:23-cv-00089 (D. Vt. May 11, 2023)
Ex-1011	ASTM Int’l, Standard F939-05, <i>Standard Practice for Selection of Release Torque Values for Alpine Ski Bindings</i> 1 (2005)
Ex-1012	Revised Stipulated Discovery Schedule/Order (Dkt. 32) in <i>Vermont Safety Developments LLC v. Head Sport GmbH</i> , No. 2:23-cv-00089 (D. Vt. May 11, 2023)

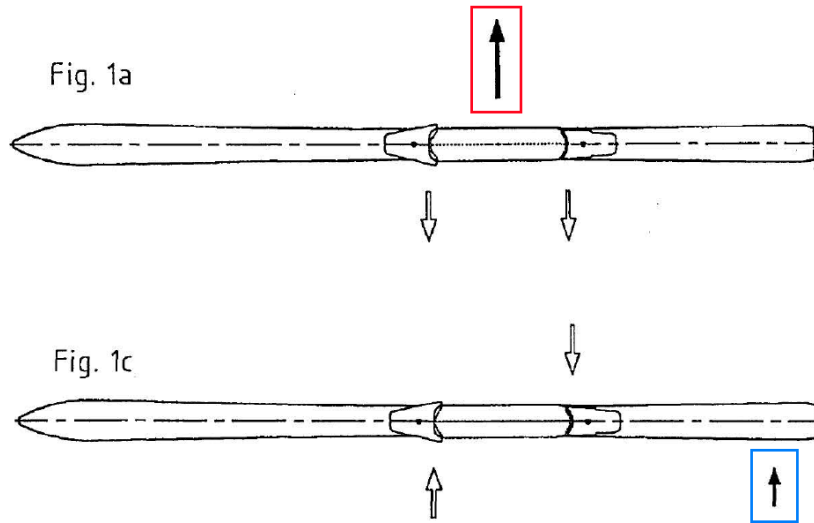
<u>HEAD Exhibit No.</u>	<u>Description</u>
Ex-1013	Complaint in <i>Vermont Safety Developments LLC v. Head Sport GmbH</i> , No. 2:23-cv-00089 (D. Vt. May 11, 2023)
Ex-1014	Petitioner's Proposed Claim Constructions served on April 23, 2024, in <i>Vermont Safety Developments LLC v. Head Sport GmbH</i> , No. 2:23-cv-00089 (D. Vt. May 11, 2023)
Ex-1015	CV of Maury Hull, Ph.D.
Ex-1016	Declaration of Kelley M. Hayes Greenhill Regarding Ex-1008
Ex-1017	U.S. Patent No. 6,007,086 to Hopkins
Ex-1018	ASTM Int'l, Standard F504-05, <i>Standard Test Method for Measuring the Quasi-Static Release Moments of Alpine Ski Bindings</i> 1 (2005)
Ex-1019	RESERVED
Ex-1020	RESERVED
Ex-1021	RESERVED
Ex-1022	Second Amended Stipulated Discovery Schedule/Order (Dkt. 35-1), filed June 28, 2024, in <i>Vermont Safety Developments LLC v. Head Sport GmbH</i> , No. 2:23-cv-00089 (D. Vt. May 11, 2023)

I. PRELIMINARY STATEMENT

Petitioner, Head Sport GmbH, requests *inter partes* review of U.S. Patent No. 7,523,953 (“’953 patent”), assigned to Patent Owner, Vermont Safety Developments LLC, and cancellation of claims 30, 31, 34-38, 53-56, and 58-60. The challenged claims are directed to a ski binding system allowing lateral release of a ski boot from a binding under certain loading conditions. The ’953 patent purports to reduce Anterior Cruciate Ligament (“ACL”) injuries during dangerous skiing falls.

Ski manufacturers have long made laterally releasable bindings to release a ski boot and prevent knee injuries during dangerous falls. *See, e.g.,* Ex-1003-*Freudiger-1*, Ex-1004-*Freudiger-2*, Ex-1005-*Dodge*; Ex-1006-*Sittmann*; Ex-1007-*Howell*.¹ For example, EP 1190746 A2 to Freudiger (“*Freudiger-2*”), published March 27, 2002, explains that many prior ski bindings can release laterally to prevent skier injury, but cannot accurately distinguish between forces caused by active skiing (*e.g.*, the **force** depicted in Figure 1a) and forces exerted during falls that may cause “ligament injuries to the knee joint,” (*e.g.*, the **force** depicted in Figure 1c). Ex-1004-*Freudiger-2*, [0002]-[0005].

¹ Unless noted otherwise, citations to *Freudiger-1*, *Freudiger-2*, and *Sittmann* refer to the certified translation provided in Ex-1003, Ex-1004, and Ex-1006, respectively.



Ex-1004-Freudiger-2, FIGs. 1a, 1c

Because prior ski bindings cannot make this distinction, *Freudiger-2* opined that they suffer from “premature opening,” causing skiers to “set [their bindings] to higher release values than would be permissible for protection,” thereby causing “ligament injuries to the knee joint,” such as ACL tears. *Id.*, [0003].

Similarly, U.S. Patent Application Publication No. 2004/0173994 A1, published Sept. 9, 2004, to Howell (“*Howell*”), explained that “ACL strain intensifies when lateral forces are applied to the ski immediately under or near the projected tibial axis (coaxial with the tibia), generally known as “phantom-foot” fall kinematics.” Ex-1007-*Howell*, [0011]. *Howell* thus discloses a ski binding heel unit with lateral release capabilities that laterally releases the ski boot from the ski when “ACL injury producing loads” are experienced. *Id.*, [0057].

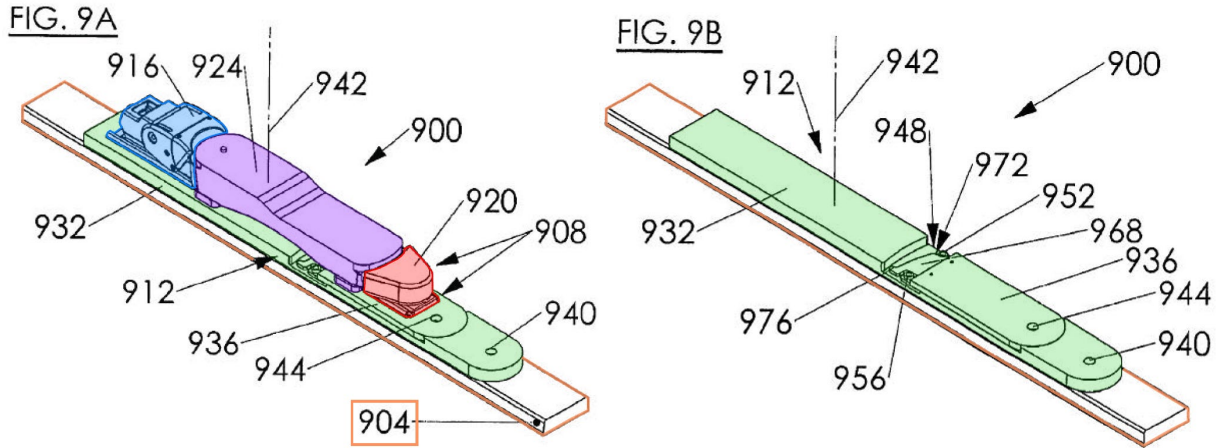
Thus, the techniques and designs described in the '953 patent were well known before the patent's priority date. The '953 patent claims recite only standard, well-known components and engineering principles.

II. THE '953 PATENT

A. Summary of Disclosure

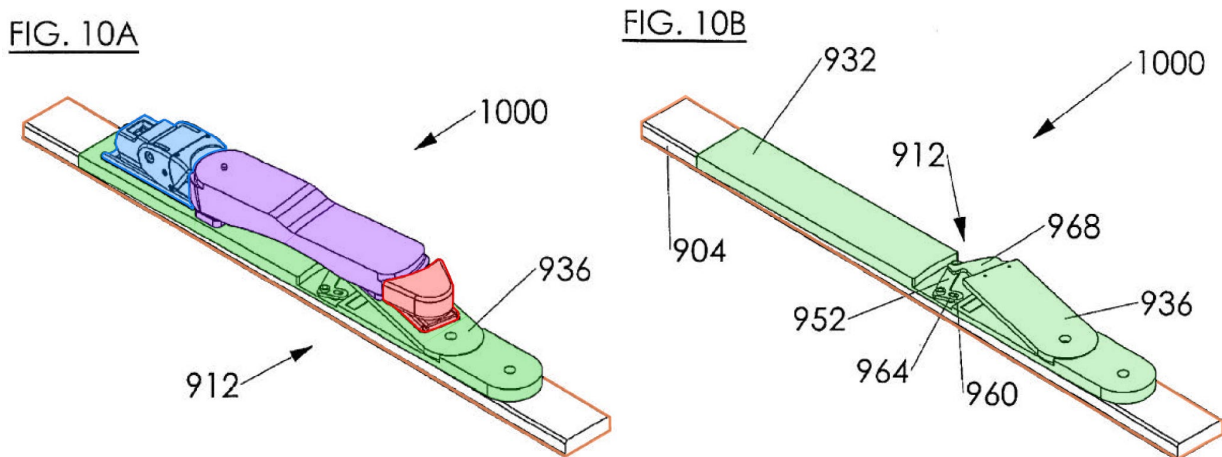
The '953 patent, filed on August 6, 2007, claims priority to a provisional application filed on August 8, 2006. Ex-1001, 1:1-10. It describes an "alpine ski binding system" that laterally releases a ski boot under certain external loads experienced along the ski that can cause ACL injuries. *Id.*, 1:14-17, 4:27-31, 4:50-54.

Figures 9A and 9B provide an overview of an alpine ski system 900 made in accordance with the purported invention. *Id.*, 9:9-10. System 900 includes a ski 904 and a binding system 908 having a release-logic mechanism 912 and heel and toe pieces 916 and 920, respectively, for clamping a ski-boot 924 into binding system 908. *Id.*, 9:9-28.



Ex-1001, FIGS. 9A-9B²

Release logic mechanism 912 is configured to “provide[] an attenuated release” of the boot from binding system 908 in response to a certain load condition. *Id.*, 4:13-18, 9:5-10. Figures 10A and 10B provide a view of the ski system with release logic mechanism 912 in a released state. *Id.*, 10:37-43.



Ex-1001, FIGS. 10A-10B

² All figures in this Petition are annotated unless noted otherwise.

This released state occurs in response to a lateral force acting on the tail of the **ski** that overcomes a release threshold. *Id.*, 10:37-46.

B. Prosecution History

During prosecution of the '953 patent, Examiner issued an obviousness rejection but noted that certain elements contained allowable subject matter, specifically, “determin[ing] a force-couple at a third axis from said first loading and said second loading,” “determin[ing] whether or not the release condition is occurring as a function of the force-couple,” and “ha[ving] a second release, said first release being an attenuated release relative to said second release.” Ex-1009, 147-152.

In response, Patent Owner amended the claims to include these elements, and Examiner issued a notice of allowance. *Id.*, 169, 177-179, 185. But, as discussed below, prior art not applied by Examiner discloses these allegedly allowable features.

C. Level Of Ordinary Skill In The Art

A person of ordinary skill in the art (“POSITA”) at the time of the alleged invention would have had an advanced degree in mechanical engineering and five years of experience in either ski binding design, manufacture, or testing; research concerning ski bindings and related equipment; or the development of standards

concerning ski bindings or related equipment. Ex-1002, Declaration of Maury Hull, Ph.D. (“Decl.”), ¶¶30-32.

D. Claim Interpretation

The Board construes claims according to principles set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). 37 C.F.R. § 42.200(b). No terms need construction to resolve the controversy in this forum.³ *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Because Patent Owner contends in a parallel proceeding that a broad construction should apply for its infringement allegations, the Board should analyze patentability under the same interpretation. While Petitioner may dispute Patent Owner’s proposed constructions in the district court case, applying Patent Owner’s purported reading of the claims, the Challenged Claims are unpatentable in view of the prior art. *See* Ex-1010; Decl., ¶¶52-53; *Google LLC v. AGIS Software Devel., LLC*, IPR2018-01083, Paper 10, 10-11 (Jan. 10, 2019).

III. STATEMENT OF PRECISE RELIEF REQUESTED

Petitioner requests review of the ’953 patent under the following grounds:

³ Petitioner does not concede that any claim term meets the statutory requirements of 35 U.S.C. §§ 101, 112. Claim construction arguments will not be fully briefed at the district court until September 10, 2024, pending the anticipated motion to stay. Ex-1022.

Ground	Reference(s)	Basis	Challenged Claim(s)
1	<i>Freudiger-1</i>	§103	30, 31, 34, 35, 37, 53, 55, 58, and 59
2	<i>Freudiger-1</i> and <i>Gulick</i>	§103	36, 38, 54, 56, and 60
3	<i>Dodge and Howell</i>	§103	30, 31, 34, 35, 37, 53, 55, 58, and 59
4	<i>Dodge, Howell, and Gulick</i>	§103	36, 38, 54, 56, and 60
5	<i>Sittmann</i>	§103	58 and 59
6	<i>Sittmann and Gulick</i>	§103	60

IV. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. Ground 1: *Freudiger-1* Renders Obvious Claims 30, 31, 34, 35, 37, 53, 55, 58, and 59

1. Overview of *Freudiger-1*

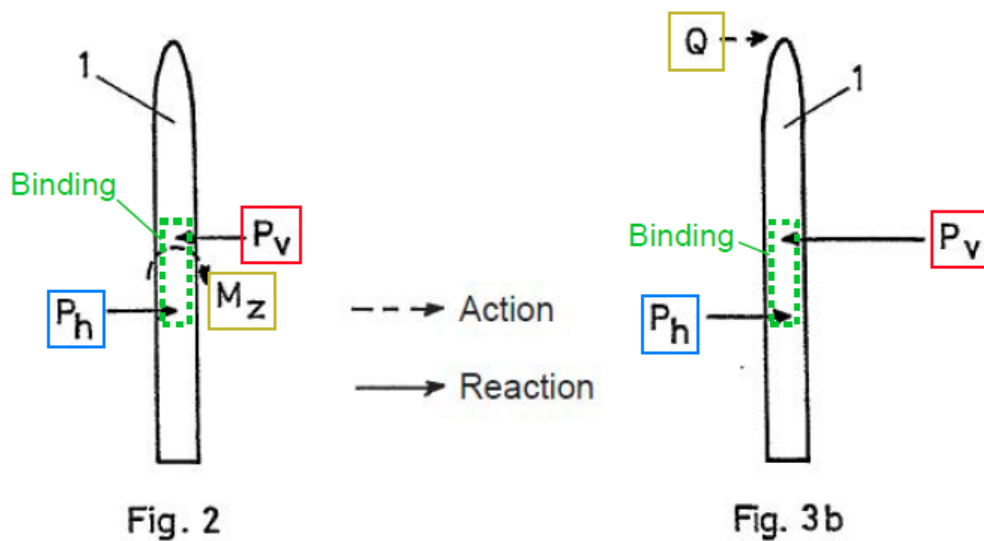
Swiss Patent No. 679213 to Freudiger (“*Freudiger-1*”), issued on January 15, 1992, constitutes prior art under pre-AIA 35 U.S.C. §§ 102(a) and/or 102(b).

Freudiger-1 discloses a “safety ski binding with automatic release force control.” Ex-1003-*Freudiger-1*, 1:3-5. *Freudiger-1* explains that prior ski bindings are unable to “distinguish whether the force on a ski binding comes from the ski boot,” e.g., during active skiing, “or [from] the ski,” e.g., when the skier falls (passive fall stress). *Id.*, 1:36-43.

In active skiing, the skier’s leg exerts a torsional moment M_z on the binding. *Id.*, 2:1-5, 2:31-43. In this loading pattern (called “pure torsional loading”), moment

M_z results in a front reaction force P_v and rear reaction force P_h exerted on the binding's toe jaw and heel jaw, respectively, with forces P_v and P_h being equal in magnitude. *Id.*; Decl., ¶58.

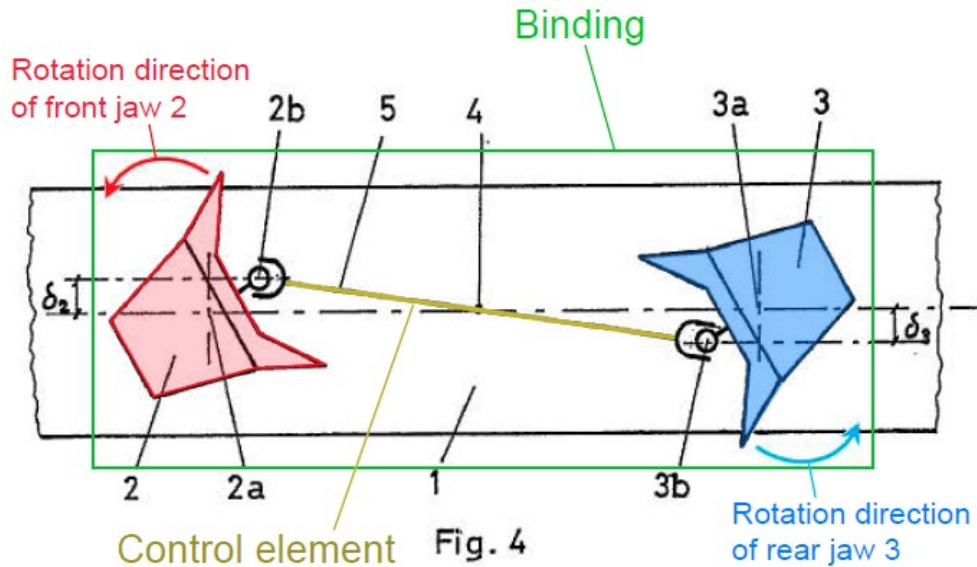
When the skier falls, *Freudiger-1* describes that an external lateral force Q acts on a section of the ski either in front of or behind the binding. Ex-1003-*Freudiger-1*, FIGS. 3a-3b, 2:1-45. In this loading pattern, called “lateral force torsion,” the reaction forces P_v and P_h on the jaws are unequal in magnitude. *Id.*; Decl., ¶58.



Ex-1003-*Freudiger-1*, FIG. 2
(pure torsion)

Ex-1003-*Freudiger-1*, FIG. 3b
(lateral force torsion)

Freudiger-1 distinguished between these loading patterns by providing a “control element [that] can determine at any time whether a particular load case represents pure torsion or lateral force torsion and can control the release force accordingly.” Ex-1003-*Freudiger-1*, 2:8-12; Decl., ¶60.



Ex-1003-Freudiger-1, FIG. 4

During pure torsion (*i.e.*, active skiing), **front jaw 2** and **rear jaw 3** hold the boot until lateral forces exerted on the jaws exceed a threshold release force. Ex-1003-Freudiger-1, FIG. 4, 2:45-53, 3:33-41. When this occurs, **front jaw 2** and **rear jaw 3** pivot away from each other until the boot is released from the **binding**. *Id.*; Decl., ¶62. Alternatively, during lateral force torsion (*i.e.*, a fall), **control element 5** causes “the release force [to] be[] reduced” so that at least one of **front jaw 2** and **rear jaw 3** pivots in response to a smaller applied force, thus releasing the boot more promptly. Ex-1003-Freudiger-1, 2:53-58, 3:53-4:3, FIG. 5; Decl., ¶62.

Freudiger-1 is analogous art to the claims of the '953 patent, Decl., ¶63, and they are related to the same technical field: boot releases for ski bindings. *Compare* Ex-1001, 1:14-17 *with* Ex-1003-Freudiger-1, 1:3-5; *see* *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1004 (Fed. Cir. 2023). *Freudiger-1* is reasonably pertinent

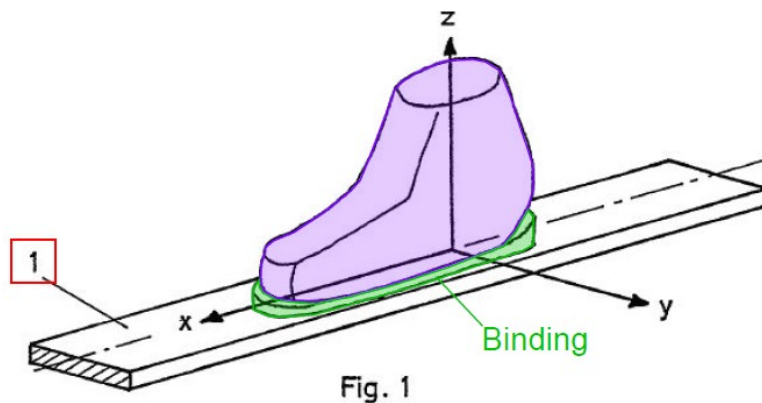
to at least one of the particular problems dealt with by Patent Owner: providing a safer ski binding through programmed logic to decrease the release level in cases of lateral force torsion. Decl., ¶63.

2. Independent Claim 30

Freudiger-1 discloses, or at least renders obvious, each element of claim 30. Decl., ¶¶64-113.

a. [30(Preamble)]

To the extent the preamble is limiting, *Freudiger-1* discloses a **binding** for securing a **boot** to a **ski 1**, thus creating a ski system. Ex-1003-*Freudiger-1*, 1:3-5; Decl., ¶¶65-66.

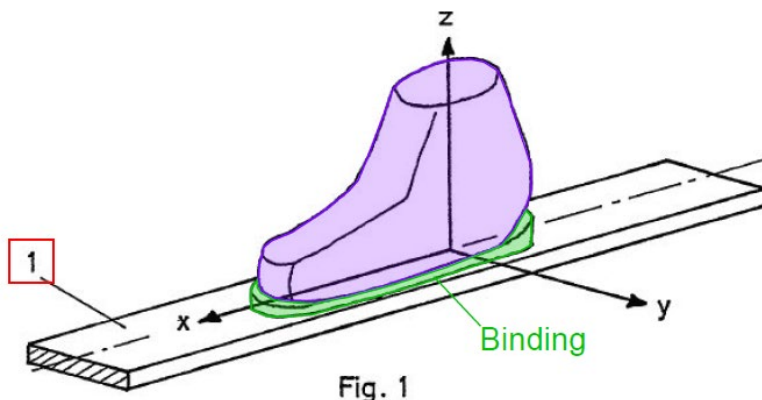


Ex-1003-*Freudiger-1*, FIG. 1

b. [30(a)]

Freudiger-1 discloses, or at least renders obvious, [30(a)] because *Freudiger-1* discloses a “ski **binding**” configured to be attached to a **ski 1**, secure a **boot** during use, and release the **boot** from the **binding** when a force applied to the **binding**

exceeds a certain threshold. Decl., ¶¶67-69; Ex-1003-*Freudiger-1*, 2:6-14, 3:33-41 (“The present invention relates to a safety ski **binding** with automatic release force control.”). The **binding** uses “safety jaw (2, 3) at the front and at the rear of the ski **boot**” to secure the boot to **ski 1**. Ex-1003-*Freudiger-1*, 3:33-34; Decl., ¶¶68.



Ex-1003-*Freudiger-1*, FIG. 1

The **binding**’s safety jaws (**front jaw 2** and **rear jaw 3**) each has a threshold release force established by a spring-biased **ball detent**. Decl., ¶72 (explaining internal **front spring 7a**, **rear spring 7b**, **spring plate 10**, and **ball detent**); Ex-1003-*Freudiger-1*, FIGS. 7-8, 2:58-3:7, 3:33-4:3.

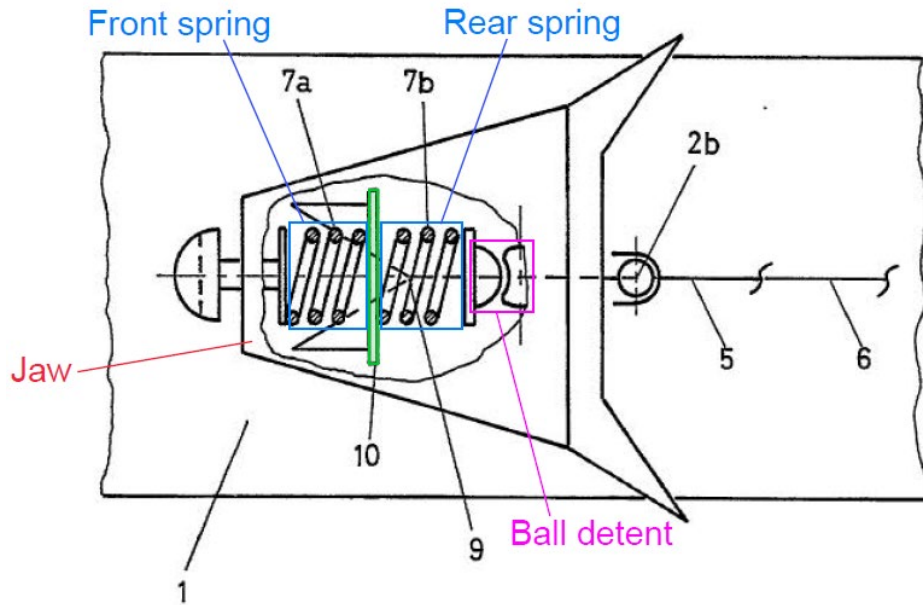
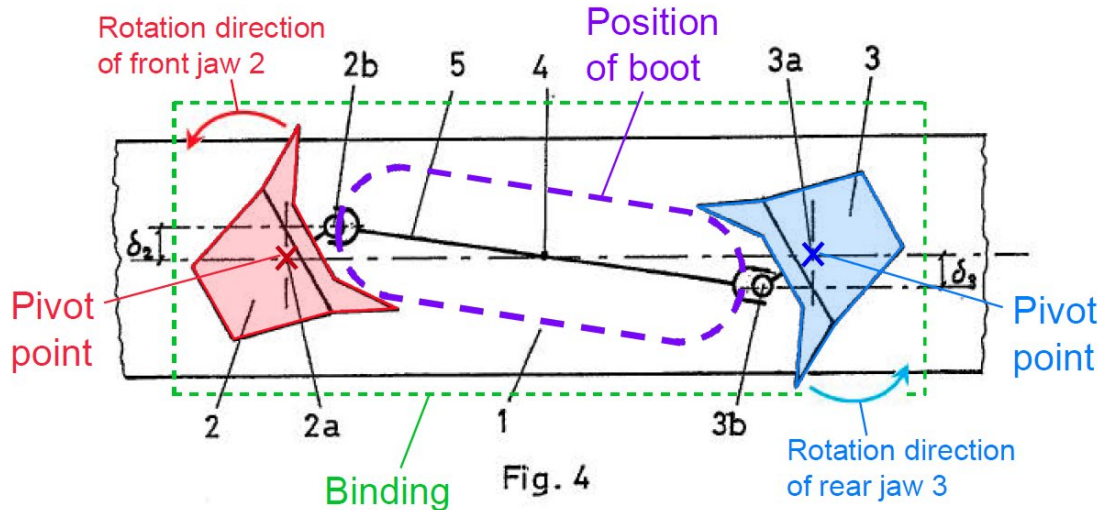


Fig. 8

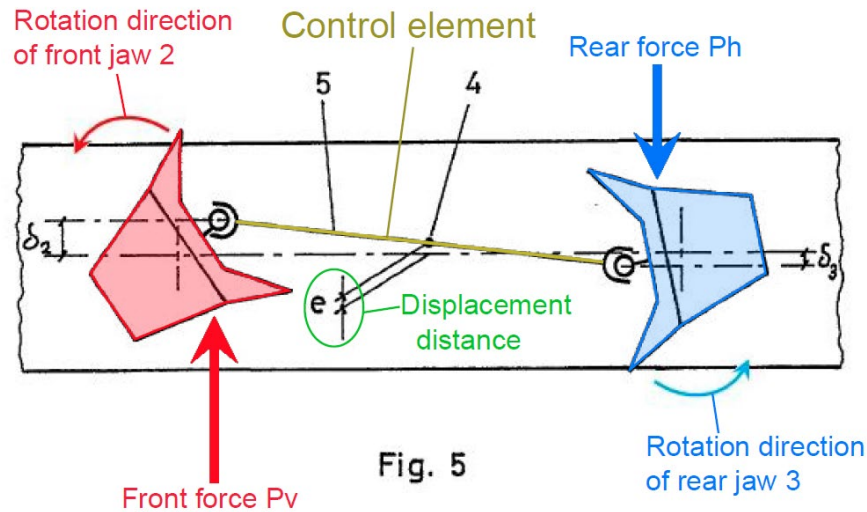
Ex-1003-Freudiger-1, FIG. 8

Freudiger-1 discloses that **front jaw 2** is configured to rotate about a “pivot point (2a)” when it experiences a load exceeding “the release force of the jaw” (*i.e.*, its threshold release force). *Ex-1003-Freudiger-1*, 2:46-49, 3:33-41. **Rear jaw 3** similarly rotates about “pivot point (3a)” in response to a threshold release force. *Id.* “Simultaneous deflection of the **front** and **rear jaws**” causes a “twist between the ski **boot** and the ski” such that the **boot** releases from the **binding**. *Id.*, 3:11-16, 3:33-36; Decl., ¶71.



Ex-1003-Freudiger-1, FIG. 4

During active skiing (*i.e.*, pure torsion), the threshold release forces of **front jaw 2** and **rear jaw 3** remain at their normal, non-reduced levels. Ex-1003-Freudiger-1, 2:49-53, 3:24-25; Decl., ¶79. This changes when the skier falls because **front jaw 2** and **rear jaw 3** are configured so “the release force [is] reduced in the presence of a transverse force torsion.” Ex-1003-Freudiger-1, 1:49-57, 2:6-12, 3:33-41, 3:53-4:3; Decl., ¶¶73-75. This occurs because lateral (or transverse) force torsion causes the jaws to experience unequal reaction forces, Decl., ¶¶58, 73, causing a “lateral deflection” of **control element 5** by **distance “e,”** reducing “the release force” in at least one of the **front** and **rear** jaw. Ex-1003-Freudiger-1, 2:53-3:5; 3:53-4:3; Decl., ¶¶74-76.



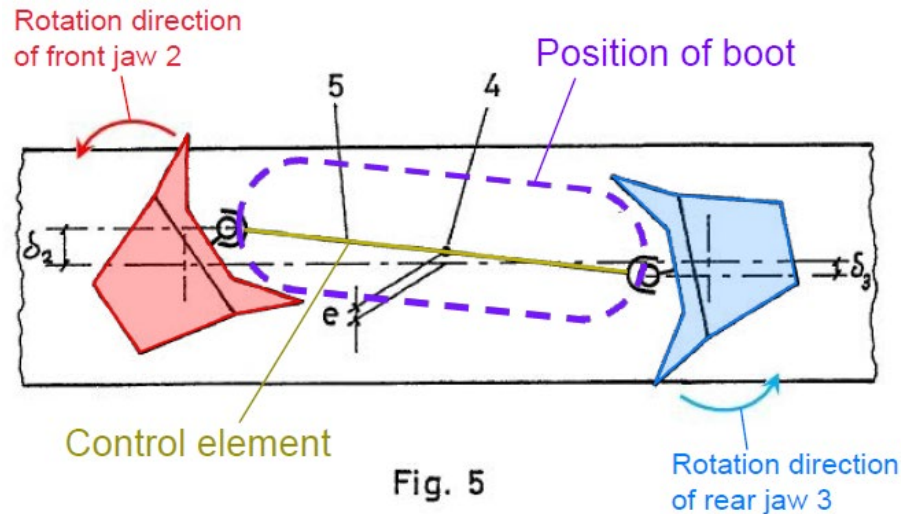
Ex-1003-Freudiger-1, FIG. 5

Accordingly, *Freudiger-1*'s binding has a “first release,” occurring during lateral force torsion when an applied load exceeds the reduced threshold release force and causes the boot release. Ex-1003-Freudiger-1, 1:49-57, 2:6-12, 2:53-3:7, 3:33-41; Decl., ¶¶75-78.

c. [30(b)]

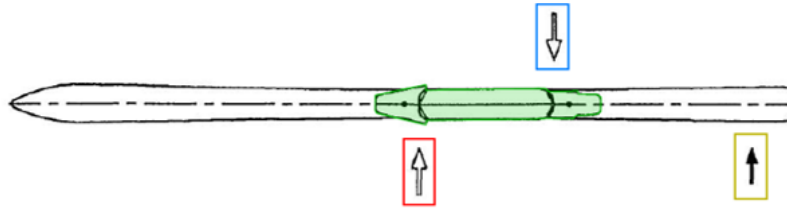
Freudiger-1 discloses, or at least renders obvious, [30(b)]. Decl., ¶¶81-88. Mechanical components of *Freudiger-1*, including front jaw 2, rear jaw 3, and control element 5, form a “release logic” because together they perform a logical operation (“determin[ing] at any time whether a particular load case represents pure torsion or lateral force torsion”) and then cause “the release force [to] be[] reduced in the presence of a transverse force torsion.” Ex-1003-Freudiger-1, 2:6-3:11, 3:33-4-4:3; Decl., ¶84. Further, these “release logic” components are configured to release the boot at the “first release” when a desired release condition occurs. Here,

the “first release” occurs when “the release force [is] reduced in the presence of a transverse force torsion” and a load applied to the binding exceeds that reduced threshold release force. *Id.*; Decl., ¶¶73-76, 85.



Ex-1003-Freudiger-1, FIG. 5 (boot release in lateral force torsion)

Freudiger-1 explains that a release occurs under lateral force torsion when excessive “forces act in the y-direction far enough away from the ski boot.” Ex-1003-Freudiger-1, 1:54-56, FIG. 3b; Decl., ¶¶87-88. Even if the claims were limited to a force applied to the ski’s inside edge, as Patent Owner may improperly argue, *Freudiger-1* suggests that the force may be applied to the inside tail edge of the ski. Decl., ¶¶87-88; Ex-1003-Freudiger-1, 1:54-56. A POSITA also would have been familiar with *Freudiger-2*’s Figure 1c, showing similar first and second reaction forces caused by an external force applied to the ski’s inside tail edge, and would have understood that this force acts in the y-direction far from the boot. Decl., ¶88.



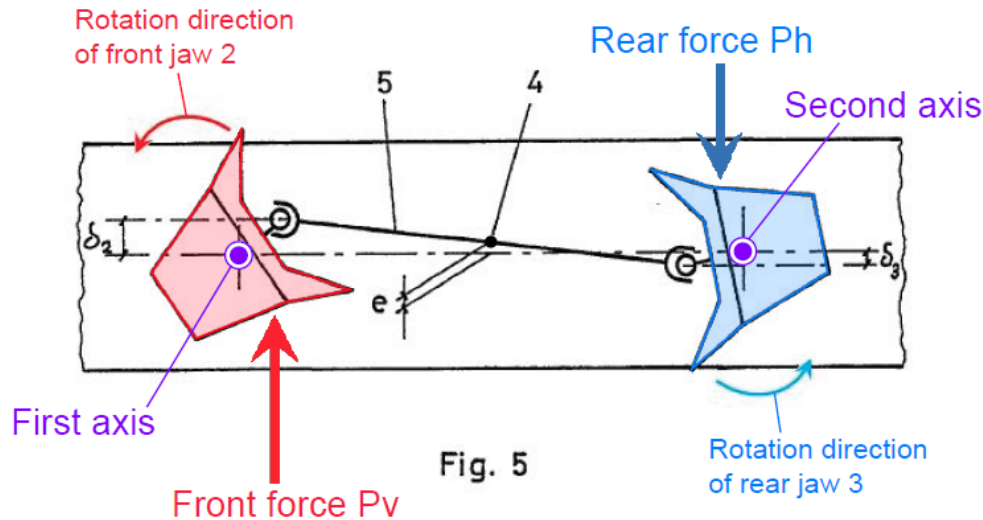
Ex-1004-Freudiger-2, FIG. 1c

Thus, *Freudiger-1* teaches this element.

d. [30(c)]

Freudiger-1 discloses, or at least renders obvious, [30(c)]. Decl., ¶¶89-99. *Freudiger-1* explains that an external load causes “reaction forces acting on the front and rear jaws” of the binding. Ex-1003-*Freudiger-1*, 2:34-40, FIGS. 3a-3b. Here, forces **Pv** on **front jaw 2** and **Ph** on **rear jaw 3** correspond to the claimed “first loading” and “second loading,” respectively, since both are internal forces occurring in reaction to an external loading on the binding. Ex-1003-*Freudiger-1*, 2:20-22, 2:34-45; Decl., ¶92.

Freudiger-1’s binding is configured to “assess” these forces by enabling rotation of **front jaw 2** and **rear jaw 3** in response to **Pv** and **Ph**, respectively. Decl., ¶92; see Ex-1003-*Freudiger-1*, 2:37-40, 3:7-36. Specifically, **Pv** is assessed about a “**first axis**” corresponding to a vertical pivot axis through pivot point 2a of **front jaw 2**. *Id.*, 2:45-49, 3:33-36; Decl., ¶¶92-93. Similarly, **Ph** is assessed about a “**second axis**” corresponding to a vertical pivot axis through pivot point 3a of **rear jaw 3**. Decl., ¶¶92-93; see Ex-1003-*Freudiger-1*, 2:45-49, 3:33-36.



Ex-1003-Freudiger-1, FIG. 5

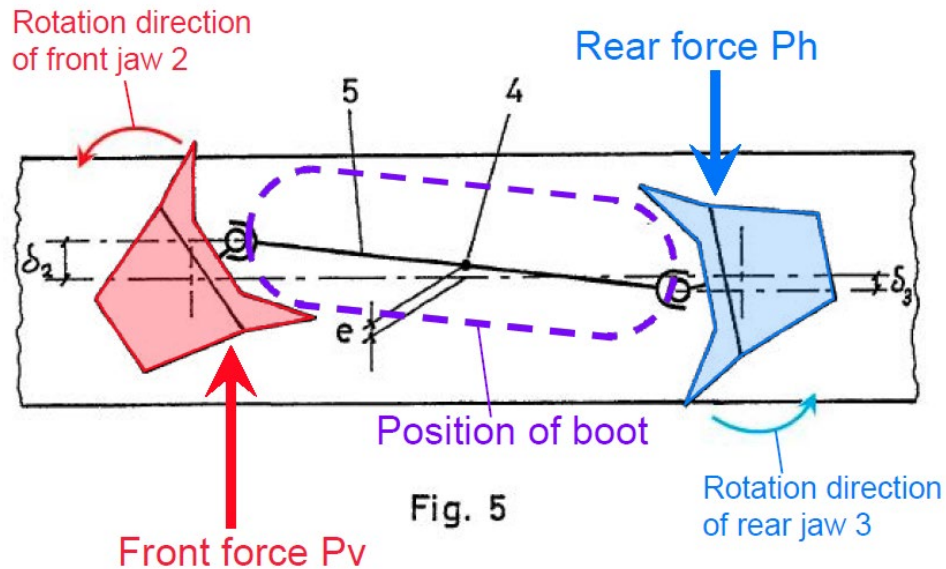
As shown in Figure 5 above, the **second axis** is spaced from and substantially parallel to the **first axis**. *Id.*; Decl., ¶93.

e. [30(d)]

Freudiger-1 discloses, or at least renders obvious, [30(d)]. Decl., ¶¶100-106.

Freudiger-1's release logic can “determine at any time whether a particular load case represents pure torsion or lateral force torsion.” Ex-1003-*Freudiger-1*, 2:6-12. This determination is made as a function of first loading **Pv** and second loading **Ph** because the release logic detects lateral force torsion when these loadings are unequal in magnitude, reducing “the release force” in response. *Id.*, 2:53-58, 3:53-4:3; Decl., ¶102. That is, **front jaw 2** and **rear jaw 3** set the force release threshold to either the normal or reduced threshold based on whether reaction forces **Pv** and **Ph** are equal or unequal in magnitude. Decl., ¶102; *see* Ex-1003-*Freudiger-1*, 2:6-12, 2:37-40, 3:53-4:3.

During falls, *Freudiger-1*'s release logic causes the binding to release the boot when the "release condition" is satisfied (*i.e.*, when a load on the binding exceeds the reduced threshold release force) by at least one of front jaw 2 and rear jaw 3 rotating so far that the boot is freed. *Id.*; Decl., ¶103.



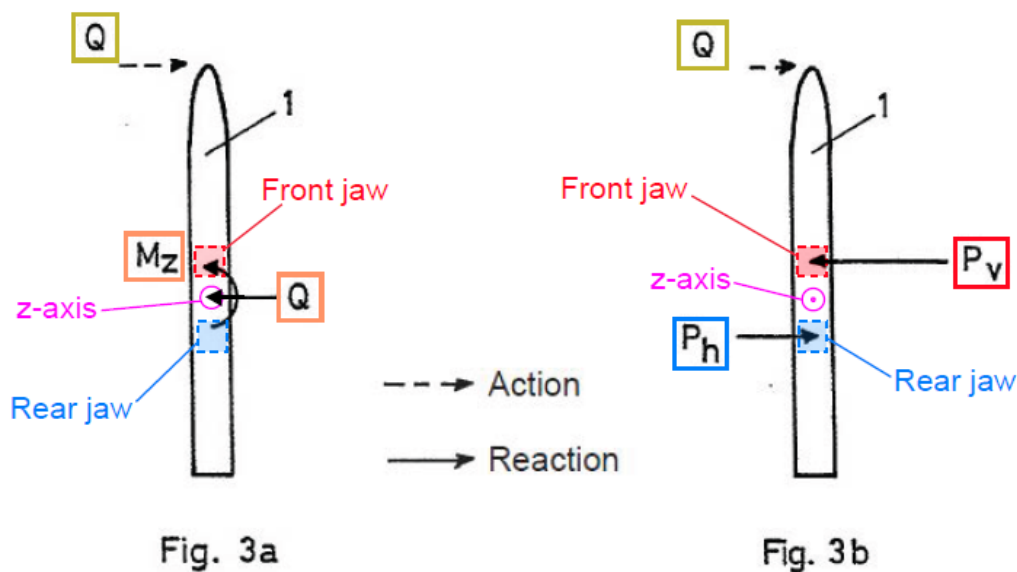
Ex-1003-*Freudiger-1*, FIG. 5 (lateral force torsion)

Thus, *Freudiger-1* discloses, or at least suggests, this claim element. A POSITA would have both understood and found it obvious that *Freudiger-1*'s release logic is configured to determine the forces at the front and rear jaws and cause the release force threshold to remain "unchanged" if $P_v = P_h$ and to reduce the release force threshold if $P_v \neq P_h$. Ex-1003-*Freudiger-1*, 3:17-28; Decl., ¶¶104-106. Thus, a POSITA would have understood that the release logic's reduction of the necessary release threshold is a function of the forces at the front and rear jaws. *Id.*

f. [30(e)]

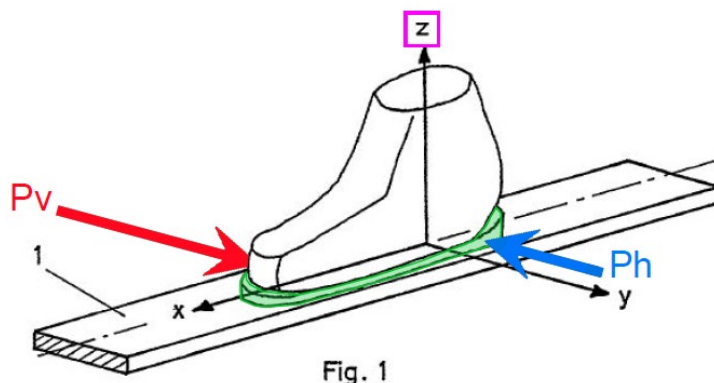
Freudiger-1 discloses, or at least renders obvious, [30(e)] because *Freudiger-1*'s binding is configured to determine a force-couple formed from first loading P_v and second loading P_h at a third axis. Decl., ¶¶107-113; Ex-1003-*Freudiger-1*, 2:27-34, 2:40-43, 3:33-41. *Freudiger-1*'s release logic is configured to determine whether a load on the binding exceeds the threshold release force as a function of the force-couple. Decl., ¶¶108, 112.

In Figures 3a-3b, *Freudiger-1* shows an external force Q acting on the ski during lateral force torsion. Ex-1003-*Freudiger-1*, 2:34-37. In reaction, the binding experiences “a torsional moment M_z and a lateral force Q ,” which can be “divided into the reaction forces acting on the front (P_v) and rear (P_h) jaws.” *Id.*, FIGS. 3a-3b, 2:34-40; Decl., ¶110.



**Ex-1003-Freudiger-1, FIGS. 3a & 3b (with legend from FIG. 2)
(lateral force torsion)**

Moment M_z is applied by the skier's leg to the binding around the vertical z -axis (i.e., a “third axis”), depicted in Figure 1 below. Decl., ¶111; see Ex-1003-Freudiger-1, 2:1-5, 2:27-34. Thus, the force-couple formed from front force P_v and rear force P_h is also applied to the binding around the z -axis. Decl., ¶111.



Ex-1003-Freudiger-1, FIG. 1

Further, the binding is configured to “determine whether or not the release condition is occurring as a function of the force-couple” formed from forces P_v and P_h . Decl., ¶¶112; Ex-1003-Freudiger-1, 2:6-12, 2:40-45, 3:53-4:3. As explained above for [30(d)], the release logic is configured to set the binding's force release threshold based on whether forces P_v and P_h are equal in magnitude. See *supra* Section IV.A.2.e. Thus, the release logic determines whether the release condition is occurring as a function of the force-couple, since the force threshold is selected based on the relative magnitudes of forces P_v and P_h (which form the force-couple) and torsional moment M_z . Decl., ¶112.

Freudiger-1 suggests that a force-couple is determined at a third axis from said first and second loadings. Because *Freudiger-1* provides lateral release capabilities when a skier falls, a POSITA would have both understood and found it obvious that the reaction forces, **Pv** and **Ph**, create a force-couple around the **z-axis**: an area of concern for injuries as it corresponds to the skier's lower leg and knee. Decl., ¶113.

3. Independent Claim 53

Freudiger-1 discloses, or at least renders obvious, each element of claim 53.

a. *[53(Preamble)]-[53(d)]*

These elements are substantially identical to [30(Preamble)]-[30(d)] above. Accordingly, for the reasons discussed in Sections IV.A.2.a-IV.A.2.e, *Freudiger-1* discloses, or at least renders obvious, these elements.

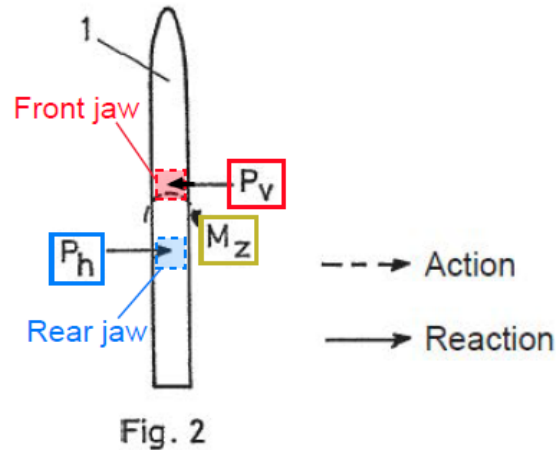
b. *[53(e)]*

Freudiger-1 discloses [53(e)] because the ski binding of *Freudiger-1* performs a “second release” of the boot during pure torsional loading. Decl., ¶¶120-127; Ex-1003-*Freudiger-1*, 2:6-12, 3:8-11, 3:23-28, 3:33-41.

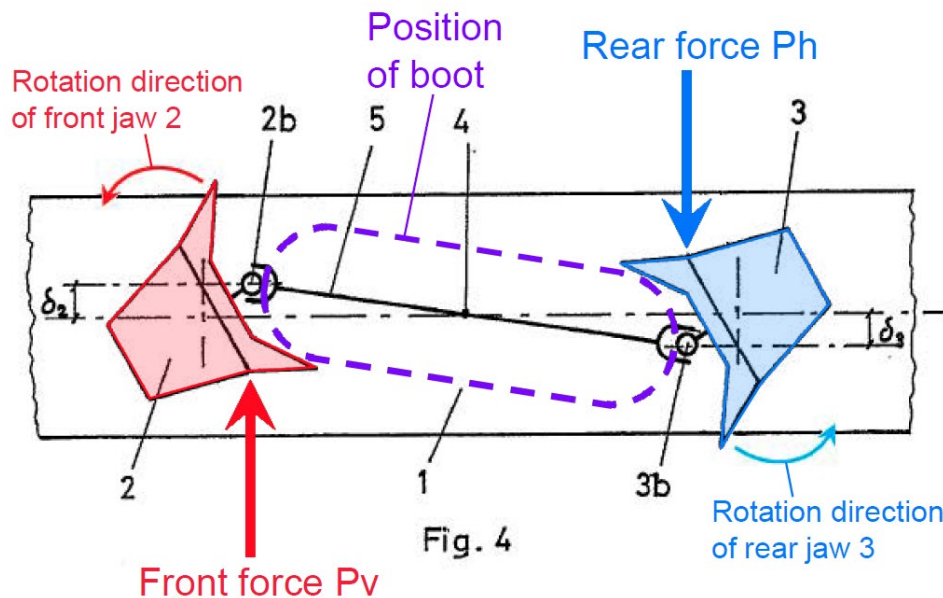
As discussed above for [30(a)], the threshold release forces of **front jaw 2** and **rear jaw 3** remain at their normal, non-reduced levels during pure torsion. *Supra* Section IV.A.2.b. When the jaws experience loads exceeding the normal release threshold, “[s]imultaneous deflection of the **front** and **rear jaws**” occurs such that “the total angle of twist between the ski **boot** and the ski is increased” and the **boot**

is released. Ex-1003-*Freudiger-1*, 2:49-53, 3:11-16, 3:33-36; Decl., ¶¶122-123.

This boot release during pure torsion corresponds to the claimed “second release.”



Ex-1003-*Freudiger-1*, FIG. 2 (pure torsion)



Ex-1003-*Freudiger-1*, FIG. 4 (boot release during pure torsion)

Further, *Freudiger-1* discloses, or at least suggests, “said first release being an attenuated release relative to said second release,” as claimed, because the first

release threshold in lateral force torsion is “reduced” compared to the second release threshold in pure torsion. Ex-1003-*Freudiger-1*, 3:53-4:3; Decl., ¶¶124-127.

4. Independent Claim 58

Freudiger-1 discloses or at least renders obvious each element of claim 58.

a. ~~[58(Preamble)]–[58(b)]~~

These elements are substantially identical to or present in [30(preamble)]–[30(b)], and [53(preamble)]–[53(b)] above. Accordingly, for the reasons discussed in Sections IV.A.2.a-IV.A.2.c, *Freudiger-1* discloses, or at least renders obvious, elements [58(Preamble)]–[58(b)].

b. ~~[58(c)]~~

Freudiger-1 discloses, or at least renders obvious, [58(c)]. Decl., ¶¶132-147.

Freudiger-1 explains that under either pure torsional loading or lateral force torsion, reaction forces **Pv** (“first loading”) and **Ph** (“second loading”) are exerted on **front jaw 2** and **rear jaw 3**, respectively, in response to an **external load**. *Id.*; 125; Ex-1003-*Freudiger-1*, 2:1-5, 2:20-45.

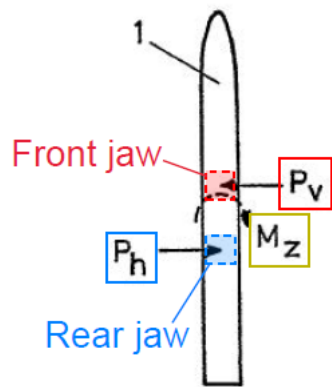


Fig. 2

**Ex-1003-Freudiger-1, FIG. 2
(modified)(pure torsion)**

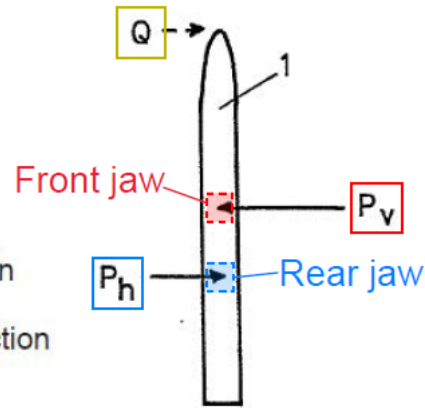
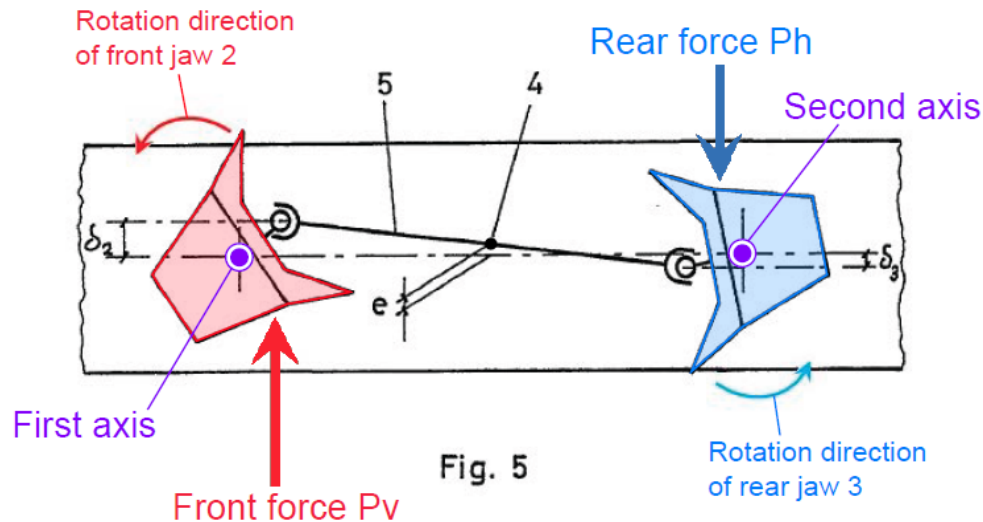


Fig. 3b

**Ex-1003-Freudiger-1, FIG. 3b
(lateral force torsion)**

Freudiger-1's binding enables rotation of **front jaw 2** in response to **force P_v**, such that the first loading is experienced internal to the ski system about a "**first axis**" corresponding to the rotational axis of **front jaw 2**. Decl., ¶¶90, 92; Ex-1003-*Freudiger-1*, 2:45-47, 3:33-36. Similarly, *Freudiger-1*'s binding enables rotation of **rear jaw 3** in response to **force P_h**, such that the second loading is experienced internal to the ski system about a "**second axis**" corresponding to the rotational axis of **rear jaw 3**. Decl., ¶¶90, 92; Ex-1003-*Freudiger-1*, 2:47-49, 3:33-36. Only once the first loading and second loading deflect the **front jaw** and **rear jaw** far enough apart is the boot freed from the binding. Decl., ¶135; Ex-1003-*Freudiger-1*, 3:8-11, 3:33-36.



Ex-1003-Freudiger-1, FIG. 5 (lateral force torsion)

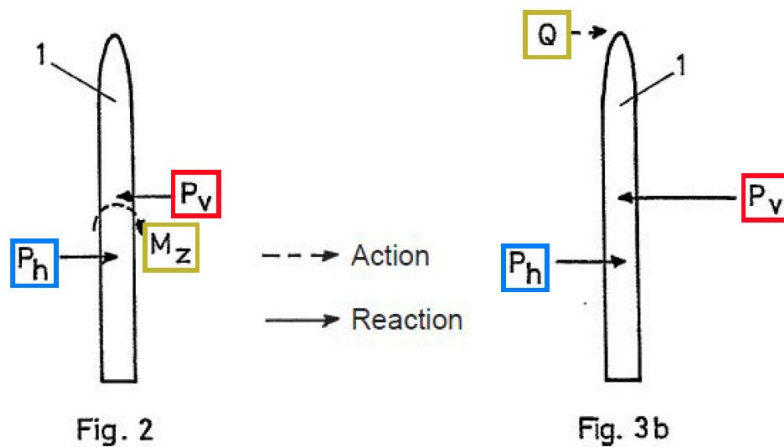
Regarding the claimed “first defined level” and “second defined level,” and as discussed above for [30(a)], the amount of force required to rotate one or both of **front jaw 2** and **rear jaw 3** in order to release the boot is reduced during lateral force torsion. *Supra* Section IV.A.2.b; Decl., ¶¶72-78. Therefore, *Freudiger-1*’s binding has a “first defined level” corresponding to the amount of force required to rotate **front jaw 2** to an open position, and a “second defined level” corresponding to the amount of force required to rotate **rear jaw 3** to an open position. Decl., ¶¶138-139; Ex-1003-Freudiger-1, 3:8-11.

Accordingly, *Freudiger-1*’s release logic activates the “first release” of the boot substantially only when (i) the “first loading” is applied to **front jaw 2** with the magnitude necessary to rotate **front jaw 2** far enough from **rear jaw 3**, and (ii) the “second loading” is applied to **rear jaw 3** with the magnitude necessary to rotate

rear jaw 3 far enough from front jaw 2, so that the boot is freed from both jaws.

Decl., ¶¶138-139.

Patent Owner appears to contend that the claimed “first defined sense” and “second defined sense” refer to the directions in which the first and second loadings are applied, respectively. Decl., ¶¶143-145; Ex-1010, 25-27. *Freudiger-1* explains that under both lateral force torsion and pure torsion, front jaw 2 and rear jaw 3 experience reaction forces P_v and P_h acting in opposite directions. Decl., ¶146; Ex-1003-*Freudiger-1*, FIGS. 2, 3b. Thus, the release logic of *Freudiger-1* activates the “first release” substantially only when first loading P_v has a first defined sense in one direction and second loading P_h has a second defined sense in another direction. Ex-1003-*Freudiger-1*, FIGS. 1-3, Decl., ¶146.



Ex-1003-*Freudiger-1*, FIG. 2
(pure torsion)

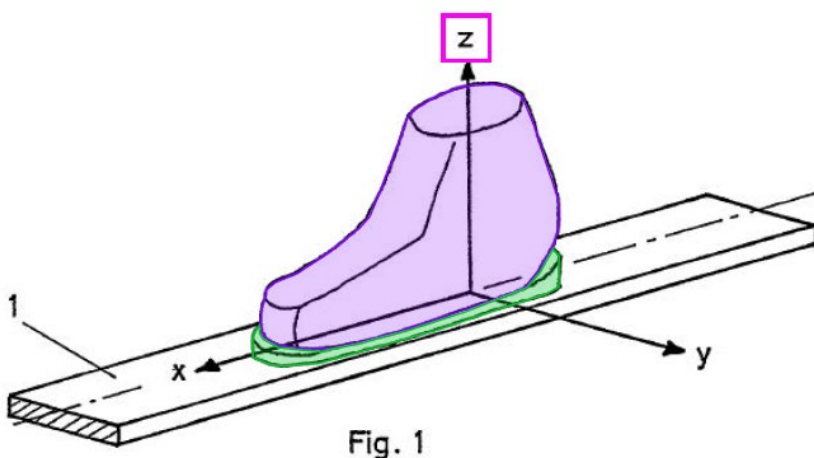
Ex-1003-*Freudiger-1*, FIG. 3b
(lateral force torsion)

c. [58(d)]

This element is substantially identical to element [53(e)], discussed above. For the reasons discussed in Section IV.A.3.b, *Freudiger-1* discloses, or at least renders obvious, this element.

5. Claim 31

Freudiger-1 discloses, or at least renders obvious, this element.



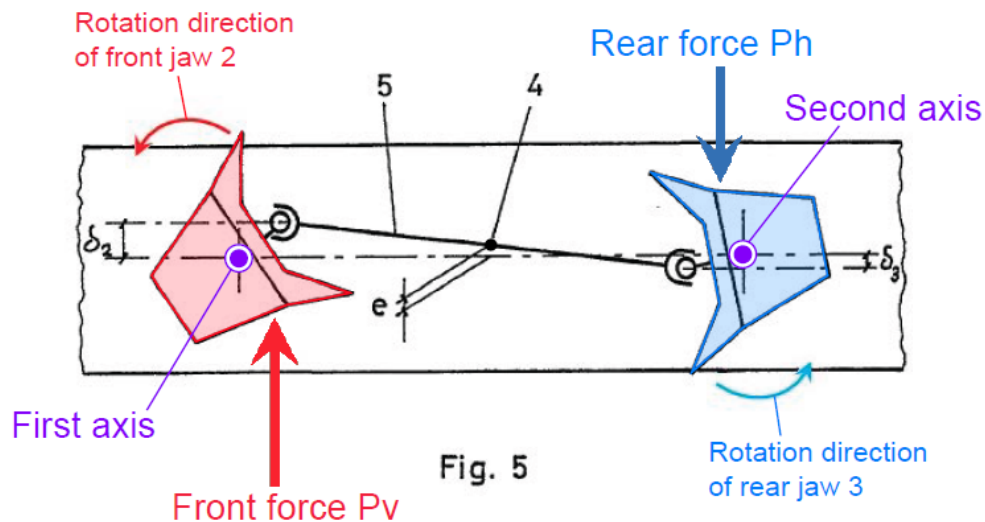
Ex-1003-*Freudiger-1*, FIG. 1

As depicted in Figure 1 above, the vertical **z-axis** in the coordinate system of *Freudiger-1*'s **binding** (i.e., the “third axis”) closely corresponds with the position of the skier's lower leg, and thus is “substantially coincident” with the skier's tibial axis. Decl., ¶¶150-152; see Ex-1003-*Freudiger-1*, 1:44-46, 2:27-34.

A POSITA would have both understood and found it obvious that *Freudiger-1*'s **z-axis** corresponds to the tibial axis, as shown in Figure 1. Decl., ¶¶150-152; see also Ex-1007-*Howell*, [0011], Ex-1004-*Freudiger-2*, [0002]-[0003].

6. Claim 34

Freudiger-1 discloses, or at least renders obvious, this element. Decl., ¶¶153-156. When an external load is applied, first loading **Pv** creates a first moment about the “**first axis**” through pivot point (2a) of **front jaw 2**. *Id.*, ¶154; Ex-1003-*Freudiger-1*, 1:44-46, 2:31-34, 2:45-47, 3:33-36. Similarly, second loading **Ph** creates a second moment about the “**second axis**” through pivot point (3a) of **rear jaw 3**. *Id.*



Ex-1003-*Freudiger-1*, FIG. 5

The binding assembly of *Freudiger-1* is configured to “determine the force-couple from the first moment and the second moment,” as claimed, because each of **front jaw 2** and **rear jaw 3** pivot only if the moments overcome each jaw’s threshold release force. Decl., ¶155; see Ex-1003-*Freudiger-1*, FIGS. 3a-3b, 2:46-3:16, 3:31-39, 3:53-4:3.

A POSITA would have at least found this element obvious in view of *Freudiger-1* considering the POSITA would have understood that the internal loadings create moments and would have further understood from *Freudiger-2* that determining a force-couple from these moments is important because it is desirable to release a boot when small moments around the tibia are experienced. Decl., ¶156; Ex-1004-*Freudiger-2*, [0002]-[0003].

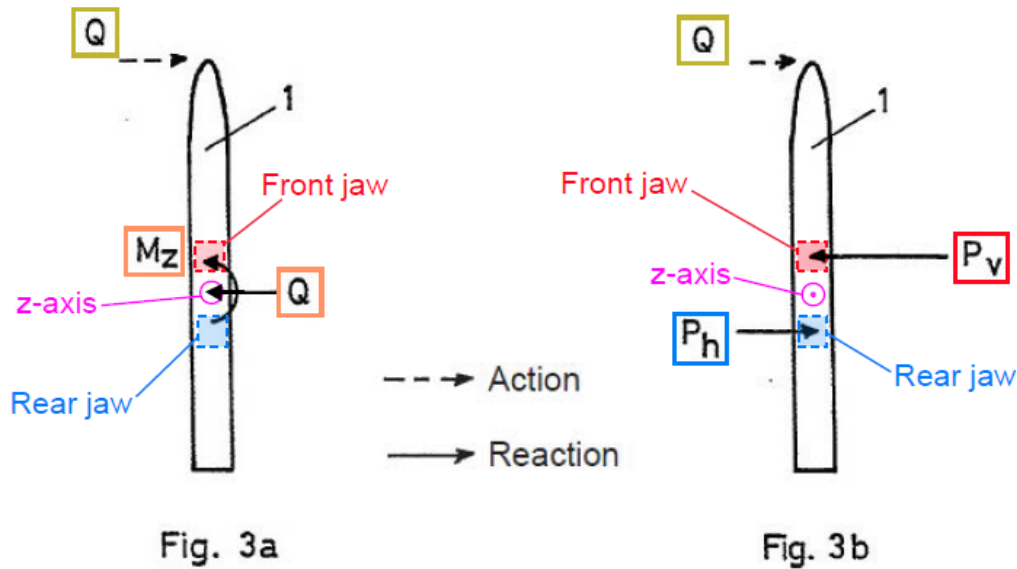
7. Claim 35

This claim is substantially identical to element [53(e)]. For the reasons discussed above in Section IV.A.3.b, *Freudiger-1* discloses, or at least renders obvious, this claim.

8. Claims 37, 55, and 59

Freudiger-1 discloses, or at least renders obvious, these additional elements. Decl., ¶¶158-163.

Freudiger-1's first release occurs when a load exceeding the reduced threshold release force is exerted on the binding during lateral force torsion. *Supra* Section IV.A.2.b.



**Ex-1003-Freudiger-1, FIGS. 3a & 3b (with legend from FIG. 2)
(lateral force torsion)**

This loading causes a first torque acting on the binding about the **z-axis**, which substantially coincides with the skier's tibial axis. Decl., ¶¶150-152; *see* Ex-1003-Freudiger-1, 2:6-12, 3:33-41, 3:53-4:3; *supra* Section IV.A.5. This first torque causes “[s]imultaneous deflection of the **front** and **rear jaws**” so “the total angle of twist between the ski **boot** and the ski is increased,” thus releasing the **boot** from the binding. Ex-1003-Freudiger-1, 3:11-15, 3:33-41; Decl., ¶159.

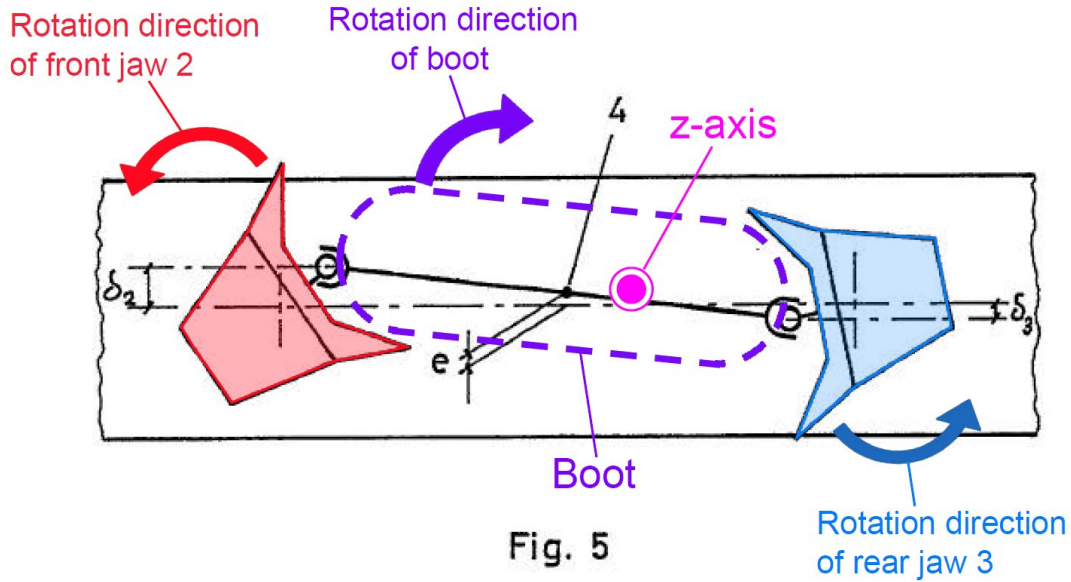


Fig. 5

Ex-1003-Freudiger-1, FIG. 5

Freudiger-1's second release occurs when a force exceeding the non-reduced threshold release force is exerted on the binding during pure torsion (e.g., during active skiing). *Supra* Section IV.A.3.b. Under pure torsion, the applied load causes a second torque acting on the binding about the **z-axis**. Decl., ¶160; *see* Ex-1003-*Freudiger-1*, 1:44-46, 2:31-34.

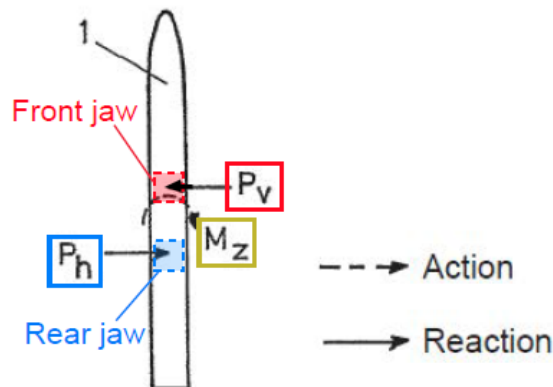
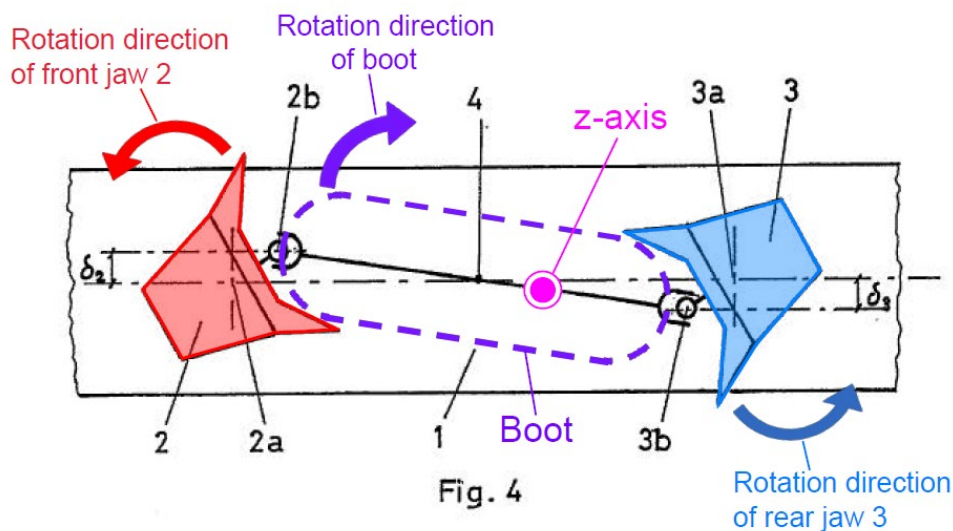


Fig. 2

Ex-1003-Freudiger-1, FIG. 2 (pure torsion)

This second torque also causes front jaw 2 and rear jaw 3 to pivot until boot release. See Ex-1003-Freudiger-1, 3:11-15, 3:33-41. The second torque (in pure torsion) is larger in magnitude than the first torque (in lateral force torsion) because the second torque has to exceed the larger, non-reduced release force to cause boot release, while the first torque only has to exceed the reduced release force. Decl., ¶160; see also Ex-1003-Freudiger-1, 4:1-3



Ex-1003-Freudiger-1, FIG. 4

Freudiger-1 suggests that the first release is a “first release torque about a tibial axis” and the second release is a “second release torque about a tibial axis” because a POSITA would have both understood and found it obvious that external loads on a ski binding assembly result in torques acting about the skier’s tibia. Decl., ¶161; see Ex-1007-Howell, [0011], Ex-1008-Gulick, 31, Ex-1004-Freudiger-2,

[0002]-[0004] (explaining that it is desirable to release the boot from the binding under small torques around the tibia).

B. Ground 2: *Freudiger-1* and *Gulick* Render Obvious Claims 36, 38, 54, 56, and 60

1. Overview of *Gulick*

David W. Gulick & C. D. Mote, *Design of a Learning Binding for Alpine Skiing*, in 13 SKIING TRAUMA AND SAFETY: THIRTEENTH VOLUME, ASTM STP 1397, 30-49 (Robert J. Johnson et al. eds., 2000) (“*Gulick*”), published in January 2000, constitutes prior art under pre-AIA 35 U.S.C. §§ 102(a) and/or 102(b).

Gulick recognized that skiers commonly suffer knee injuries because the release settings of then-existing bindings did not account for “the maximum forces during skiing” or for “changes in snow conditions, skiing style, and other unmeasurable variables.” Ex-1008-*Gulick*, 30-31. Therefore, *Gulick* developed a “learning binding” model with variable release settings that adapt to real-time changes in forces experienced during skiing. *Id.*, 31-32.

Gulick used an experimental binding with [force sensors](#) to collect force and moment measurements exerted by the skier during skiing. *Id.*, 32-34. The binding was set using the ASTM-recommended release settings for each skier. *Id.*, 33, Table 1.

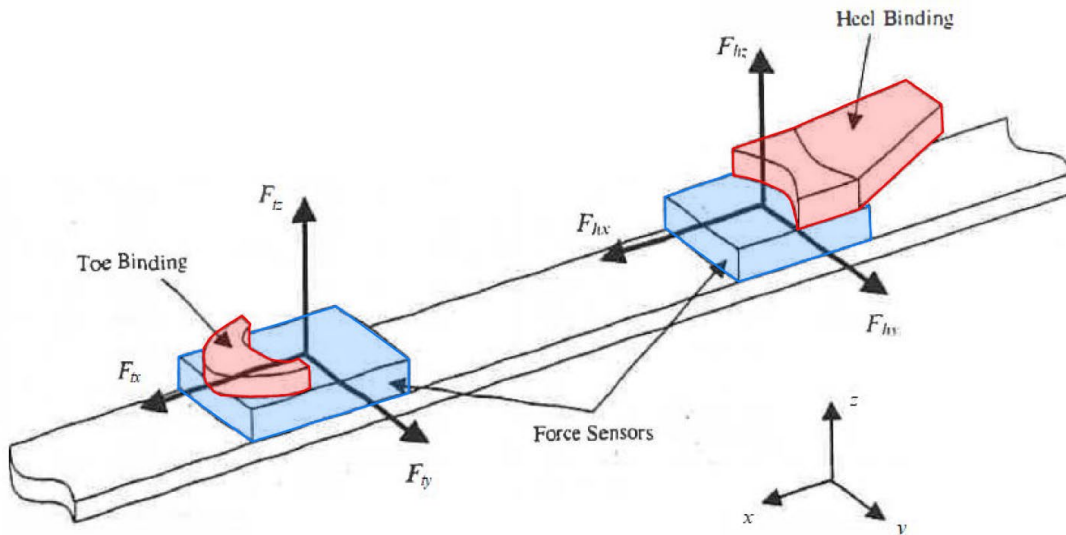


FIG. 1—Instrumented ski and force components.

Ex-1008-Gulick, FIG. 1

Gulick found that the ASTM-recommended release settings “substantially exceed[ed] the maximum forces generated by a great majority of skiers during normal downhill skiing,” suggesting that the ASTM settings are higher than necessary. *Id.*, 43-47; see also Ex-1004-Freudiger-2, [0003]. *Gulick*’s learning binding’s release settings were “on average at least 22% less than the corresponding ASTM recommended settings.” Ex-1008-Gulick, 47. As a result, *Gulick*’s learning binding effectuated earlier releases in dangerous falling scenarios without causing inadvertent releases, suggesting that the learning binding “can significantly improve the safety of alpine skiing” without hindering performance. *Id.*, 30, 32, 47.

Gulick is analogous art to the claims of the ’953 patent and is related to the same technical field: ski binding releases designed to reduce injuries. Decl., ¶170; compare Ex-1001, 1:14-17 with Ex-1008-Gulick, 30-32; see *Corephotonics*, 84

F.4th at 1004. *Gulick* is reasonably pertinent to at least one of the particular problems dealt with by Patent Owner: providing a safer ski binding. Ex-1001, 1:14-17.

2. Rationale for Combining *Freudiger-1* and *Gulick*

A POSITA would have been motivated to combine the teachings of *Freudiger-1* and *Gulick* because doing so would have been obvious, beneficial, and predictable. Decl., ¶¶171-178. A POSITA would have been specifically motivated to incorporate *Gulick*'s teaching regarding ski binding release thresholds below the ASTM-recommended levels because this teaching would have addressed the goals of *Freudiger-1*. *Id.*, ¶170.

A POSITA would have understood, or found it obvious, that *Freudiger-1*'s "second release" (*see supra* Section IV.A.3.b) is set to the ASTM-recommended release setting in accordance with industry standard. *Id.*, ¶172; Ex-1011, Intro; Ex 1006-*Gulick*, 30, 32. A POSITA further would have understood from *Gulick* that the ASTM-recommended settings exceed the maximum forces generated by most skiers. Decl., ¶172; Ex-1008-*Gulick*, 32, 47; Ex-1007-*Howell*, [0008].

Freudiger-1 confirms this by explaining the need to distinguish pure torsion from lateral force torsion and to decrease the release threshold when lateral force torsion occurs. Ex-1003-*Freudiger-1*, 2:1-12, 3:53-4:3. Therefore, as indicated by *Freudiger-1* and *Gulick*, a POSITA would have been motivated to release the boot

more readily under lateral force torsion. Decl., ¶173; *see* Ex-1008-*Gulick*, 30, 32, 47; Ex-1003-*Freudiger-I*, 1:39-43; 1:49-54, 2:1-12.

While *Freudiger-I* discloses a “first release” (*see supra* Section IV.A.2.b) in which “the release force [is] reduced” due to “the presence of a transverse force torsion,” *Freudiger-I* does not quantify the reduction of the release threshold for the first release. Thus, a POSITA would have looked to *Gulick* for further instruction on the magnitude of the threshold reduction for *Freudiger-I*’s first release. Decl., ¶174.

The release settings calculated by *Gulick*’s learning binding were “on average at least 22% less than the corresponding ASTM recommended setting.” Ex-1008-*Gulick*, 47. As a result, *Gulick*’s binding “yield[ed] earlier releases in several falling scenarios” compared to the bindings with ASTM-recommended settings, suggesting that a binding with release settings below ASTM-recommended levels “can significantly improve the safety of alpine skiing” without inadvertently releasing the boot. *Id.*; Decl., ¶¶169, 175. Therefore, a POSITA would have been motivated to implement *Gulick*’s at least 22% retention reduction to *Freudiger-I*’s first release to improve safety without sacrificing performance. Decl., ¶¶169, 175.

Further, any modification of *Freudiger-I*’s binding, including adjusting the mechanical components (*e.g.*, springs 7a-7b or spring plate 10), to accommodate the teaching of *Gulick* would have been well within the level of ordinary skill in the

art. Decl., ¶177. *Gulick* merely provides the quantity by which a POSITA would reduce the first release threshold compared to the second release threshold. *Id.*

A POSITA would have found it obvious to apply *Gulick*'s teachings to *Freudiger-1* because the combination amounts to applying a known technique to a device ready for improvement. *Id.*, ¶178.

3. Claims 36 and 54

A POSITA would have been motivated, or found it obvious, to set *Freudiger-1*'s first release to "at least 22% less than" the ASTM-recommended setting used for the second release because doing so would have brought the binding release settings closer to the maximum forces generated by most skiers, resulting in a faster release, reducing the likelihood of release failure, and creating a safer binding. Decl., ¶¶179-180; Ex-1008-*Gulick*, 32, 47.

Freudiger-1's release settings can easily be adjusted by moving spring plate 10 to change the tension on spring 7b, thereby adjusting the amount of force required to rotate *Freudiger-1*'s jaw. Decl., ¶181; Ex-1003-*Freudiger-1*, 2:58-3:7. Moreover, adjusting a ski binding release threshold was a common practice before the '953 patent. Decl., ¶181; *see, e.g.*, Ex-1006-*Sittmann*, 8:10-22; Ex-1005-*Dodge*, [0046]. Thus, a POSITA would have known how to use *Gulick*'s teaching to reduce the release threshold of *Freudiger-1* by at least 22%. Decl., ¶181.

Although *Gulick* electronically implements its release setting reduction, translating this teaching to *Freudiger-1*'s mechanical binding would have required nothing more than ordinary skill and basic knowledge of *Freudiger-1*'s ski binding. *Id.*, ¶182.

Thus, this combination would have involved “the mere application of a known technique”—reducing the release threshold by at least 22%—“to a piece of prior art ready for the improvement”—*Freudiger-1*'s binding. Decl., ¶183; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). The result would have been a “predictable variation,” as *Gulick*'s reduced release threshold would have improved *Freudiger-1*'s device “in the same way.” Decl., ¶183. Moreover, a POSITA would have had a reasonable expectation of success for this combination because *Gulick* and *Freudiger-1* disclose similar laterally-releasable ski bindings and similar ski conditions where release may be required (*e.g.*, in response to a fall). *Id.*; Ex-1003-*Freudiger-1*, 2:6-12, 3:8-16, 3:33-36; Ex-1008-*Gulick*, 34-36. Each reference is also analogous art to the '953 patent. *Supra* Sections IV.A.1, IV.B.1.

Moreover, it would have been obvious to a POSITA to adjust *Freudiger-1*'s first release threshold to come to the claimed invention. Decl., ¶184. It was within a POSITA's skill to adjust a binding's release threshold. *Id.* Because it was known that a release threshold “at least 22%” lower than the ASTM-recommended threshold creates safer ski bindings without sacrificing performance, a POSITA

would have been motivated to adjust *Freudiger-1*'s first release threshold to be at least 20% lower than the second release threshold. *Id.*; *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003).

Additionally, the '953 patent presents no evidence of criticality of the "at least 20%" limitation to refute the obviousness of this limitation. *In re Applied Materials, Inc.*, 692 F.3d 1289, 1295-98 (Fed. Cir. 2012). Thus, the combination of *Freudiger-1* in view of *Gulick* renders obvious claims 36 and 54.

4. Claims 38, 56, and 60

For the same reasons above for claims 36 and 54, the combination of *Freudiger-1* and *Gulick* also renders obvious claims 38, 56, and 60. Decl., ¶188. A POSITA would have understood that the first release being at least 20% less than the second release is substantially equivalent to the first release torque being at least 20% less than the second release torque. *Id.*

C. Ground 3: Dodge and Howell Render Obvious Claims 30, 31, 34, 35, 37, 53, 55, 58, and 59

1. Overview of Dodge

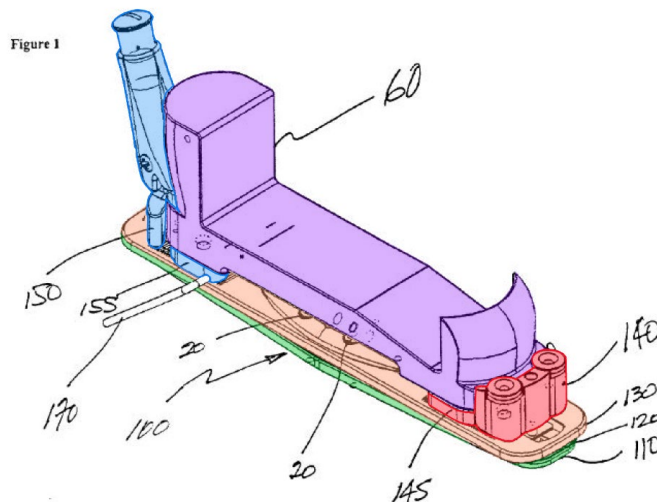
U.S. App. No. 09/774,351 to Dodge ("*Dodge*"), published August 1, 2002, constitutes prior art under pre-AIA 35 U.S.C. §§ 102(a) and/or 102(b).

Dodge discloses a "safety ski binding" designed to reduce "[ACL] injuries" by laterally releasing a ski boot. Ex-1005-*Dodge*, [0017]-[0018]. *Dodge* recognized that ACL injuries are "often caused by a load to the medial (inside) edge of the tail

of the ski,” and found that conventional bindings are unable to differentiate between these loads and loads applied elsewhere on the ski. *Id.*, [0017].

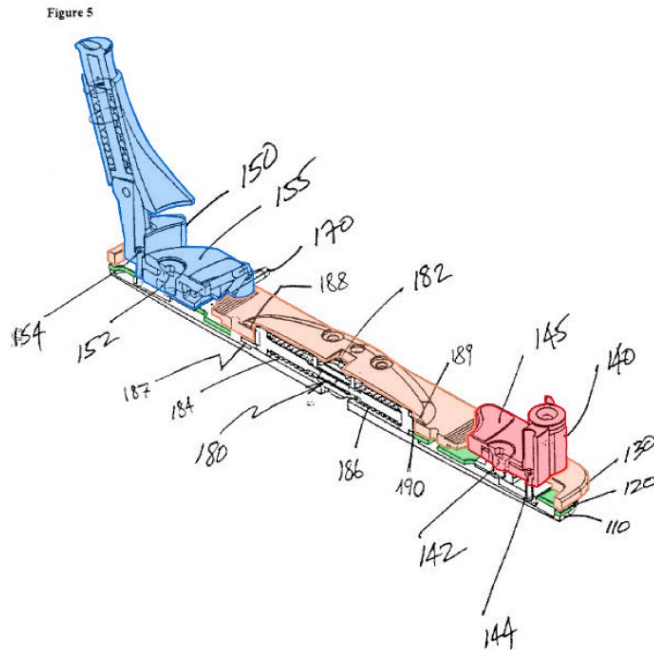
To achieve greater “protection against ACL injuries,” *Dodge* provides a ski binding 100 configured so that “the ski boot will be released more easily if a load is applied to the medial (inside) edge of the tail of the ski than if a similar load is applied to the lateral (outside) edge of the front of the ski.” *Id.*, [0017]-[0018], [0046].

Dodge’s binding 100 has a **toe cup 140** and **heel cup 150** that secure the **boot** to a ski. *Id.*, [0041].



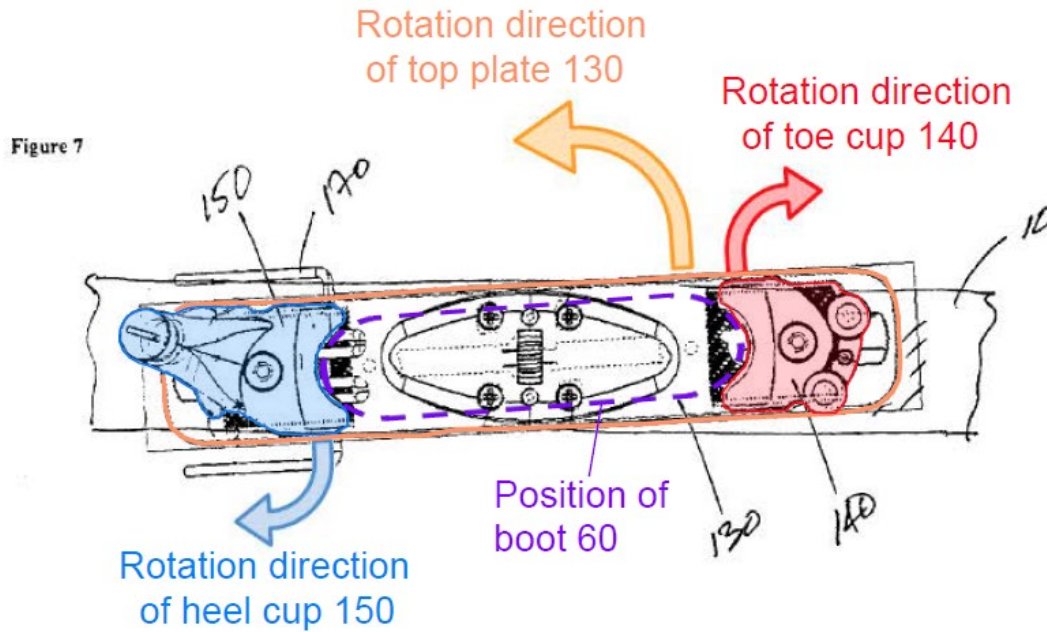
Ex-1005-*Dodge*, FIG. 1

Binding 100 includes a **base plate 120** mounted to the ski and a laterally-pivotable **top plate 130** mounted to **base plate 120**. *Id.*, [0041]. **Toe cup 140** and **heel cup 150** are pivotably attached to **top plate 130**. *Id.*



Ex-1005-Dodge, FIG. 5

When an external force is applied to the ski, the resulting “torque on the boot is transferred through [the toe and heel] pads to the top plate.” *Id.*, [0019], [0045]. If the transferred torque is large enough, top plate 130 pivots and boot 60 is released. *Id.*, [0019], [0044]-[0047].



Ex-1005-Dodge, FIG. 7 (labels removed)

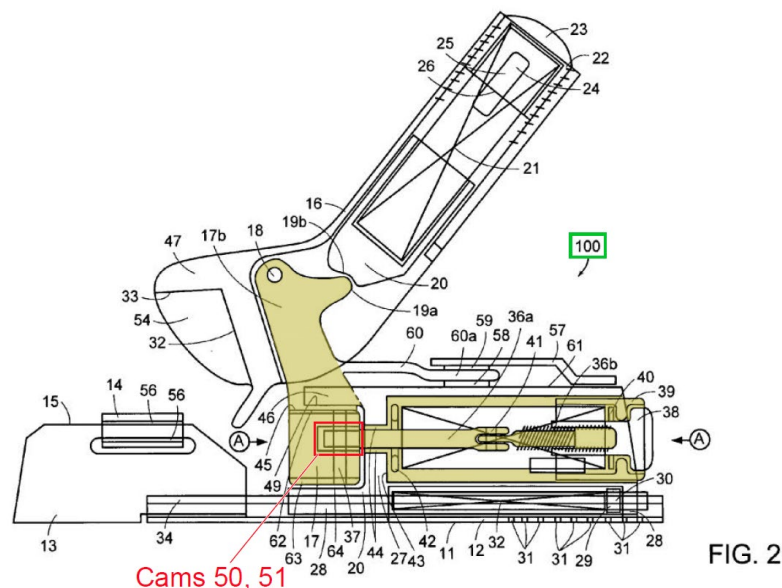
Dodge is analogous art to the claims of the '953 patent and they are related to the same technical field: boot releases for ski bindings. Decl., ¶199; *compare* Ex-1001, 1:14-17 *with* Ex-1005-Dodge, [0019], [0044]-[0047]; *see Corephotonics*, 84 F.4th at 1004. *Dodge* is reasonably pertinent to at least one of the problems dealt with by Patent Owner, such as providing a safer ski binding protecting against ACL injuries due to the “phantom foot” mechanism associated with loads on the inside edge of the ski tail. Decl., ¶199; *see supra* Section I.

2. Overview of *Howell*

As discussed above, *Howell* was published on September 9, 2004, and constitutes prior art under pre-AIA 35 U.S.C. §§ 102(a) and/or 102(b).

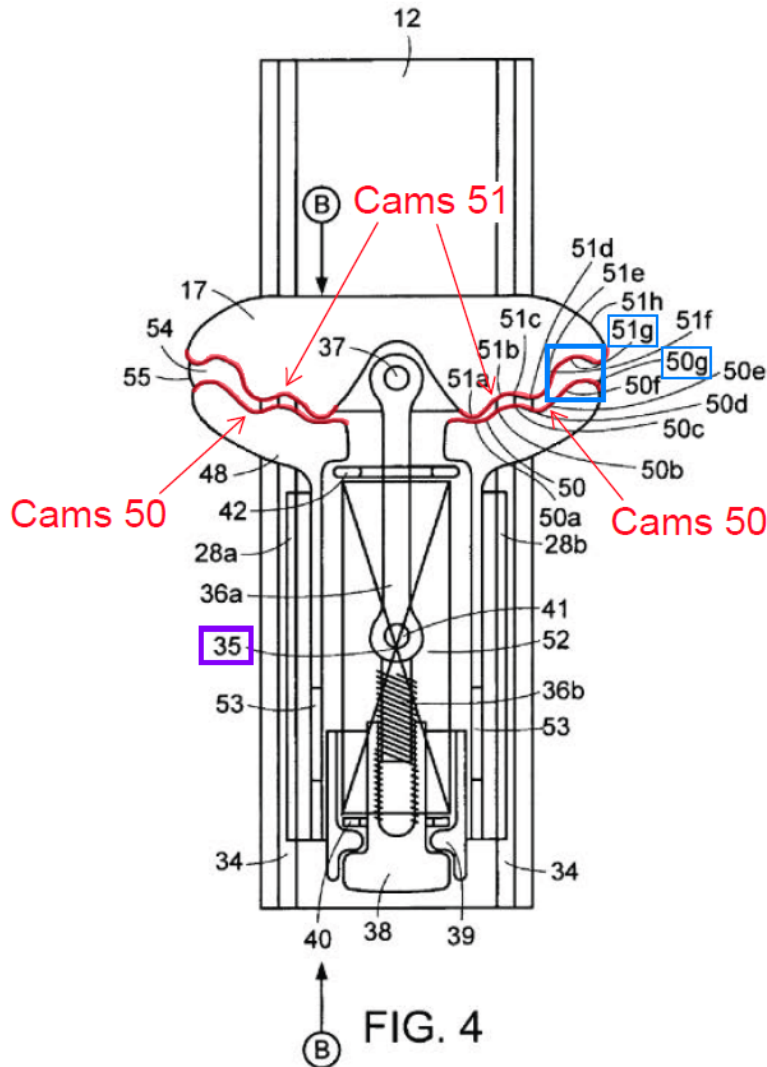
Howell discloses a ski binding heel unit with lateral-release functionality. Ex-1007-*Howell*, Abstract, [0002]-[0011], [0054]-[0059]. *Howell* recognized that “ski bindings provide lateral toe release” of the boot “except where a lateral force is applied to the ski immediately under or near a non[-]lateral releasing heel.” *Id.*, [0005]-[0011]. Under forces near the heel piece, ACL injury is common. *Id.*; Decl., ¶201.

To solve this problem, *Howell* discloses a heel unit 100 with a lateral release assembly that pivots about consecutive cams 50a-g, 51a-g when a lateral force is applied, producing an incrementally increasing reaction force, which laterally releases the boot once the assembly rotates beyond a predetermined cam axis. Ex-1007-*Howell*, [0055]-[0059], claims 1, 13.



Ex-1007-Howell, FIG. 2

The lateral boot release occurs only if the lateral force is strong enough to overcome a **spring** bias and draw the **outer-most cam surfaces (50g, 51g)** together. *Id.*, [0054], [0059]; Decl., ¶¶202-203.



Ex-1007-Howell, FIG. 4

Howell is analogous art to the claims of the '953 patent and they are related to the same technical field: lateral boot releases for ski bindings to reduce knee injuries. Decl., ¶204; *compare* Ex-1001, 1:14-17 *with* Ex-1007-Howell, [0002]-

[0011], [0054]-[0059]; *see Corephotonics*, 84 F.4th at 1004. *Howell* is reasonably pertinent to at least one of the problems dealt with by Patent Owner: providing safer ski bindings to prevent ACL injury due to “phantom-foot” fall kinematics. Decl., ¶204.

3. Rationale for Combining *Dodge* and *Howell*

A POSITA would have been motivated to combine the teachings of *Dodge* and *Howell*. It would have been obvious, beneficial, and predictable before the '953 patent to use *Howell*'s teaching regarding a laterally-releasable heel binding. Decl., ¶¶205-208. As *Howell* explains, a binding with “a lateral releasing toe can be dangerous to the knee” when “lateral forces [are] applied to the ski immediately under a heel” piece. Ex-1007-*Howell*, [0003]-[0005], [0011]. Thus, a POSITA would have been specifically motivated to incorporate *Howell*'s teaching to address the goals of both *Dodge* and *Howell*: preventing ACL injuries. *Id.*; Decl., ¶206; Ex-1005-*Dodge*, [0017], [0046].

Any modification of *Dodge*, including implementing *Howell*'s heel binding components, would have been within a POSITA's skillset. Decl., ¶207. Indeed, as *Dodge* explains, “[b]y properly designing the cam surfaces” 187-190, a POSITA can adjust a ski binding's release threshold for certain external loads. Ex-1005-*Dodge*, [0046]. *Dodge* understood that a POSITA would have known how to design the cam surfaces to achieve this result, and *Howell* details cam surfaces (50a-g, 51a-

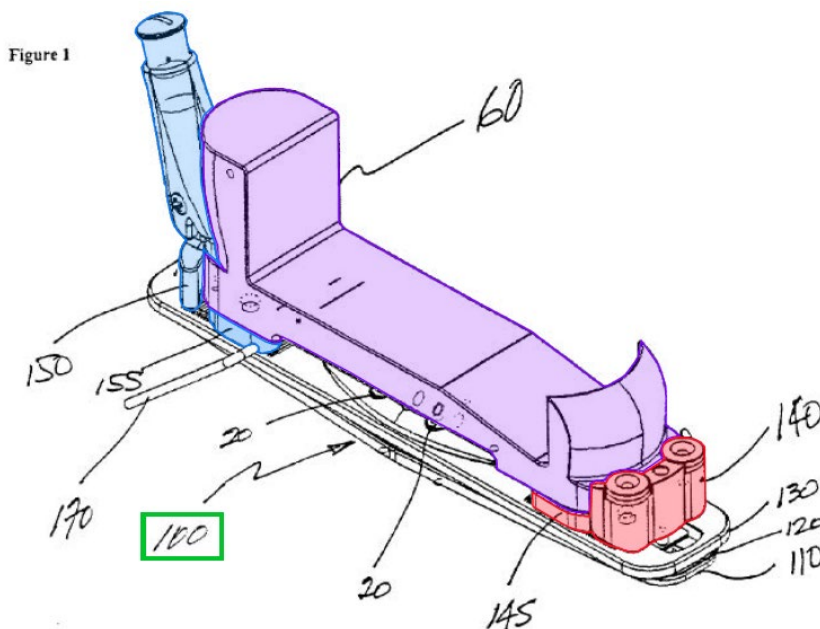
g) achieving a lateral release under dangerous loads applied to the side of the ski.
Decl., ¶¶207-208.

Accordingly, a POSITA would have found it obvious to apply *Howell*'s teaching to *Dodge* because the combination merely amounts to applying a known technique to a device ready for improvement. Decl., ¶¶207-208.

4. Independent Claim 30

a. [30(Preamble)]

To the extent the preamble is limiting, *Dodge* discloses this element because *Dodge*'s “binding 100 is mounted on a ski 10” and “hold[s] a boot... to the binding.” Ex-1005-*Dodge*, [0018], [0041]; Decl., ¶209.

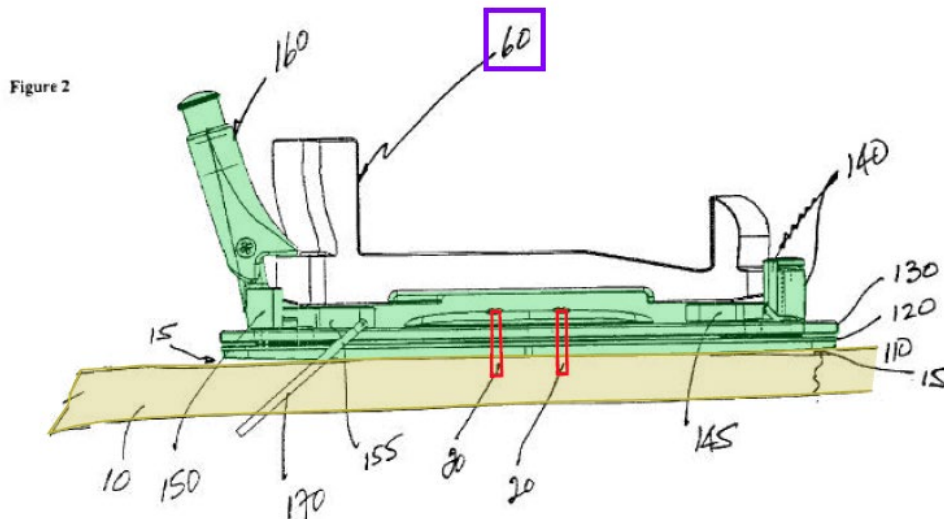


Ex-1005-*Dodge*, FIG. 1

Howell similarly discloses an “alpine ski binding” with a laterally-releasable heel unit. Ex-1007-*Howell*, [0002]-[0003]; Decl., ¶211.

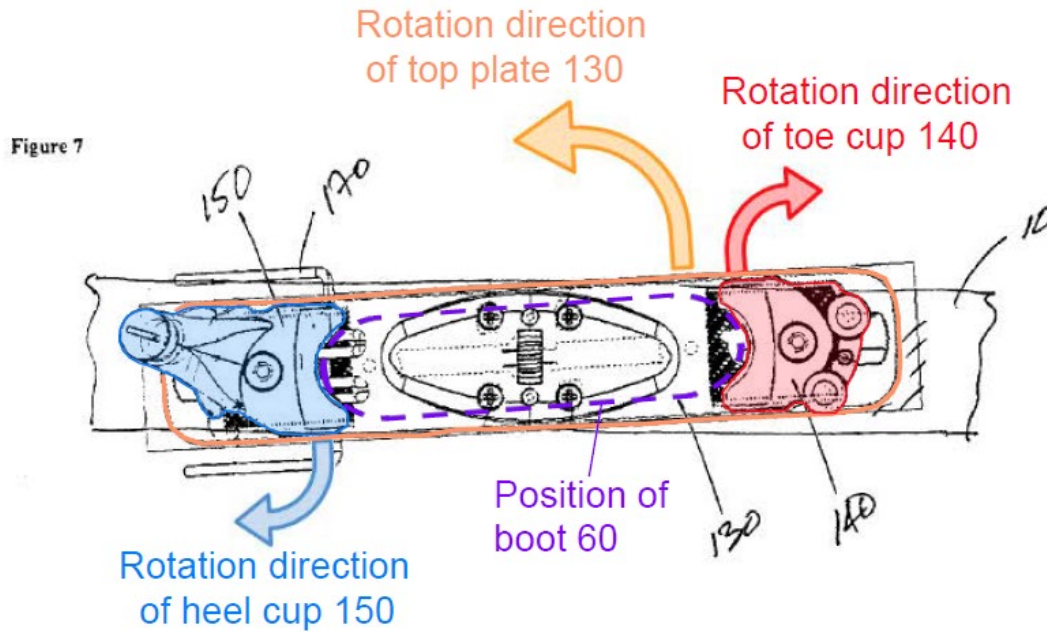
b. [30(a)]

Dodge discloses, or at least renders obvious, [30(a)]. Decl., ¶¶212-216. Dodge's binding is fastened, and secures a boot, to ski 10. Ex-1005-Dodge, [0041]-[0042].



Ex-1005-Dodge, FIG. 2

Binding 100 can release boot 60 when an applied load overcomes a “predetermined bias.” Ex-1005-Dodge, [0023], [0045]-[0046]. As Dodge explains, a “twisting load... [on] the tail of the ski” causes a “torsional force on the boot” that is “transferred to the top plate 130.” *Id.*; Decl., ¶¶214-215. If the force overcomes the bias on top plate 130, the plate pivots about a front cam roller 191 relative to the ski, causing “toe cup 140 and the heel cup 150 [to] pivot..., thereby releasing the boot.” Ex-1005-Dodge, [0023], [0046]-[0047]. This “first release” of boot 60 is shown in Figure 7. Decl., ¶¶215-216.



Ex-1005-Dodge, FIG. 7 (labels removed) (roller 191 not shown)

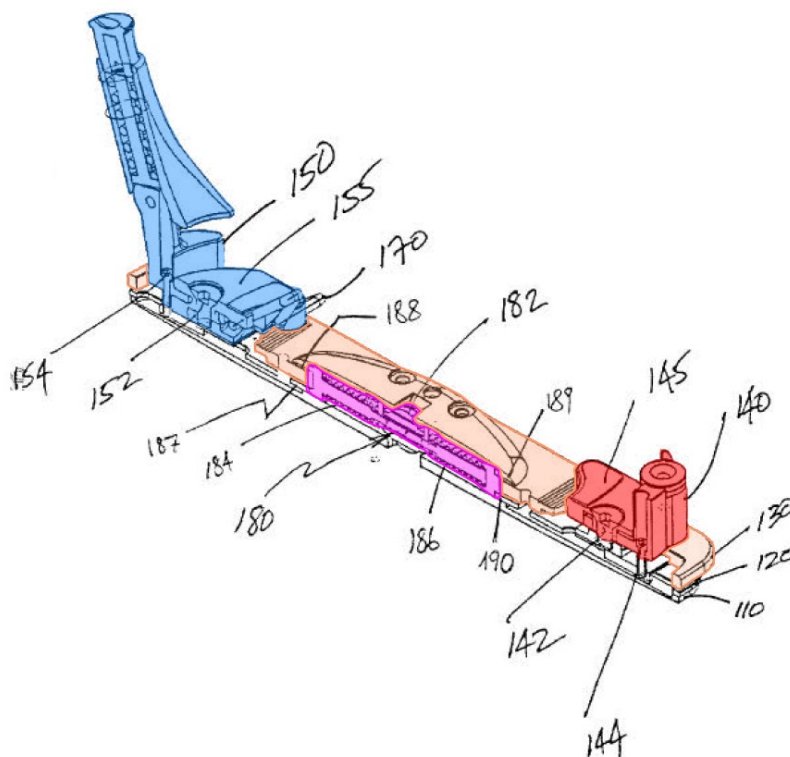
Howell similarly discloses this element. Ex-1007-*Howell*, [0002]-[0003]. To the extent Patent Owner improperly argues that the first release is limited to a heel release, *Howell* discloses a lateral heel release. Decl., ¶¶217-218. To prevent “ACL strain” under “phantom-foot fall kinematics,” *Howell* discloses a binding that laterally releases a boot when a lateral force applied to the boot’s heel overcomes a threshold which may injure the ACL (*i.e.*, a first release). Ex-1007-*Howell*, [0005], claim 13.

c. [30(b)]

Dodge discloses, or at least renders obvious, [30(b)]. Decl., ¶219.

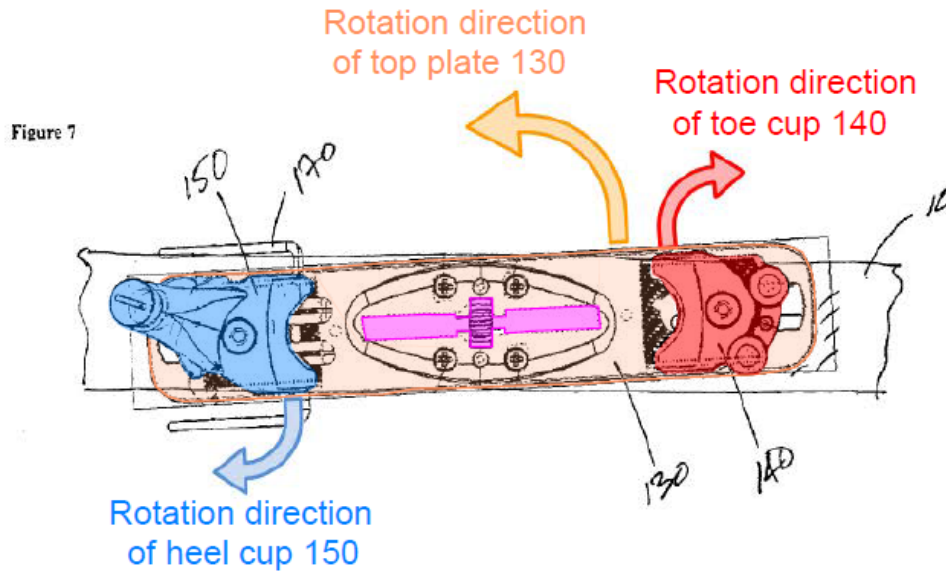
Binding 100 includes “biasing means 180... which hold top plate 130 in its normal position.” Ex-1005-*Dodge*, [0041]; Decl., ¶220.

Figure 5



EX-1005-*Dodge*, FIG. 5 (“normal position” of top plate 130)

A “rotational moment applied to the boot” that “overcomes the biased alignment of the **pivotable plate**” causes “**top plate 130** [to] pivot[]... about the front cam roller 191.” Ex-1005-*Dodge*, [0023], [0047]. **Toe cup 140** and **heel cup 150** likewise pivot due to rotation of **top plate 130**, “thereby releasing the boot.” *Id.*; Decl., ¶221.



Ex-1005-Dodge, FIG. 7

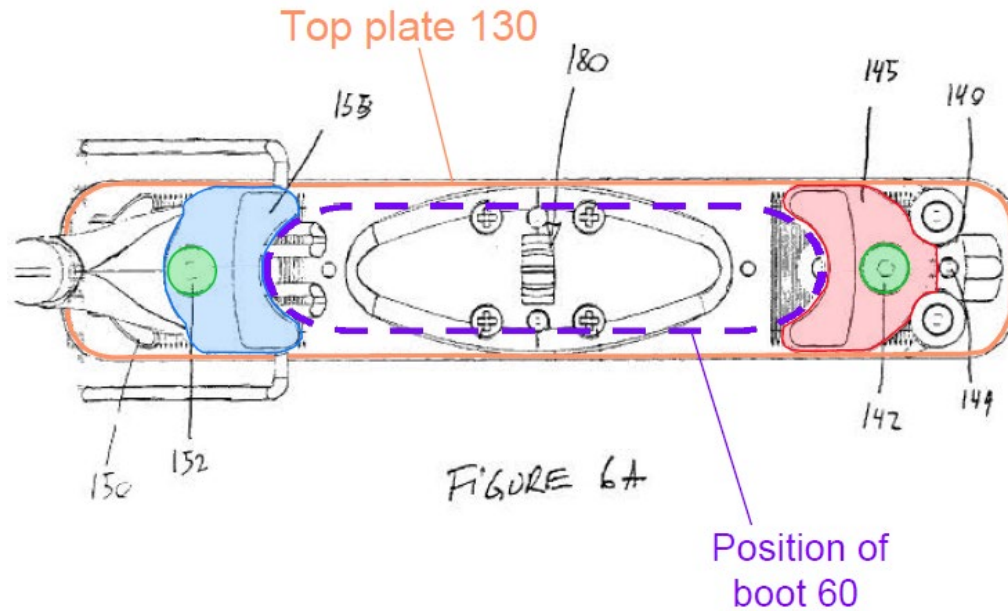
Here, **biasing means 180**, **top plate 130**, **toe cup 140**, and **heel cup 150** form a “release logic” because together they perform a logical operation to release the boot in response to a “release condition.” Decl., ¶222. The “release condition” occurs when a “twisting load on the forebody [or tail] of the ski” causes a moment on the boot that “overcomes the biased alignment of the **pivotable plate**,” which causes the binding to release the boot. *Id.*, ¶¶222-223; Ex-1005-Dodge, [0023], [0047].

With *Dodge*’s binding, the boot is “released more easily if a load is applied to the medial (inside) edge of the tail of the ski than if a similar load is applied to the lateral (outside) edge of the front of the ski.” Ex-1005-Dodge, [0046]. A POSITA would have understood *Dodge*’s release for loads on the ski’s inside tail to be a “release condition.” Decl., ¶224. Even if the claims were limited to a force

applied to the ski's medial inside edge, as Patent Owner may improperly argue, *Dodge* discloses or at least teaches this element. *Id.*; Ex-1005-*Dodge*, [0046]. *Howell* also discloses release logic mechanisms that release the boot when a lateral force applied near the heel overcomes a threshold which may injure the ACL. *See* Ex-1007-*Howell*, claim 13; Decl., ¶¶225-227. Thus, a POSITA would have both understood and found it obvious that both *Dodge* and *Howell* disclose or teach this claim element. Decl., ¶227.

d. [30(c)]

Dodge discloses, or at least renders obvious, [30(c)]. As *Dodge* explains, heel pad 155 and toe pad 145 are connected to top plate 130 by “fastening means 142 and 152.” Ex-1005-*Dodge*, [0045]. So, “any torque applied to the boot 60 is transmitted to the top plate 130” via heel pad 155, toe pad 145, and fastening means 142, 152. *Id.*, [0041]; Decl., ¶¶228-229.

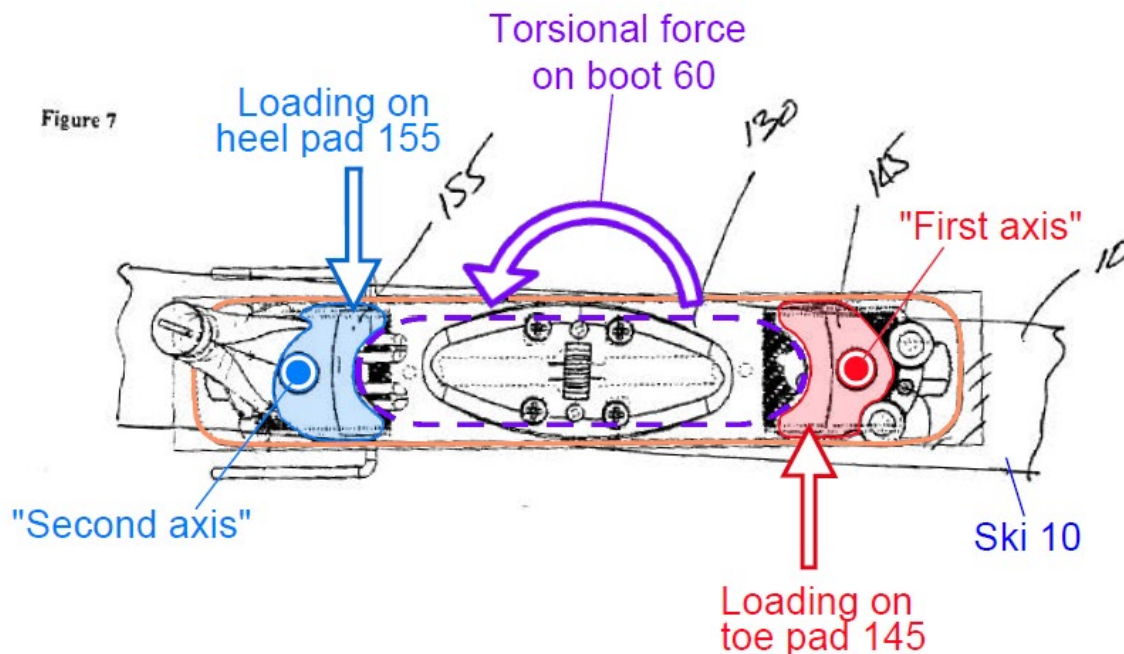


Ex-1005-Dodge, FIG. 6A (labels removed)

Thus, based on an external force applied to the ski, *Dodge*'s binding is configured to assess a "first loading" at toe pad 145 and a "second loading" at heel pad 155. Decl., ¶230; Ex-1005-*Dodge*, [0019], [0023], [0045]. For example, when an external load on the ski results in "torsional forces (about a vertical axis) on the boot," *Dodge*'s binding is configured so that "frictional and/or impingment [sic] forces [are] applied by the boot to the toe pad... [and] heel pad." Ex-1005-*Dodge*, [0043]. Thus, the external force on the ski causes an internal "first loading" at toe pad 145 and an internal "second loading" at heel pad 155. Decl., ¶¶230.

Dodge assesses the “first loading” and “second loading” because if the forces transferred from the pads to top plate 130 are “sufficient to overcome the bias on the top plate then it pivots, and the boot is released.” Ex-1005-Dodge, [0019]; Decl.,

¶231. Further, *Dodge* assesses the **first loading** relative to a **first vertical axis** through **fastening means 142** and assesses the **second loading** relative to a **second vertical axis** through **fastening means 152**. Ex-1005-*Dodge*, [0045]. Since the “**first axis**” and “**second axis**” are both vertical and spaced apart, they are substantially parallel. Decl., ¶231.



Ex-1005-Dodge, FIG. 7 (labels removed)

Howell similarly discloses, or renders obvious, this element. Decl., ¶233. *Howell*'s lateral release assembly includes **cam surfaces** having cam axes "defined by a contact point of one of the **first plurality of cams** [50a-g] and one of the **second plurality of cams** [51a-g]," meaning that the cam axes are the contact points where pairs of cams collide under an external load. Ex-1007-*Howell*, [0057]-[0059], claim 13; Decl., ¶233. Here, the external load causes a first internal reaction load relative

to a first cam axis of a first cam pair; if the external load “continues to persist in magnitude and duration,” it causes a second internal reaction load relative to a second cam axis of a second cam pair. Ex-1007-*Howell*, [0057]-[0059], claim 13; Decl., ¶233. Thus, the axes are substantially parallel and spaced from one another. Decl., ¶234. Only after the “lateral release assembly rotates beyond a predetermined cam axis” of the **outer-most cam pair** is the boot laterally released. *Id.*; *see also* Ex-1007-*Howell*, [0059].

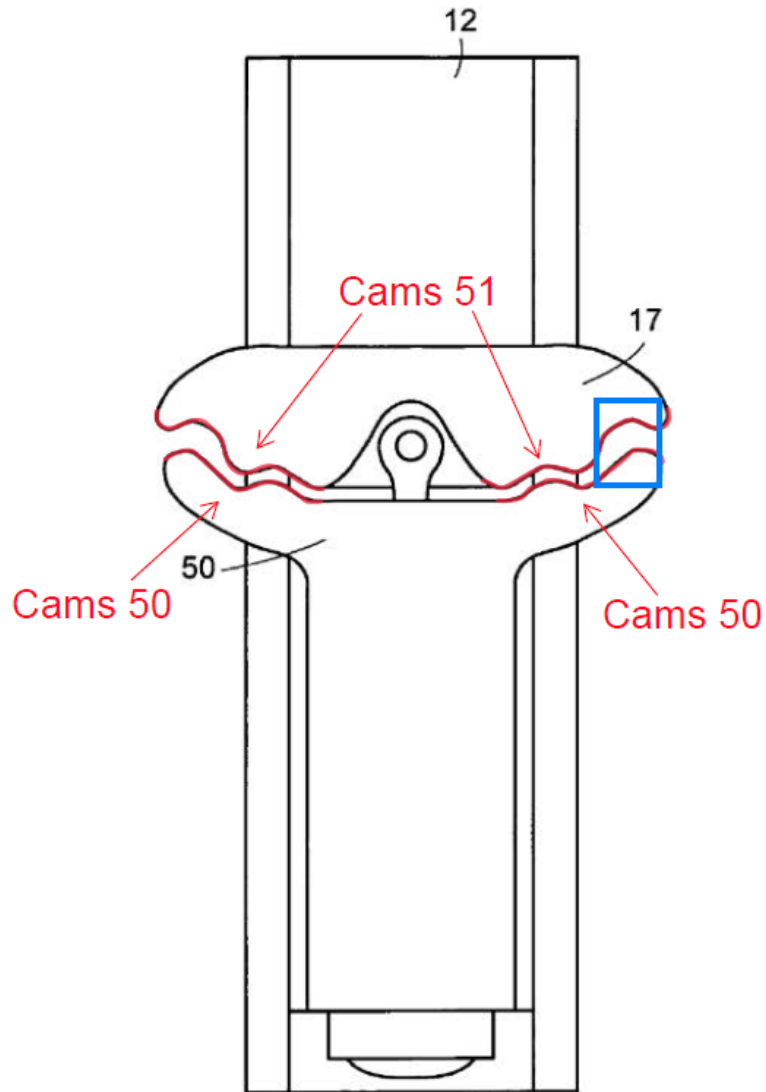


FIG. 3

Ex-1007-Howell, FIG. 3

e. [30(d)]

Dodge discloses, or at least renders obvious, [30(d)] because *Dodge*'s binding is configured to “determine whether or not the release condition is occurring” when the loads transferred to top plate 130 by fastening means 142, 152

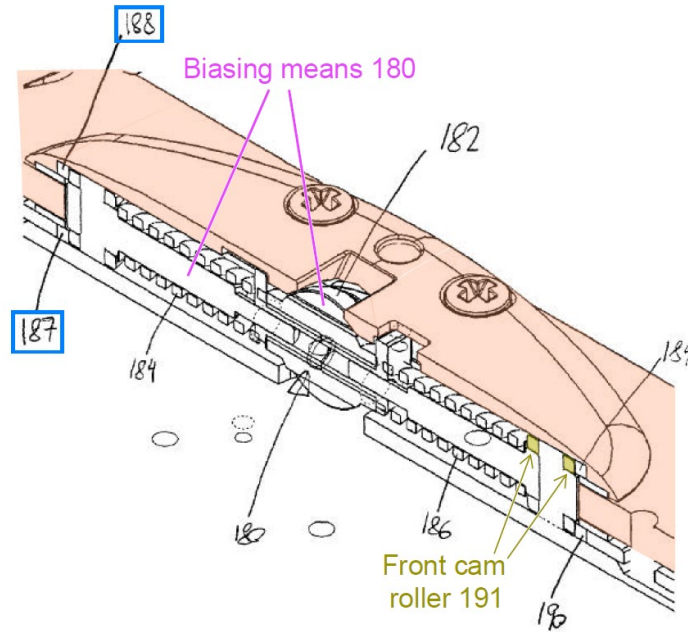
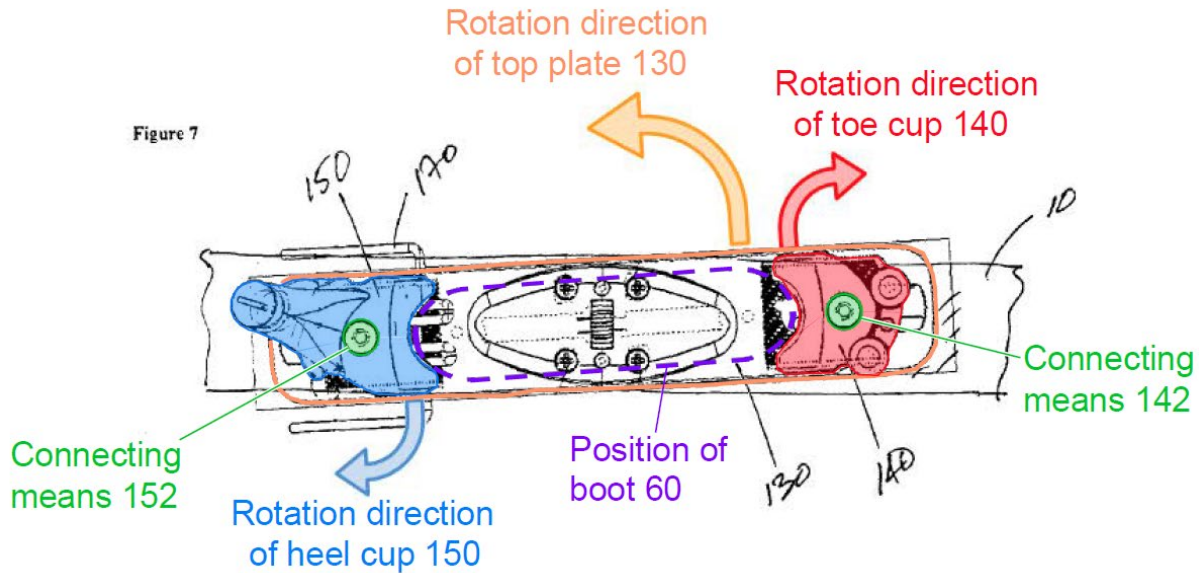


FIGURE 5A

Ex-1005-Dodge, FIG. 5A (close-up of FIG. 5)

When top plate 130 pivots, “toe cup 140 and the heel cup 150 are pivoted... about connecting means 142 and 152, thereby releasing the boot.” Ex-1005-Dodge, [0046]-[0047]. This “first release” occurs because rear cam surfaces 187-188 are designed to allow biasing means 180 to be more easily overcome under loads on the ski’s inside tail edge—the location most likely to cause ACL injury—relative to loads on the outside front edge. *Id.*, [0017]-[0018], [0046]-[0047]; Decl., ¶¶191-192, 245.



Ex-1005-*Dodge*, FIG. 7 (modified)

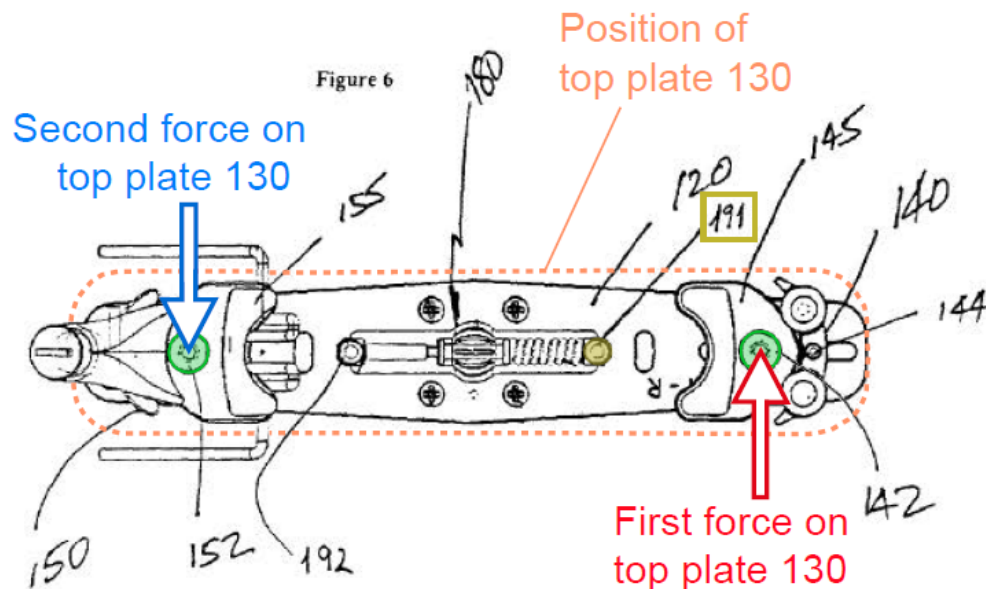
Therefore, *Dodge* discloses, or at least suggests, this element because a POSITA would have both understood and found it obvious to design *Dodge*'s cam surfaces such that its release logic can determine the internal forces and cause the boot to "be released more easily if a load is applied to the medial (inside) edge of the tail of the ski." Decl., ¶245. This would be understood by a POSITA. *Id.*

As explained, *Howell* similarly discloses, or renders obvious, this element because only when the external lateral force creates incrementally increasing reaction forces and exceeds a predetermined threshold will the *Howell* release logic determine that a release is necessary to prevent knee injury. Ex-1007-*Howell*, claim 13; Decl., ¶¶246-248.

f. [30(e)]

Dodge discloses, or at least renders obvious, [30(e)]. Decl., ¶¶249-253. As discussed for [30(c)], the torsional load on the boot creates first and second internal loadings exerted on top plate 130 by fastening means 142 and 152. Ex-1005-*Dodge*, [0045]-[0047]. Therefore, binding 100 is configured to determine a force-couple consisting of the forces exerted on top plate 130 by fastening means 142 and 152, respectively. *Id.*; Decl., ¶250.

Dodge also explains, “if the twisting load is applied to the tail of the ski[,] the top plate pivots about the front cam roller 191” to release the boot. Ex-1005-*Dodge*, [0046]-[0047]; Decl., ¶221, 243-244.



Ex-1005-*Dodge*, FIG. 6

A POSITA would have understood from *Dodge* that a force-couple is determined at a third axis from the first and second loadings because *Dodge* is

concerned with differentiating between loads applied to different parts of the ski to prevent ACL injuries. Decl., ¶252; Ex-1005-*Dodge*, [0002], [0017], [0046]. Indeed, *Dodge* explains that ACL injuries “are often caused by a load to the medial (inside) edge of the tail of the ski” and sought to “afford skiers significant additional protections against ACL injuries.” Ex-1005-*Dodge*, [0017]. Thus, a POSITA would have both understood and found it obvious that *Dodge* is configured to release the boot when reaction forces caused by an external load create an ACL-threatening force-couple around a third axis, coinciding with the skier’s lower leg (*i.e.*, tibial axis), where ACL injuries occur. Decl., ¶¶252-253. Thus, the force-couple experienced by **top plate 130** is formed about a “third axis” at the skier’s tibia. *Id.*, ¶252.

Additionally, *Dodge*’s release logic is configured to determine whether the “release condition” (discussed above for [30(b)]) is occurring as a function of the force-couple on **top plate 130**. Decl., ¶251; *supra* Section IV.C.4.c. Thus, *Dodge*’s binding determines that the release condition is occurring “as a function of the force-couple,” as claimed, since the force-couple (*i.e.*, the **first force** and **second force**) causes **top plate 130** to rotate to release the boot. Decl., ¶251; Ex-1005-*Dodge*, [0023], [0047].

Howell similarly discloses, or renders obvious, this element because, as explained, *Howell* describes a lateral heel release binding that prevents ACL

injuries, specifically when an applied lateral force causes high strain on the “tibial axis,” generally known as phantom-foot fall kinematics. Ex-1007-*Howell*, [0005], [0011]; Decl., ¶254. Thus, a POSITA would have understood that *Howell* is configured to release the boot when a lateral load during a phantom-foot fall creates a force-couple, formed at a third axis coinciding with the skier’s lower leg, that may injure the skier’s ACL. Decl., ¶254.

5. Independent Claim 53

a. *[53(Preamble)]-[53(d)]:*

These elements are substantially identical to [30(Preamble)]-[30(d)]. Thus, for the reasons discussed in Sections IV.C.4.a-IV.C.4.e, *Dodge* and *Howell* disclose, or at least render obvious, these elements.

b. *[53(e)]*

Dodge discloses this element because *Dodge*’s binding is configured to release the boot more easily under loads applied to the inside tail edge compared to loads on the ski’s outside front edge. Decl., ¶¶260-264; Ex-1005-*Dodge*, [0046]. *Dodge* achieves this by designing rear cam surfaces 187-188 to release biasing means 180 more easily (*i.e.*, in response to a smaller applied load) than front cam surfaces 189, 190. Decl., ¶260; Ex-1005-*Dodge*, [0045]-[0046]. Thus, *Dodge* discloses a “first release,” occurring when “the ski boot [is] released more easily if a load is applied to the medial (inside) edge of the tail of the ski,” and a “second

release,” occurring when a larger load “is applied to the lateral (outside) edge of the front of the ski.” Decl., ¶260. The first release is “attenuated” because it is triggered by a smaller applied load, relative to the second release. *Id.*; see Ex-1005-Dodge, [0046].

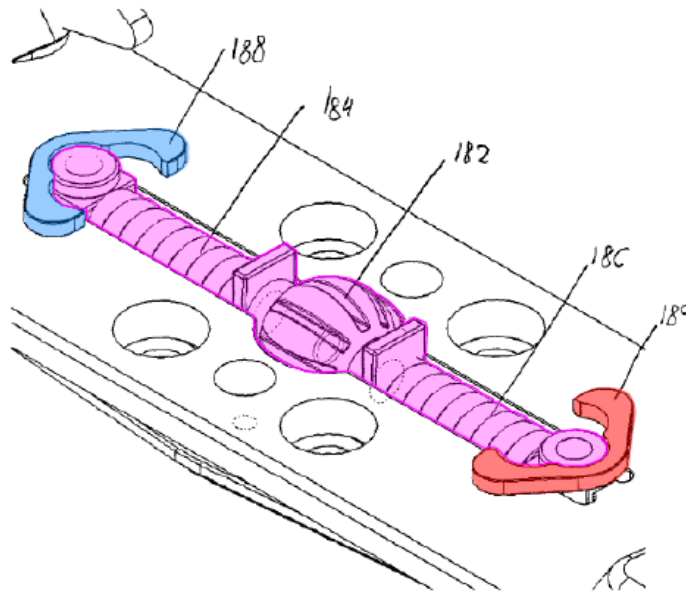


FIGURE 5B

Ex-1005-Dodge, FIG. 5B (cam surfaces 187, 190 not shown)

Howell similarly discloses, or renders obvious, this element. Decl., ¶¶261-264. *Howell* explains that conventional toe release bindings cannot effectively release the boot under lateral loads applied “under or near the projected tibial axis,” leading to ACL injuries. Ex-1007-*Howell*, [0003], [0005], [0011]. Thus, *Howell* provides a first release—a lateral release at the heel piece under these loads to prevent ACL injury. Decl., ¶261. *Howell* also provides a second release—the

conventional “lateral toe release to release the ski from the boot when a transverse-longitudinal (side of the ski) force is applied to the ski at all [other] points along the ski.” Ex-1007-*Howell*, [0005]. Thus, to the extent Patent Owner argues improperly that the first release should be limited to a heel piece and a second release should be limited to a toe piece, *Howell* discloses, or renders obvious, this element. Decl., ¶¶261-264.

6. Independent Claim 58

a. [58(Preamble)]-[58(b)]

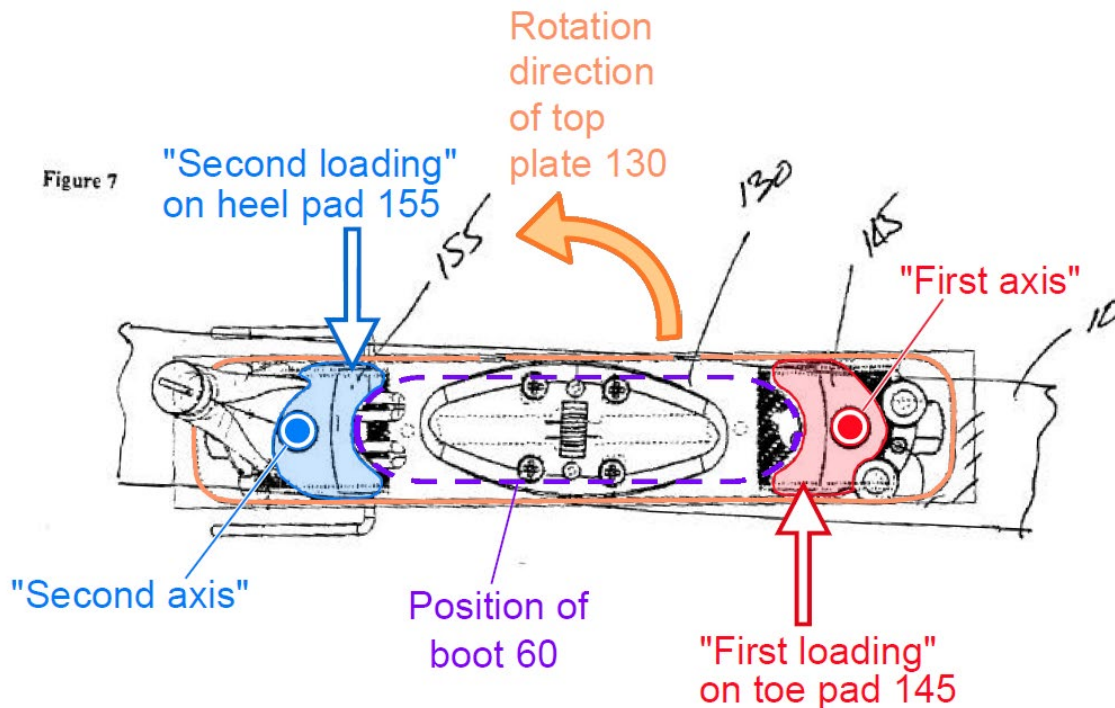
These elements are substantially identical to [30(Preamble)]-[30(b)] and [53(Preamble)]-[53(b)] above. Accordingly, for the reasons discussed in Sections IV.C.4.a-IV.C.4.c, *Dodge* discloses, or at least renders obvious, these elements.

b. [58(c)]

Dodge discloses, or at least renders obvious, [58(c)] because *Dodge*’s release logic is designed so that a first release occurs substantially only in response to first and second loadings exceeding certain thresholds and applied in certain directions. Decl., ¶¶268-280.

Dodge explains a “twisting load” on the ski’s tail causes “frictional and/or impingment [sic] forces to be applied by the boot to the toe pad... [and] heel pad,” which transfer the forces to top plate 130 via fastening means 142, 152. Ex-1005-

Dodge, [0043], [0045], [0047]. If the forces overcome the bias on **top plate 130**, the top plate pivots relative to the ski, releasing the **boot**. *Id.*; Decl., ¶269.



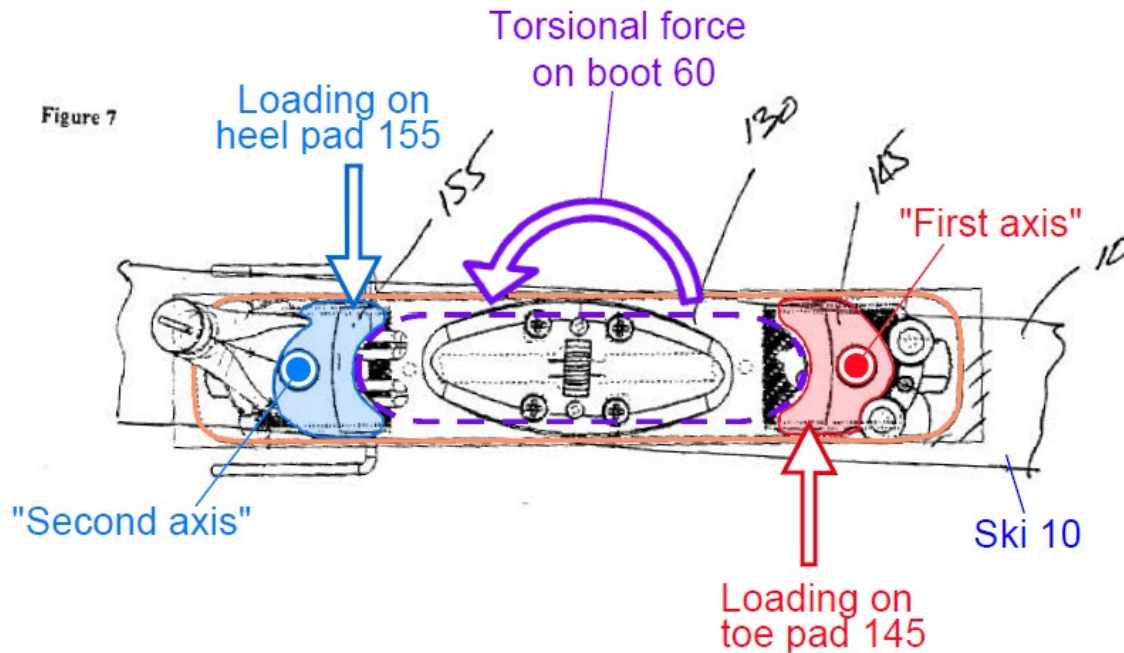
Ex-1005-Dodge, FIG. 7

Thus, the external load on the ski causes a “**first loading**” of **toe pad 145** “internal to the ski system” along or around a **first vertical axis** through fastening means 142 and a “**second loading**” of **heel pad 155** “internal to the ski system” along or around a **second vertical axis** through fastening means 152. Ex-1005-Dodge, [0043], [0045], [0047]; Decl., ¶270.

If these forces “overcome the bias on the **top plate** then it pivots, and the **boot** is released.” Ex-1005-Dodge, [0019], [0045]. Thus, the first and second loadings must each exceed a defined level before **top plate 130** is pivoted to release the **boot**.

Decl., ¶271. As *Dodge* explains, the level of force required to overcome the bias is adjustable through the design of cam surfaces 187-190. Ex-1005-*Dodge*, [0046]. Thus, *Dodge*'s "release logic" (*see supra* Section IV.C.4.c) sets a "first defined level" and "second defined level" being the magnitude of force required at **toe pad 145** and at **heel pad 155**, respectively, to overcome the predetermined bias and rotate **top plate 130**. Decl., ¶271.

Additionally, *Dodge*'s release logic activates the first release substantially only when the first loading has a first defined sense and the second loading has a second defined sense. Decl., ¶¶272-274. Patent Owner appears to contend that the first and second defined senses refer to the directions in which the first and second loadings are applied, respectively. *Id.*, ¶¶275-276. For *Dodge*, **toe pad 145** and **heel pad 155** experience reaction loads in opposite directions (see annotated Figure 7 below). Decl., ¶¶278-279; *see also* Ex-1005-*Dodge*, [0047]. Thus, to release the **boot**, the "**first loading**" has a first defined sense in one direction and the "**second loading**" has a second defined sense in another, opposite direction. Decl., ¶¶278-279.



Ex-1005-Dodge, FIG. 7

At a minimum, *Dodge* suggests that the release logic activates the first release substantially only when a first loading exceeds a first defined level and has a first defined sense, and a second loading exceeds a second defined level and has a second defined sense. Decl., ¶280. Because *Dodge* explains that “injuries to the knee are often caused by a load to the medial (inside) edge of the tail of the ski” and that cam surfaces 187-190 can be designed to more easily release the boot under these dangerous forces (*see* Ex-1005-Dodge, [0017], [0045]-[0046]), a POSITA would have both understood and found it obvious to design the cam surfaces to effectuate a release when a force acting on one cam surface reaches a certain threshold and acts in a certain direction and a force acting on a different cam surface reaches a

certain threshold and acts in a certain direction. Decl., ¶280. Thus, a POSITA would have understood that *Dodge* discloses, or at least teaches, this claim element. *Id.*

Howell similarly discloses, or renders obvious, this element because, as explained above, an external force creates internal reaction forces relative to the corresponding cam axes. Decl., ¶281; Ex-1007-*Howell*, claim 13. It is only when the external force persists that the release assembly will create additional reaction forces that “progressively pivot about consecutive cams, producing an incrementally increasing force opposing the lateral force.” Ex-1007-*Howell*, claim 13. Thus, to the extent Patent Owner attempts to improperly limit this element to a sequential (rather than parallel) operation, *Howell* discloses or renders obvious this element because the forces are being applied in sequence to one another, and it is only when “the lateral release assembly rotates beyond a predetermined cam axis” that a lateral release is achieved. *Id.*; Decl., ¶¶281-282.

c. [58(d)]

This element is substantially identical to element [53(e)], discussed above. For the reasons discussed in Section IV.C.5.b, *Dodge* discloses this element.

7. Claim 31

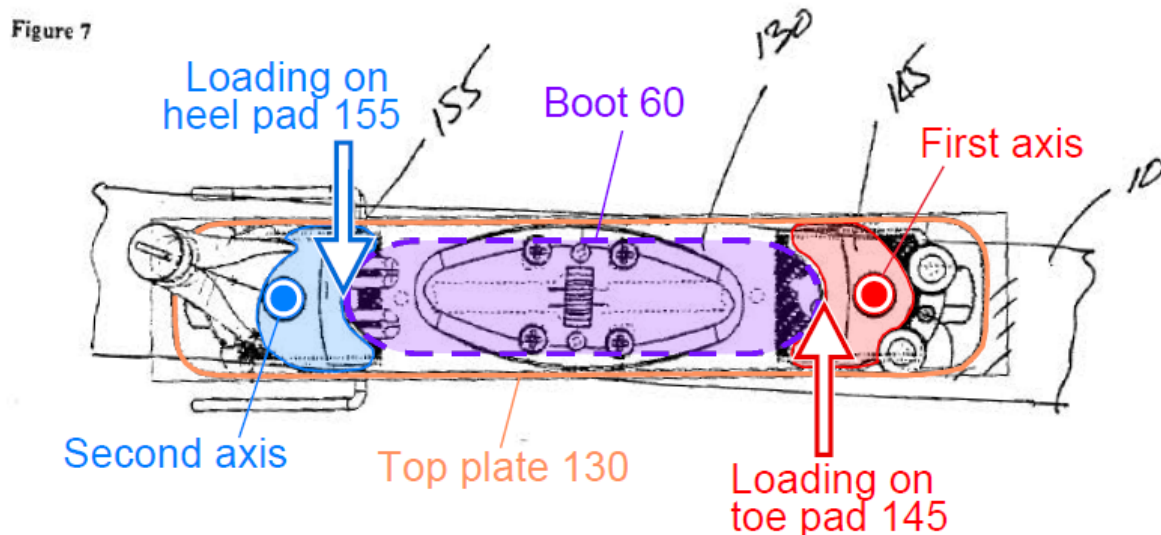
Dodge discloses this element. Decl., ¶¶284-286. As discussed for [30(e)], *Dodge*’s “third axis” is substantially coincident with the skier’s tibial axis while the skier wears boot 60 because *Dodge* is concerned with “afford[ing] skiers significant

additional protections against ACL injuries,” which a POSITA would have understood are due to loads experienced around the skier’s tibial axis. Ex-1005-Dodge, [0017], [0033], FIGS. 1, 6-7; Decl., ¶285.

As explained for [30(e)], *Howell* similarly discloses or renders obvious this element. Ex-1007-*Howell*, [0005], [0011]; Decl., ¶287.

8. Claim 34

Dodge discloses this element. Decl., ¶¶288-290. As explained for [30(c)], *Dodge* discloses that the **first loading** at **toe pad 145** acts about the “**first axis**,” thus causing a first moment. Ex-1005-*Dodge*, [0019, [0043]-[0045]; Decl., ¶289. Similarly, the **second loading** at **heel pad 155** causes a second moment about the “**second axis**.” Ex-1005-*Dodge*, [0019, [0043]-[0045]; Decl., ¶289.



Ex-1005-*Dodge*, FIG. 7

Binding 100 determines the force-couple on **top plate 130** (*see supra* Section IV.C.4.f) from the first and second moments since the moments are transferred to **top plate 130** by fastening means 142 and 152 to form the force-couple. Decl., ¶290; Ex-1005-*Dodge*, [0019], [0043]-[0045].

9. Claim 35

This element is identical to claim [53(e)]. For the reasons discussed above in Section IV.C.5.b, *Dodge* and *Howell* disclose, or at least render obvious, this element. Decl., ¶291.

10. Claims 37, 55, and 59

Dodge discloses or renders obvious these elements. Decl., ¶¶292-295.

As discussed for [30(a)] and [53(e)], *Dodge* discloses a “first release” and “second release” in response to loads on the rear end and front end of the ski, respectively, both of which cause top plate 130 to pivot, thus releasing boot 60. Ex-1005-*Dodge*, [0047]; *id.*, ¶293. In each instance, a load is experienced about the skier’s tibial axis. Decl., ¶294. A POSITA would have understood that because *Dodge* is concerned with “afford[ing] skiers significant additional protection against ACL injuries,” *Dodge* differentiated the torque experienced on the skier’s tibia under loads applied at the tip versus loads applied at the tail of the ski. *Id.*; Ex-1005-*Dodge*, [0017], [0046]-[0047]. Thus, *Dodge* discloses a first release torque and a second release torque about the skier’s tibial axis. Decl., ¶¶294-295.

As explained for [53(e)], *Howell* similarly discloses or renders obvious this element because a POSITA would have understood and found it obvious that a lateral force “can act over the entire length of the lower leg to generate a moment about the femur,” substantially coinciding with the tibial axis. Ex-1007-*Howell*, [0005], [0011]; Decl., ¶¶296-298. Thus, a POSITA would have known that the moment or torque around the tibial axis is different for a force applied to the ski under or near the tibial axis compared to a similar force applied to a different point along the ski. Decl., ¶296.

D. Ground 4: Dodge, Howell, and Gulick Render Obvious Claims 36, 38, 54, and 56

1. Rationale for Combining *Dodge*, *Howell*, and *Gulick*

A POSITA would have been motivated to combine the teachings of *Dodge*, *Howell*, and *Gulick* because doing so would have been obvious, beneficial, and predictable. Decl., ¶299. A POSITA would have been specifically motivated to incorporate *Gulick*’s teaching regarding ski binding release thresholds below the ASTM-recommended levels because it would have addressed the goals of *Dodge* and *Howell*. *Id.*

A POSITA would have known or found it obvious that *Dodge*’s or *Howell*’s second release is set to the ASTM-recommended release setting in accordance with industry standard. *Id.*, ¶300; Ex-1011, Intro. A POSITA further would have

understood from *Gulick* that the ASTM-recommended settings exceed the maximum forces generated by most skiers. *Supra* Section IV.B.1; Decl., ¶300.

Further, *Dodge* explains that ACL injuries “are often caused by a load to the medial (inside) edge of the tail of the ski.” Ex-1005-*Dodge*, [0017]. Thus, a POSITA would have been motivated to release the boot more easily under loads likely to cause ACL injury. Decl., ¶301; Ex-1005-*Dodge*, [0017]-[0018], [0046]; Ex-1008-*Gulick*, 30, 32, 43, 46-47.

While *Dodge* contemplates a lower release threshold for loads applied at the ski’s inside tail edge (Ex-1005-*Dodge*, [0046]), and *Howell* contemplates a lower release threshold for lateral forces applied near the projected tibial axis (Ex-1007-*Howell*, [0011]), neither *Dodge* nor *Howell* quantifies the reduction of the release threshold for the first release. Thus, a POSITA would have looked to *Gulick* for further instruction on the magnitude of the threshold reduction. Decl., ¶302.

As explained above, the release settings of *Gulick*’s learning binding were “on average at least 22% less than the corresponding ASTM recommended setting” without inadvertently releasing the boot. *Supra* Section IV.B.1. Therefore, a POSITA would have been motivated to implement *Gulick*’s at least 22% release setting reduction to improve safety and prevent knee injuries without sacrificing performance. Decl., ¶304.

Further, modification of *Dodge*'s and *Howell*'s teachings, including adjusting the design of mechanical components (e.g., *Dodge*'s cam surfaces 187-190) to accommodate *Gulick*'s teaching would have been well within the level of ordinary skill in the art. *Id.*, ¶305. Specifically, a POSITA would have known how to design the cam surfaces of *Dodge* to achieve the desired result; *Gulick* merely provides the quantity by which a POSITA would have reduced the first release threshold relative to the second release threshold. *Id.*

Accordingly, a POSITA would have found it obvious to apply *Gulick*'s teachings to *Dodge* and *Howell* because the combination merely applies a known technique to a device ready for improvement. *Id.*, ¶306.

2. Claims 36 and 54

A POSITA would have been motivated, or found it obvious, to set *Dodge*'s first release to be "at least 22% less than" the ASTM-recommended settings for the second release because doing so would have brought the binding release settings closer to the maximum forces generated by most skiers, resulting in a faster release, reducing the likelihood of release failure, and creating a safer binding. Decl., ¶¶307-308; Ex-1008-*Gulick*, 32; *see also* Ex-1005-*Dodge*, [0046].

Although *Gulick* electronically implements its release setting reduction, translating this teaching to *Dodge*'s mechanical binding would have only required the application of ordinary skill. Decl., ¶309. *Dodge* explains that this reduction

could be accomplished by adjusting cam surfaces 187-190. *Id.*; Ex-1005-*Dodge*, [0046]. Adjusting a ski binding release threshold was a common practice before the critical date of the '953 patent. Decl., ¶309; *see, e.g.*, Ex-1004-*Freudiger*-2, [0006]; Ex-1007-*Howell*, [0008] (“skiers [can] manually increase the release level biasing of the ski bindings which increases the retention of the ski to the boot in the binding”).

This combination would have involved “the mere application of a known technique”—reducing the binding threshold by at least 22%—“to a piece of prior art ready for the improvement”—*Dodge*’s binding, *KSR*, 550 U.S. at 417, resulting in a “predictable variation,” as *Gulicks*’s reduced threshold would merely have improved *Dodge*’s device “in the same way.” Decl., ¶310. Moreover, a POSITA would have had a reasonable expectation of success for this combination because the references disclose similar ski bindings and conditions where release may be required (*e.g.*, in response to a fall). *Id.* Further, each reference is analogous art to the '953 patent. *See supra* Sections IV.B.1, IV.C.1, IV.C.2.

A POSITA would have been motivated to adjust *Dodge*’s first release to arrive at the claimed invention of “at least 20%” because it was known in the art to adjust the release threshold and that reducing the release threshold “at least 22%” creates safer ski bindings. Decl., ¶311; *Peterson*, 315 F.3d at 1329 (“[E]ven a slight overlap in range establishes a prima facie case of obviousness.”).

Additionally, the '953 patent presents no evidence of criticality of the “at least 20%” limitation to refute the obviousness of this limitation. *Applied Materials*, 692 F.3d at 1295-98; Decl., ¶311. Thus, the combination of *Dodge*, *Howell*, and *Gulick* renders obvious claims 36 and 54. Decl., ¶313.

3. Claims 38, 56, and 60

For the same reasons above, the combination of *Dodge*, *Howell*, and *Gulick* renders obvious claims 38, 56, and 60 because a POSITA would have understood that the first release being at least 20% less than the second release is substantially equivalent to the first release torque being at least 20% less than the second release torque. Decl., ¶¶314-316.

E. Ground 5: Sittmann Renders Obvious Claims 58 and 59

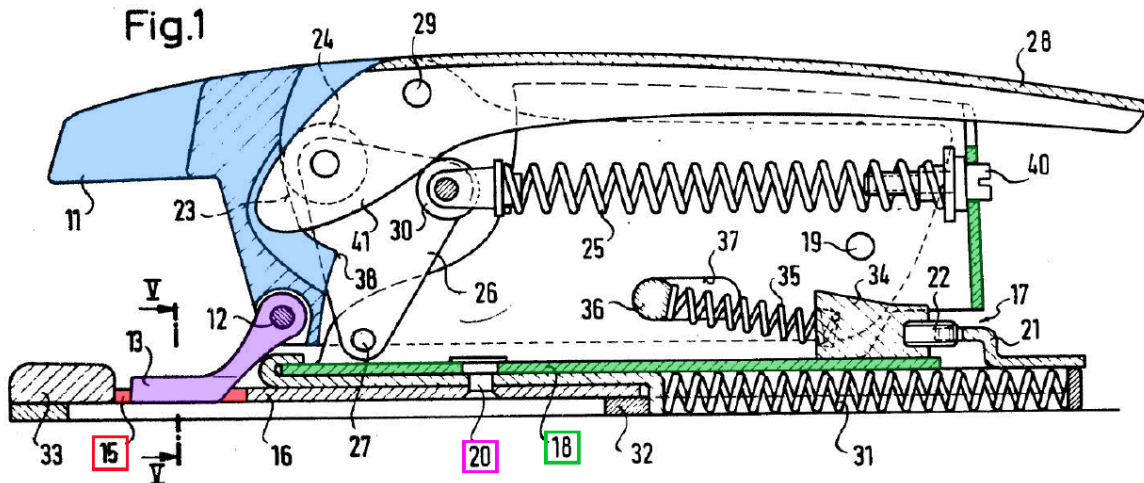
1. Overview of *Sittmann*

German Patent Application Publication No. 2340420 A1 to Sittmann (“*Sittmann*”), published February 20, 1975, constitutes prior art under pre-AIA 35 U.S.C. §§ 102(a) and/or 102(b).

Sittmann discloses a “safety ski binding” assembly for releasably securing a boot to a ski. Ex-1006-*Sittmann*, 1:1-4. The assembly includes a laterally-releasing toe binding and a heel binding with vertical and lateral boot release mechanisms. *Id.*, 3:12-14, 9:8-11, 11:6-23.

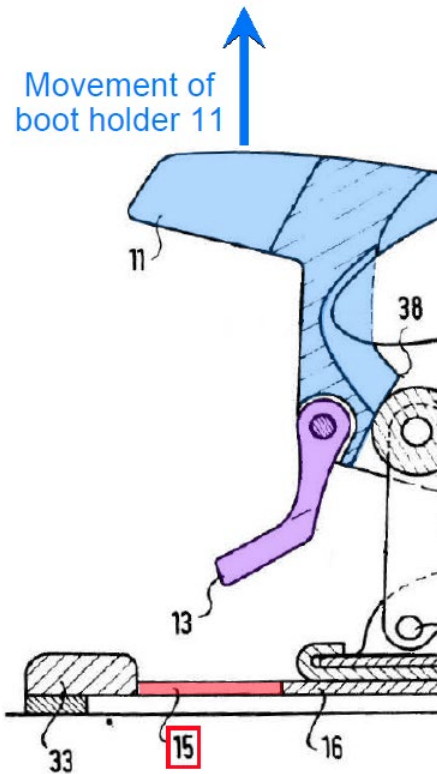
Sittmann’s heel binding includes a housing 18, which can swivel “around a vertical axis 20.” *Id.*, 7:25-27, 8:1-3. The heel binding also includes tread spur 13

and boot holder 11 for releasably holding the boot. *Id.*, 3:12-14, 8:5-6, 10:16-17. In the heel binding's closed position, tread spur 13 is pressed down into slot 15. *Id.*, 10:1-6, 10:32-11:4; Decl., ¶321.



Ex-1006-Sittmann, FIG. 1

Sittmann's binding assembly can release the boot *heel* laterally when the skier experiences a forward, twisting fall, and can release the boot *toe* laterally when the skier experiences other excessive lateral loads. Ex-1006-Sittmann, 3:1-23, 11:15-23; Decl., ¶¶319, 322-325. Initially, "[t]he lateral release [at the heel] is blocked" because "tread spur 13 is held in the slot 15," but is unlocked during forward, twisting falls because when the skier falls forward, "the boot [] lift[s] the boot holder to such an extent that the tread spur can swing completely out of the slot." Ex-1006-Sittmann, 3:1-23, 11:15-20; Decl., ¶323.



Ex-1006-Sittmann, FIG. 3 (cropped)

Once **tread spur 13** is freed, side release device 17 enables the heel binding to laterally release the boot under a large lateral force. Ex-1006-*Sittmann*, 3:7-22, 11:15-23; Decl., ¶324. Side release device 17 includes **detent 21** (a “**detent recess**”) and **counter detent 22** (a “**roller**”), which is connected to **housing 18** and pretensioned “by helical compression **springs 35**.” Ex-1006-*Sittmann*, 8:10-22. “[T]he release force can be adjusted in a lateral direction” by adjusting the tension of **springs 35**. *Id.*; Decl., ¶324.

Sittmann is analogous art to the claims of the '953 patent because each relate to the same technical field: lateral ski binding heel releases. Decl., ¶326; *compare* Ex-1001, 1:14-17 *with* Ex-1006-*Sittmann*, 1:1-4; *see* *Corephotonics*, 84 F.4th at 1004. *Sittmann* is reasonably pertinent to at least one of the particular problems dealt with by Patent Owner, such as providing a safer ski binding. Ex-1001, 1:14-17.

2. Independent Claim 58

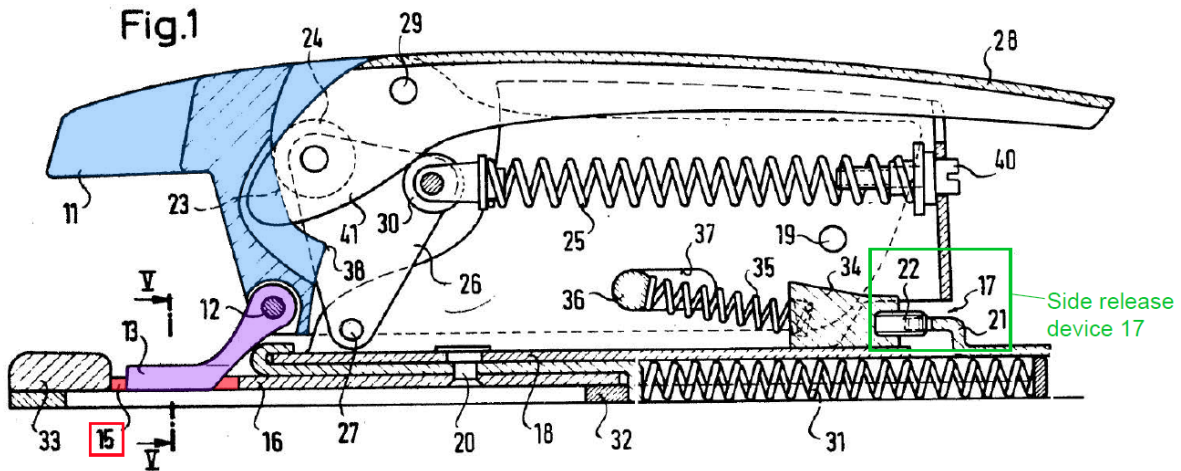
Sittmann discloses or renders obvious each element of claim 58.

a. [58(Preamble)]

Sittmann discloses a “safety ski binding with a boot holder.” Ex-1006-*Sittmann*, 1:1-2, 7:25-35, 8:5-8; Decl., ¶327.

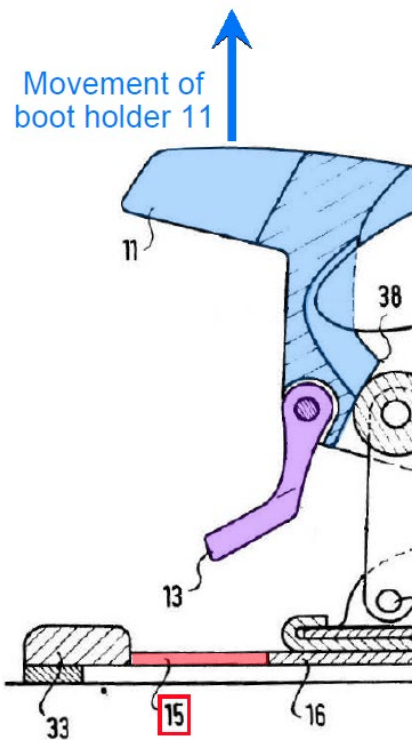
b. [58(a)]

Sittmann discloses or renders obvious [58(a)]. Decl., ¶¶328-333. *Sittmann*’s heel binding attaches to a ski and includes **boot holder 11** for holding the boot. *Id.*, ¶329; *see* Ex-1006-*Sittmann*, 7:25-8:8, 10:1-3, 10:32-11:4.



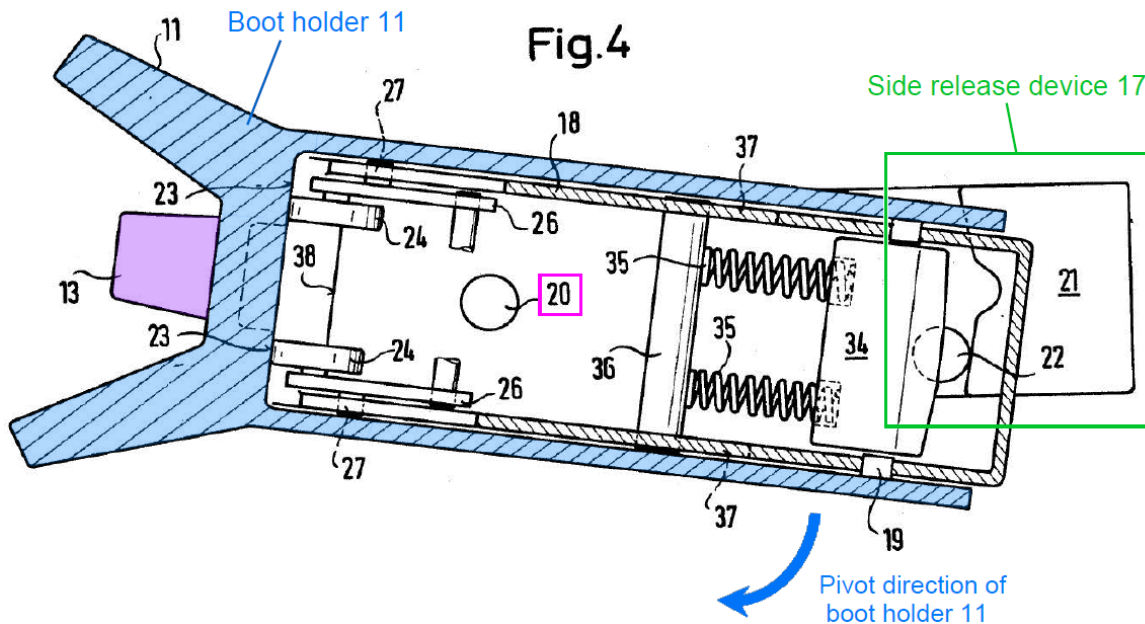
Ex-1006-Sittmann, FIG. 1

Sittmann's heel binding can laterally release the boot once boot holder 11 is lifted, allowing tread spur 13 to swing completely out of slot 15. Decl., ¶¶330-331; Ex-1006-Sittmann, 11:15-20.



Ex-1006-Sittmann, FIG. 3

Once tread spur 13 is freed, side release device 17 enables lateral rotation of boot holder 11 about vertical axis 20 to release the boot heel in response to a “lateral force [that] is sufficiently large so that the detent roller 22” can “emerge from the detent recess 21.” Ex-1006-Sittmann, 1:1-4, 11:15-23, 13:1-4; Decl., ¶331.



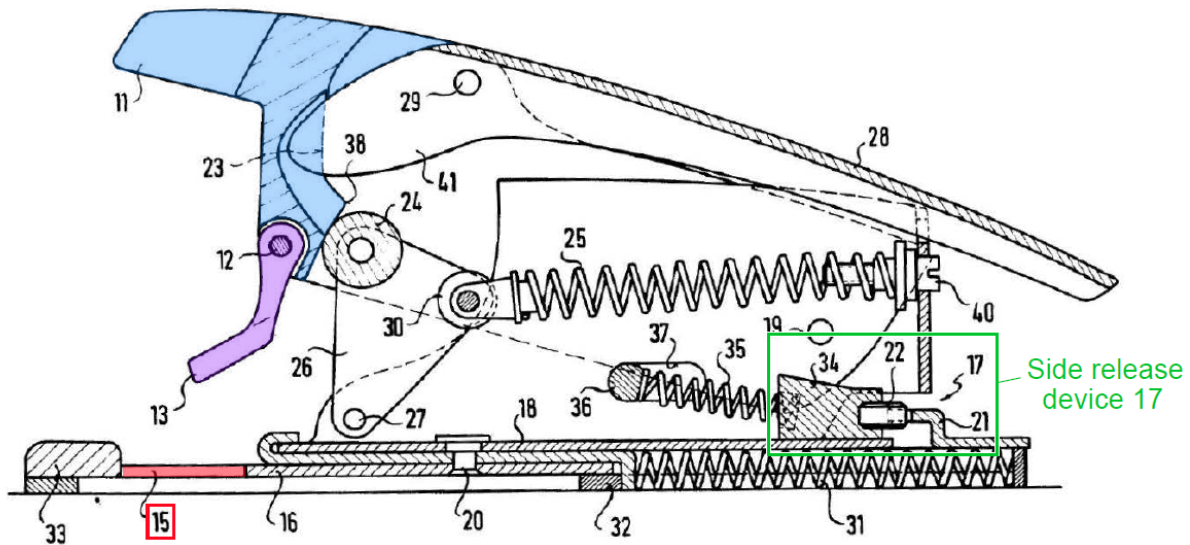
Ex-1006-Sittmann, FIG. 4 (modified)

This lateral release by the heel binding corresponds to the “first release.” Decl., ¶332.

c. [58(b)]

Sittmann discloses [58(b)]. Decl., ¶¶334-336. The claimed “release logic” corresponds to boot holder 11, tread spur 13, slot 15, and side release device 17 of the heel binding, which together cause the “first release” of the boot. *Id.*, ¶334; see *supra* Sections IV.E.1, IV.E.2.b.

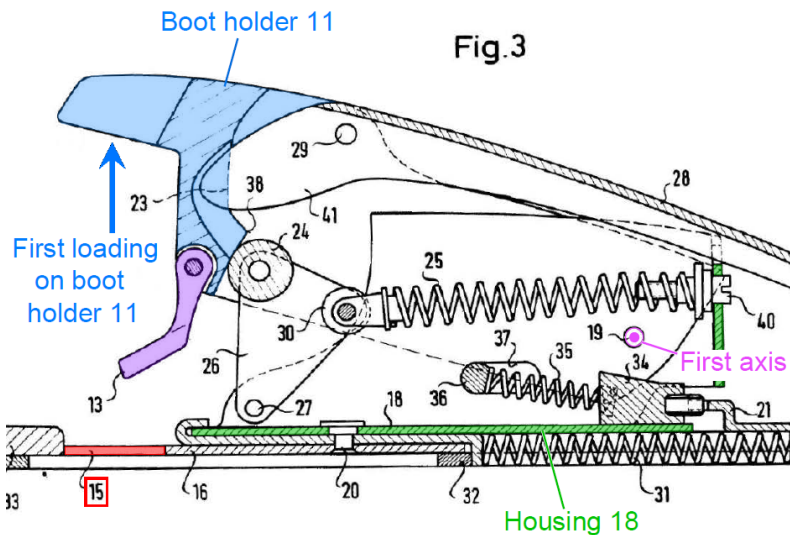
Fig.3



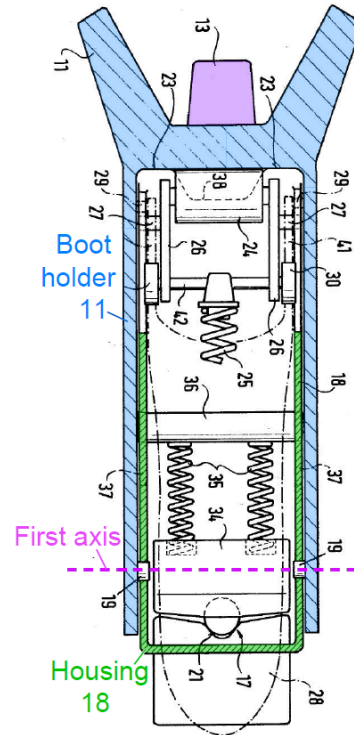
Ex-1006-Sittmann, FIG. 3

d. [58(c)]

Sittmann discloses or renders obvious [58(c)]. Decl., ¶¶337-348. The first and second loadings on *Sittmann*'s binding are caused by an external force experienced during a forward, rotational fall. Decl., ¶¶337, 339; Ex-1006-*Sittmann*, 3:1-22. First, the external force creates an upward lifting force exerted on boot holder 11 to free tread spur 13 from slot 15 (the "first loading"). Ex-1006-*Sittmann*, 3:9-12, 11:15-20; Decl., ¶338. This lifting force causes boot holder 11 to "pivot around a transverse axis 19" (the "first axis"). Ex-1006-*Sittmann*, 8:5-8, 14:6-10. Further, the first loading exceeds a "first defined level" and has a "first defined sense," as claimed, because the "first defined level" and "first defined sense" correspond to the amount and direction of force required to free tread spur 13 from slot 15. *Id.*, 11:16-20; Decl., ¶338.

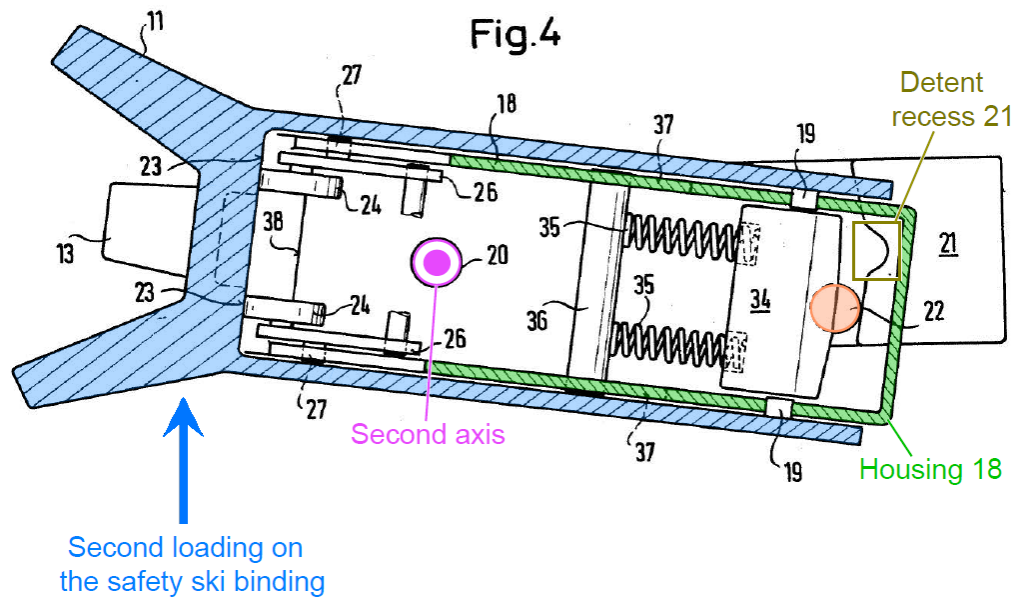


Ex-1006-Sittmann, FIG. 3
(cropped, labels removed)



Ex-1006-Sittmann, FIG. 2
(rotated)

Second, the external force creates a lateral force causing **detent roller 22** to emerge from **detent recess 21** (the “second loading”). Decl., ¶339; Ex-1006-Sittmann, 11:20-23. The second loading exceeds a “second defined level” and has a “second defined sense” because the lateral force has sufficient magnitude and is applied in a direction to push **detent roller 22** out of **detent recess 21**. Decl., ¶339. **Boot holder 11** can then swivel laterally around **vertical axis 20** (the “second axis”). Ex-1006-Sittmann, 8:1-8; Decl., ¶339.



Ex-1006-Sittmann, FIG. 4

Moreover, *Sittmann*'s release logic activates said first release—the lateral heel release—“substantially only when” the first and second loadings exceed defined levels and have defined senses because *Sittmann*'s heel binding only performs the lateral release if boot holder 11 is lifted high enough to free tread spur 13 from slot 15, and if the lateral force is strong enough to push detent roller 22 out of detent recess 21. Ex-1006-Sittmann, 11:16-23; Decl., ¶340. The boot heel will not laterally release if either condition is not met. Decl., ¶340.

To the extent Patent Owner attempts to improperly limit the claims to a sequential operation, *Sittmann* suggests this element because a POSITA would have understood and found it obvious that *Sittmann*'s internal components are set to activate a lateral release only once a first loading applied in the vertical direction

lifts the heel of the boot before a second loading applied in the horizontal direction can cause a lateral release. *Id.*, ¶341.

e. ***[58(d)]***

Sittmann discloses, or at least renders obvious, [58(d)]. In addition to the first release by the heel binding (described above for [58(a)]), *Sittmann* discloses a second release corresponding to a lateral release by the toe binding. Ex-1006-*Sittmann*, 3:12-15; Decl., ¶¶349-350. Specifically, *Sittmann* explains that its disclosure is “particularly useful with a heel binding, which interacts with a toe binding that also allows lateral release.” Ex-1006-*Sittmann*, 3:12-15. The toe binding is “[n]ormally” responsible for “the side release,” but “the heel binding takes over side release” when lateral release at the toe is not possible. *Id.*, 3:9-22.

A POSITA would have understood that laterally-releasing toe bindings were customary and well known. Decl., ¶¶351-352; *see* Ex-1007-*Howell*, [0003]. Patent Owner likewise concedes this point as the ’953 patent discusses “conventional toe release type ski bindings.” Ex-1001, 6:36-37, 7:1-16, FIG. 2.

A POSITA would have further understood that *Sittmann*’s “first release”—a lateral heel release—is “attenuated” relative to the “second release”—a lateral toe release—because *Sittmann*’s heel binding laterally releases the boot only when the skier experiences twisting falls in which a conventional toe release is not possible. Ex-1006-*Sittmann*, 3:15-22; Decl., ¶353. A POSITA would have understood that

twisting falls pose a risk of ACL injury and also would have understood from *Howell* that bindings “which rel[y] on a lateral releasing toe can be dangerous to the knee.” Decl., ¶¶353-354, 370; Ex-1007-*Howell*, [0004]. Thus, a POSITA would have understood that the lateral release threshold of *Sittmann*’s heel binding would be lower than the toe binding’s lateral release threshold since the heel binding only releases laterally during dangerous falls in which a prompt release can prevent injury, as well as to mitigate the injury risks associated with lateral toe releases. Decl., ¶¶353-354.

At the least, *Sittmann* suggests this element because *Sittmann* discloses that the heel binding’s lateral release threshold can be decreased, thereby requiring less force to prompt a release. Decl., ¶¶355, 359; Ex-1006-*Sittmann*, 8:18-22 (the heel binding’s “release force can be adjusted in a lateral direction” by changing the pretension of springs 35 “by a screwing device”). A POSITA would have understood that *Sittmann* is configured to have an attenuated first release at the heel and would have further understood how to reduce the first release threshold. Decl., ¶355. Thus, a POSITA would have understood and found it obvious to adjust *Sittmann*’s binding to provide an attenuated lateral heel release compared to a second, non-attenuated lateral toe release. *Id.*, ¶¶355, 359.

3. Claim 59

Sittmann teaches a lateral “first release” by the heel binding and a lateral “second release” by the toe binding, each in response to certain lateral loads. *Supra* Sections IV.E.2.b, IV.E.2.e; see Ex-1006-*Sittmann*, 3:9-22, 11:16-23. A POSITA would have understood that under either circumstance—triggering *Sittmann*’s first release or second release—an external load acting on the ski causes reaction forces on the binding. Decl., ¶362; see generally, Ex-1003-*Freudiger-1*. For instance, as evidenced by *Freudiger-1*, when a lateral load acts on the ski, the skier’s boot exerts reaction forces acting on the binding’s front and rear jaws. Ex-1003-*Freudiger-1*, 2:34-40. As shown in Figure 3b below, these reaction forces create a torque about the skier’s tibial axis, substantially coinciding with the boot’s center of rotation. *Id.*; Decl., ¶362.

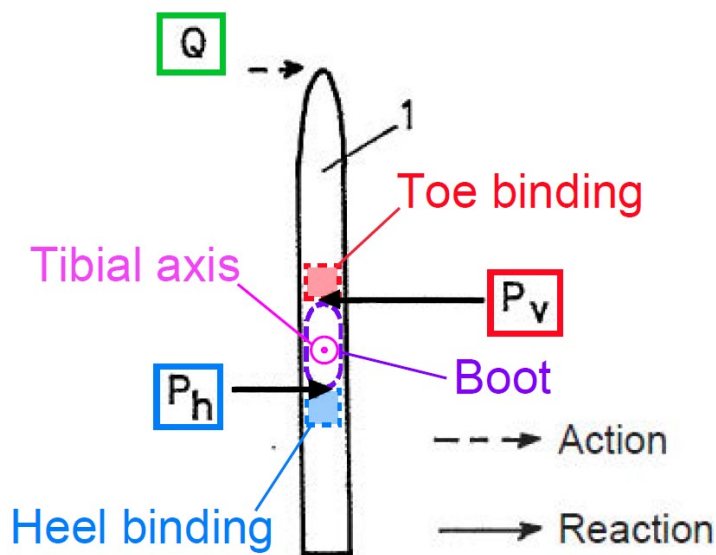


Fig. 3b

Ex-1003-Freudiger-1, FIG. 3b (labels from FIG. 2)

Thus, in *Sittmann*, a lateral load applied during a forward, twisting fall creates a torque about the skier's tibial axis that acts on *Sittmann*'s heel binding, resulting in a first release at the heel once the torque exceeds the release threshold. Ex-1006-*Sittmann*, 11:20-23; Decl., ¶363. Similarly, a POSITA would have understood and found it obvious that a lateral load applied along the ski also creates a torque about the skier's tibial axis that acts on *Sittmann*'s toe binding (which is responsible for lateral releases in most conditions), resulting in a second release at the toe. Decl., ¶363; *see also* Ex-1007-Howell, [0003].

Therefore, the claimed “first release torque” and “second release torque” correspond to the amount of torque about the tibia required to cause the “first release” and “second release,” respectively. Decl., ¶363; *see* Ex-1006-*Sittmann*, 11:20-23.

F. Ground 6: *Sittmann* and *Gulick* Render Obvious Claim 60

1. Rationale for Combining *Sittmann* and *Gulick*

A POSITA would have been motivated to combine the teachings of *Sittmann* and *Gulick* because doing so would have been obvious, beneficial, and predictable. Decl., ¶¶366-372. A POSITA would have been specifically motivated to incorporate *Gulick*'s teachings because doing so would have addressed the goals of *Sittmann*: providing a safer ski binding allowing for a lateral toe release (“second

release”) and a lateral heel release (“first release”) when the toe release is prevented. *Id.*, ¶¶366-367; Ex-1006-*Sittmann*, 3:9-22

A POSITA would have known or found it obvious that *Sittmann*’s toe binding (responsible for the second release) is set to the ASTM-recommended release setting in accordance with industry standard. Decl., ¶367; Ex-1011, Intro. A POSITA further would have understood from *Gulick* that the ASTM-recommended settings exceed the maximum forces generated by most skiers. Decl., ¶367; Ex-1008-*Gulick*, 47.

While *Sittmann* discloses a first and second release, and a POSITA would have understood that *Sittmann*’s first release is attenuated relative to the second release, *Sittmann* does not quantify the reduction of the release threshold for the heel binding relative to the toe binding. Thus, a POSITA would have looked to *Gulick* for further instruction on the magnitude of the threshold reduction. Decl., ¶368.

As explained above, the release settings of *Gulick*’s learning binding were “on average at least 22% less than the corresponding ASTM recommended setting” without inadvertently releasing the boot. *Supra* Section IV.B.1. Therefore, a POSITA would have been motivated to implement *Gulick*’s at least 22% release setting reduction to *Sittmann*’s first release to prevent knee injuries during dangerous falls. Decl., ¶370.

Further, modification of *Sittmann*'s teaching, including adjusting the settings of side release device 17, would have been well within the level of ordinary skill in the art. *Id.*, ¶371. Specifically, a POSITA would have known how to set the tension of *Sittmann*'s spring 35 to achieve the desired lateral release setting. *Id.*

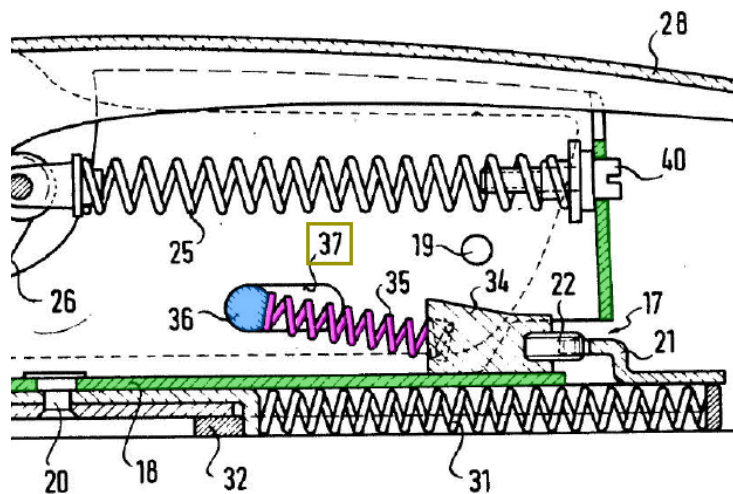
Accordingly, a POSITA would have found it obvious to apply *Gulick*'s teaching to *Sittmann* because the combination merely amounts to applying a known technique to a device ready for improvement. *Id.*, ¶372.

2. Claim 60

As explained above, a POSITA would have understood that *Sittmann*'s first release is attenuated relative to its second release. *Supra* Section IV.E.2.e. A POSITA also would have understood that it could set the first release torque threshold to be at least 20% less than the second release torque because this is an arbitrary quantity. Decl., ¶¶373-374. The '953 patent presents no evidence of criticality of this limitation to refute its obviousness. *Id.*; *Applied Materials*, 692 F.3d at 1295-98.

Regardless, as explained above, *Sittmann* provides how a POSITA would reduce the first release torque of the heel. *Supra* Section IV.E.2.e. A POSITA would have further understood how to design the lateral heel release to further reduce the release torque threshold and would have motivated to reduce this torque setting by at least 20% because doing so would have created a safer binding that protects against knee

injuries. Decl., ¶¶375-377; *see also* Ex-1006-Sittmann, 3:15-22; Ex-1007-Howell, [0005], [0011]; Ex-1008-Gulick, 30-32. Further, a POSITA would have expected success in this adjustment because *Sittmann*'s lateral release device 17 is well-equipped for such a modification. Decl., ¶376. Indeed, *Sittmann* even teaches how to make this modification: the release torque setting is adjusted by displacing a cross pin 36 (on which "springs 35 are supported") to a "desired position within the elongated hole 37 by a screwing device." Ex-1006-Sittmann, 8:18-22. Displacement of cross pin 36 "provide[s] the spring 35 with a suitable pre-tension" that provides the reduced heel release torque. *Id.*; Decl., ¶¶376-377.



Ex-1006-Sittmann, FIG. 1 (cropped)

Thus, it would have been well within a POSITA's knowledge to identify a first position of cross pin 36 with a corresponding tension of spring 35 yielding a first release torque that is at least 20% less than the second release torque. Decl., ¶378; Ex-1006-Sittmann, 8:10-22. Moreover, a POSITA would have had a

reasonable expectation of success in modifying *Sittmann*'s binding to achieve the claimed release torque adjustment. Decl., ¶379.

V. THE BOARD SHOULD NOT EXERCISE DISCRETION TO DENY INSTITUTION

A. 35 U.S.C. § 314(a) Does Not Favor Denial

Discretionary denial is inappropriate. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential).

1. A stay has been requested but not yet granted

The parties filed a stipulation to postpone claim construction proceedings in the district court in light of this Petition (Ex-1022). Petitioner intends to move to stay the litigation prior to claim construction depositions or briefing. Since the District of Vermont has not yet had a chance to grant a stay, this factor is neutral, weighing neither for nor against discretionary denial. But as further explained below, the parties and the court have made very little progress and investment since the inception of the district court proceeding.

2. The district court's trial date is not reflective of the status of the proceeding

While the district court schedule anticipates trial in about 16 months, the litigation is in its early stages. Very little has been done to advance the proceeding. While service of the complaint occurred in early July 2023, the Court did not enter a case schedule until December 11, 2023. The parties then served initial contentions

and conducted an early neutral evaluation on February 26, 2024. Patent Owner issued its first set of discovery requests on March 4, 2024, before amending its asserted claims days later, on March 8, 2024. No documents have otherwise been exchanged.

Claim construction and fact discovery are just beginning in earnest. Expert discovery, dispositive motions, and trial are still many months-to-years away. These deadlines for discovery, dispositive motions, and trial are currently uncertain because they are based off of the Court's issuance of a claim construction order. Ex-1022. But claim construction briefing has not yet begun, and the Court has not yet scheduled a hearing.⁴

Because very little progress has been made in the parallel litigation and the discovery schedule is contingent on a future claim construction ruling, this factor weighs against discretionary denial.

3. Investment in the parallel proceeding has been minimal

The investment in the co-pending litigation has been minimal. Aside from the parties' initial disclosures and initial contentions, no meaningful discovery has taken place.

⁴ The parties anticipate a hearing "on or near September 23, 2024." Ex-1022.

The parties held an Early Neutral Evaluation (“ENE”) session on February 26, 2024, in hopes to resolve the dispute. After the ENE was unsuccessful, Patent Owner amended its contentions, adding new assertions of infringement on March 8, 2024. Since then, Petitioner has worked diligently to file this Petition.

Petitioner’s diligent filing mere months after the ENE and amended infringement allegations “weigh[s] against exercising the authority to deny institution.” *Fintiv*, Paper 11, 11; *see also Apple Inc. v. Koss Corporation*, IPR2021-00592, Paper 9, 16 (PTAB Aug. 23, 2021).

4. Potential overlap between the parallel proceedings is speculative

Because the co-pending litigation is in its early stages, Petitioner’s invalidity positions have not yet been fully developed—only preliminary contentions have been served. Final invalidity contentions are not due until several weeks after the Court’s claim construction order issues. But this is still many months away. Thus, any overlap is unknown at this stage and does not favor discretionary denial.

5. This Petition involves the same parties

The Petition involves the same parties as the parallel proceeding. This factor is neutral. *See HP Inc. v. Slingshot Printing LLC*, IPR2020-01084, Paper 13, 9 (PTAB Jan. 14, 2021).

6. Other circumstances favor institution

Petitioner presents compelling, meritorious challenges to the Challenged Claims, which counsel against denial of institution. *Hewlett Packard Enterprise Co., et al. v. Billjco LLC*, IPR2022-00420, Paper 17, 6 (PTAB July 12, 2022). None of the grounds asserted herein were previously considered by either the Office or district court. *Cf. Comcast Cable Commn's, LLC v. Rovi Guides, Inc.*, IPR2019-00231, Paper 14, 11 (PTAB May 20, 2019). Moreover, because the '953 patent is currently asserted in a district court case, institution here provides narrowing and simplifying benefits for the court. Indeed, Petitioner challenges each asserted and previously asserted claim. Thus, the Board should institute.

B. 35 U.S.C. § 325(d) Does Not Favor Denial

Denial of institution under § 325(d) is inappropriate at least because Examiner did not analyze the prior art combinations presented herein. *Freudiger-1*, *Sittmann*, *Gulick*, and *Freudiger-2* were not cited during prosecution and thus, have not been previously considered. While *Dodge* and *Howell* appear on an IDS during prosecution, Examiner failed to apply *Dodge* or *Howell* for any rejection, Ex-1009, 134-37, and each discloses the limitations noted in the reasons for allowance. *Id.*, 147-52, 185. Accordingly, denial of institution under § 325(d) is not warranted.

VI. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Parties-in-Interest

Petitioner certifies that Head Sport GmbH is the real party-in-interest.

B. Related Matters

Petitioner submits that Patent Owner has asserted the Challenged Patent in *Vermont Safety Developments LLC v. Head Sport GmbH*, Case No. 2:23-cv-00089-GWC (DVT).

C. Lead and Back-Up Counsel, and Service Information

Lead Counsel	Back-Up Counsel
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Please address all correspondence to lead and back-up counsel at the addresses shown above and Head-VSD-IPR@finnegan.com. Petitioner consents to electronic service by email.

VII. GROUNDS FOR STANDING

The '953 patent is available for *inter partes* review. Petitioner is not barred or estopped from requesting such review on any grounds identified herein.

VIII. CONCLUSION

For the reasons above, Petitioner requests the Board institute *inter partes* review and cancel each challenged claim as unpatentable.

Respectfully submitted,

Dated: June 28, 2024

By: /Aaron L. Parker/
Aaron L. Parker, Reg. No. 50,785

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

Pursuant to 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the foregoing Petition contains 13,998 words, excluding those portions identified in 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

Respectfully submitted,

Dated: June 28, 2024

By: /Aaron L. Parker/
Aaron L. Parker, Reg. No. 50,785

CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. §§ 42.6(e) and 42.105, the **Petition for *Inter Partes* Review of U.S. Patent No. 7,523,953, the associated Power of Attorney, and Exhibits 1001-1018, 1022** were served via Priority Mail Express on the correspondence address of record with the USPTO as follows:

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A courtesy copy has also been emailed to litigation counsel for Patent

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Dated: June 28, 2024

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