

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOD SPORTSMAN MARKETING, LLC
Petitioner,

v.

HANGZHOU ZH TECH CO., LTD.
Patent Owner

Patent No. 11,736,855
Case No. PGR2024-00034

PETITION FOR POST-GRANT REVIEW

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EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 11,736,855 (“the ’855 Patent”)
1002	Declaration of Dr. Jason Janet
1003	File History of ’855 Patent
1004	U.S. Patent No. 11,451,900 (“Unger”)
1005	U.S. Patent No. 8,050,444 (“Smith”)
1006	U.S. Patent No. 8,488,814
1007	U.S. Patent No. 3,160,717
1008	U.S. Patent No. 2,235,372
1009	U.S. Patent Application Publication No. 2020/0196698
1010	U.S. Patent 8,869,355
1011	U.S. Patent Application Publication No. 2021/0080996
1012	U.S. Patent Application Publication No. 2005/0238181 (“Nilsson”)
1013	U.S. Patent No. 10,792,190 (“Hakansson”)
1014	WEBSTER’S NEW WORLD COLLEGE DICTIONARY, 4 th Ed. (1999)
1015	AMERICAN HERITAGE DICTIONARY, 2 nd College Ed. (1982)
1016	OXFORD AMERICAN DESK DICTIONARY (1998)
1017	Samuel et al., INTRODUCTION TO ENGINEERING DESIGN (2005)

Exhibit No.	Description
1018	U.S. Patent 9,366,871
1019	Budynas et. al, SHIGLEY’S MECHANICAL ENGINEERING DESIGN 8th Ed. (2006)
1020	Animated 3D Model of Unger-Smith Torsion Spring
1021	IDC Spring, <i>How Springs Are Made – The Spring Manufacturing Process</i> , available at https://idcspring.com/spring-manufacturing-process/ (last accessed May 21, 2024)
1022	Lee Spring, <i>Torsion Springs</i> , available at https://www.leespring.com/learn-about-torsion-springs# (last accessed May 20, 2024)
1023	James Spring & Wire Company, <i>Torsion Springs</i> , available at https://www.jamesspring.com/our-capabilities/torsion-springs/ (last accessed May 20, 2024)
1024	<i>Curriculum Vitae</i> of Dr. Jason Janet

I. INTRODUCTION

Petitioner Good Sportsman Marketing, LLC (“GSM”) respectfully requests post grant review of Claims 1-19 (“Challenged Claims”) of U.S. Patent No. 11,736,855 (“the ’855 Patent,” Ex. 1001). The Challenged Claims are directed to a communication device (e.g., walkie-talkie) that is releasably connectable to a hearing protection equipment (e.g., noise-reducing earmuffs) to provide communication capabilities to the equipment. However, GSM’s own prior art—U.S. Patent No. 11,451,900 (“Unger,” Ex. 1004)—demonstrates that there was nothing novel about such communication devices, including the use of mounting arms for releasably connecting such devices to earmuffs.

Recognizing this, the ’855 Patent characterizes its supposed novelty as using a torsion spring to rotatably bias the walkie-talkie’s mounting arms to aid in attachment and detachment to earmuffs. But there is nothing new about this either—it simply modifies one embodiment of Unger’s device to incorporate a well-known torsion-spring mechanism commonly used in earmuffs and communication devices. In fact, Unger expressly suggests doing so—Unger discloses alternative embodiments where the mounting arms are “flexible” or “resilient” and can be “bent or otherwise manipulated” to initially engage the walkie-talkie with earmuffs and then “be allowed to return to a normal or at rest state” to secure the engagement. The prior art shows that torsion springs were well-known and commonly used to allow

for precisely this type of manipulation.

II. MANDATORY NOTICES (37 C.F.R. § 42.8)

A. Each Real-Party-In-Interest

GSM is the real-party-in-interest.

B. Notice of Related Matters

GSM is unaware of any related matters.

C. Lead and Back-Up Counsel

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GSM is filing a Power of Attorney concurrently with this petition.

D. Service Information

Service of documents via mail or hand-delivery may be made on GSM at: Cabello Hall Zinda, PLLC 801 Travis Suite 1610, Houston, Texas 77002. The fax number for GSM's counsel is (832) 631-9991. GSM consents to service by email provided all counsel of record are served, as well as jwatkins@chzfir.com. Proof

of service of this petition and exhibits is provided in the appended certificate.

III. REQUIREMENTS FOR PGR (37 C.F.R. §§ 42.201, 42.203, & 42.204)

A. Standing

GSM certifies that the '855 Patent is available for PGR and GSM is not barred or estopped from requesting Post-Grant Review of any of the challenged claims on the identified grounds.

B. Fees

GSM requests review of 19 claims. The undersigned authorizes the Commissioner to charge the fee specified by 37 C.F.R. § 42.15(a) to Deposit Account No. 603139, referencing attorney docket number 139-171. Any additional required fees or credits may be deducted or credited to the same account.

IV. CHALLENGE AND RELIEF REQUESTED (37 C.F.R. § 42.204(B))

A. § 42.204(b)(1)-(2): Statement of Requested Relief

GSM requests institution of trial and cancellation of claims 1-19 of the '855 Patent in view of the Grounds below.

Ground	Claims	Basis	Prior Art / Basis
1	1-19	§ 103	Unger and Smith
2	18	§ 103	Unger and Smith, further in view of Hakansson
3	3-6, 8, 9, 16	§ 112(b)	Indefiniteness

Ground	Claims	Basis	Prior Art / Basis
4	10	§ 112(a)	Lack of Enablement
5	10	§ 112(a)	Lack of Written Description

Each Ground also relies on the general knowledge of a person having ordinary skill in the art (hereafter, “General Knowledge”). *See Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1337-38 (Fed. Cir. 2020) (permitting reliance on general knowledge of a POSITA).

B. § 42.204(b)(4): Unpatentability

Claims 1-19 are unpatentable as detailed in Sections VI to X below.

C. § 42.204(b)(5): Supporting Evidence

GSM’s exhibits are filed herewith. The relevance of the evidence, including identification of specific evidence that supports this challenge is found throughout the Petition. GSM submits the declaration of Dr. Jason Janet (Ex. 1002) in support of this Petition pursuant to 37 C.F.R. § 1.68.

V. THE ’855 PATENT

A. Priority Date

The ’855 Patent was filed February 13, 2023 and claims priority to a Chinese patent application filed on January 10, 2023. Ex. 1001. The ’855 Patent is thus subject to the first inventor-to-file amendments of the AIA. Leahy-Smith America Invents Act (AIA), Pub. L. No. 112-29, § 3(n)(1) 125 Stat. 284 (2011) (codified as

amended in 35 U.S.C.).¹

B. Overview of '855 Patent

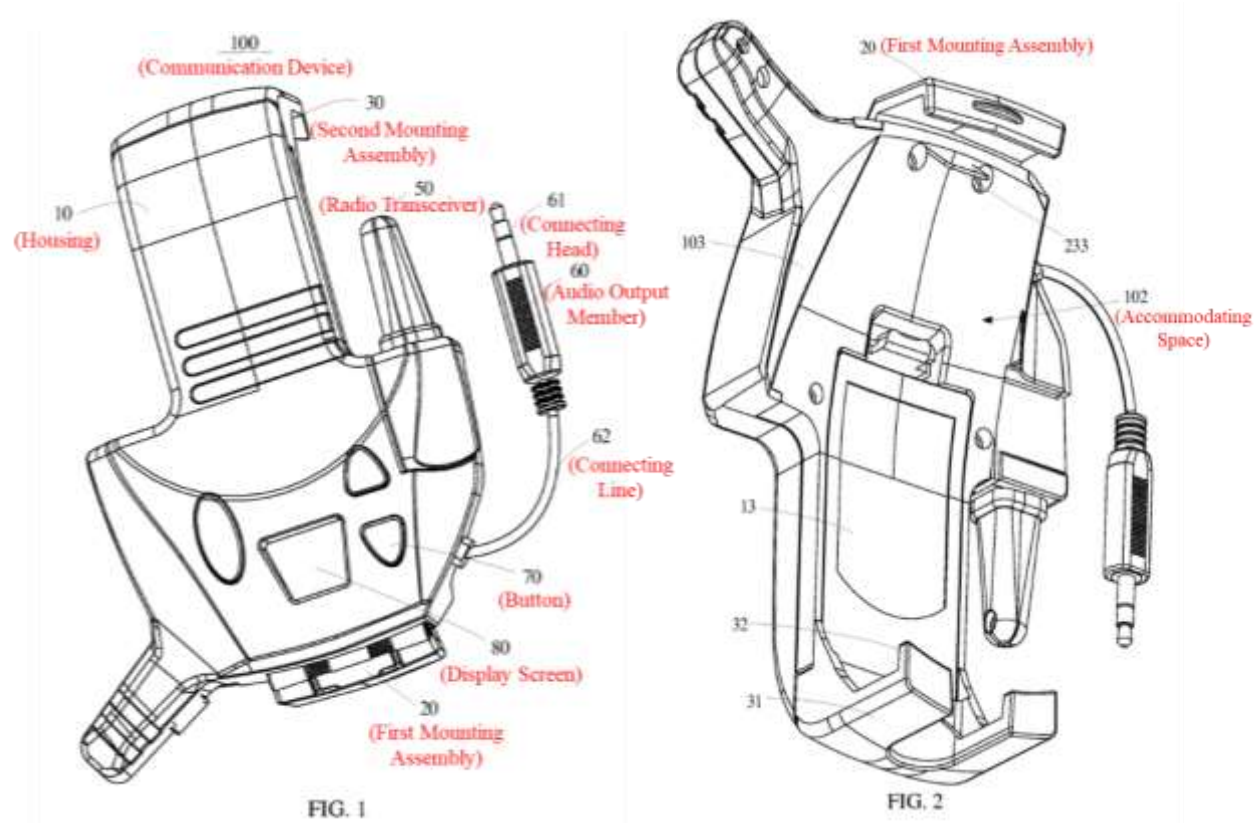
The '855 Patent relates to the field of “communication transceivers and in particular to a communication device for hearing protection equipment, and a system for connecting a communication device to a hearing protection equipment.” Ex. 1001, 1:16-20.

The specification’s “Background” teaches that personal protective equipment, such as earmuffs or earplugs, are used to protect users “by providing a barrier which reduces the level of noise or other sounds that is able to reach the users’ ears” and further that “[u]sers often equip the equipment with a communication device, so they can use their mobile phones normally when wearing the equipment.” *Id.*, 1:24-34. “However, the existing communication device has a low adaptability and can only be installed on the equipment of a specific size, and the installation process is also inconvenient.” *Id.*, 1:32-35.

The '855 Patent purports to disclose a novel communication device (e.g., walkie-talkie) that relies on a torsion spring to make it easier to attach and detach

¹ GSM takes no position in this proceeding on whether the '855 Patent is entitled to the January 10, 2023 foreign filing date, as the asserted references qualify as prior art even assuming that is the effective priority date.

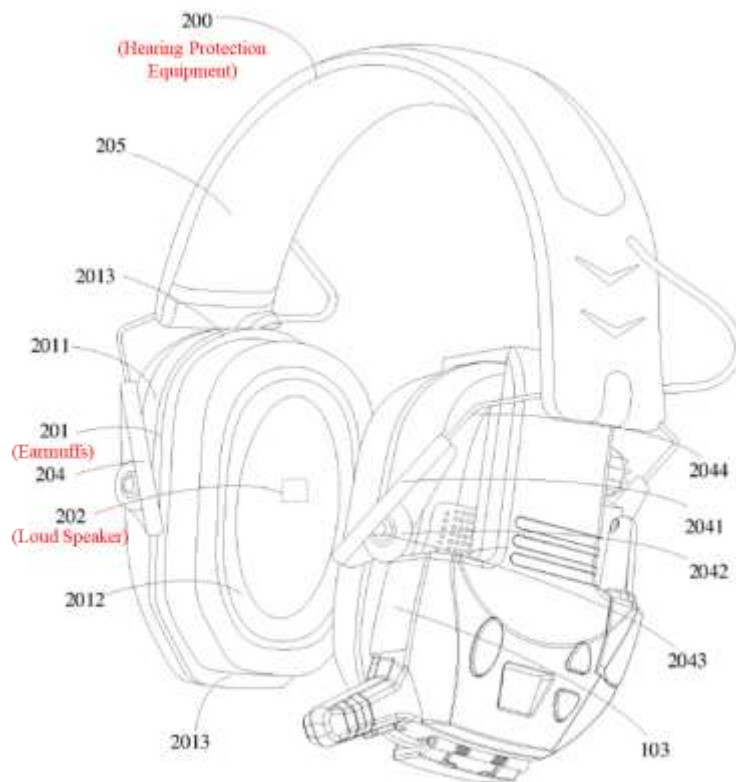
the device to hearing protection equipment (e.g., earmuffs). An exemplary embodiment of the communication device 100 is shown in Figures 1 and 2 (annotated below):



Id., 2:11-14, 2:55-58. Communication device 100 includes: housing 10, first mounting assembly 20 rotatably arranged on a first end of the housing 10, second mounting assembly 30 arranged on a second end of the housing 10, microphone 40 (unlabeled) for capturing audio, radio transceiver 50 configured to wirelessly transmit the audio captured by the microphone 40 and wirelessly receive wireless signals carrying audio, audio output member 60 (for connecting to an audio input member of the hearing protection equipment) configured to transmit the wireless

signals carrying audio to the loudspeakers 202 of the hearing protection equipment, button 70, and display screen 80. Ex. 1001, 2:62-3:19.

In Figure 9 (annotated below), “[t]he first mounting assembly 20 and the second mounting assembly 30 are releasably mounted on two ends of the earmuff 201 respectively to connect the communication device 100 with the hearing protection equipment 200:”



Id., 3:5-9.

“First mounting assembly 20” is called out as the “technical solution of the present disclosure.” *Id.*, 4:14-18. The specification teaches that the first mounting assembly 20 is “rotatably arranged at the first end of the housing 10” such that when

communication device 100 needs to be installed on hearing protection equipment 200, second mounting assembly 30 is installed on the top of the earmuff while first mounting assembly 20 “is rotated in a direction away from the housing 10, so that the hearing protection equipment 200 can be placed in the housing 10 easily, then the first mounting assembly 20 is rotated in a direction close to the housing 10 to install on the other fixing part 2013 of the hearing protection equipment 200 conveniently.” *Id.*, 4:14-27. According to the specification, this “installation process is simple and convenient.” *Id.*, 4:27-29. When the first mounting assembly 20 “is rotated in the direction away from the housing 10, the accommodating space 102 for accommodating the equipment 200 is expanded, so that the hearing protection equipment 200 of different sizes can be placed into the accommodating space 102, thus the communication device 100 has better adaptability.” *Id.*, 4:29-36.

Figures 6-8 (annotated below) show one embodiment of a first mounting assembly, which includes first connecting member 21 (green-highlighted pin) accommodated in opening 2211 of connecting part 221; elastic member 23 (a torsion spring having two yellow-highlighted elastic bodies 231, two opposite purple-highlighted butting parts 232, and two opposite blue-highlighted fixing parts 233) sleeved on connecting member 21; and first mounting member 22 with receiving portion 2221 for receiving the butting parts 232 (each having a straight section 2321 and bending section 2322).

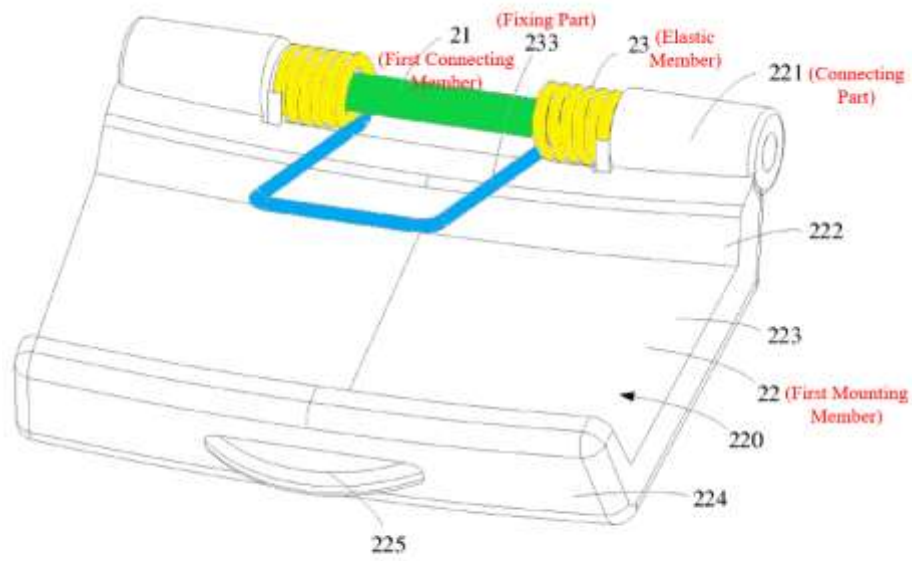


FIG. 6

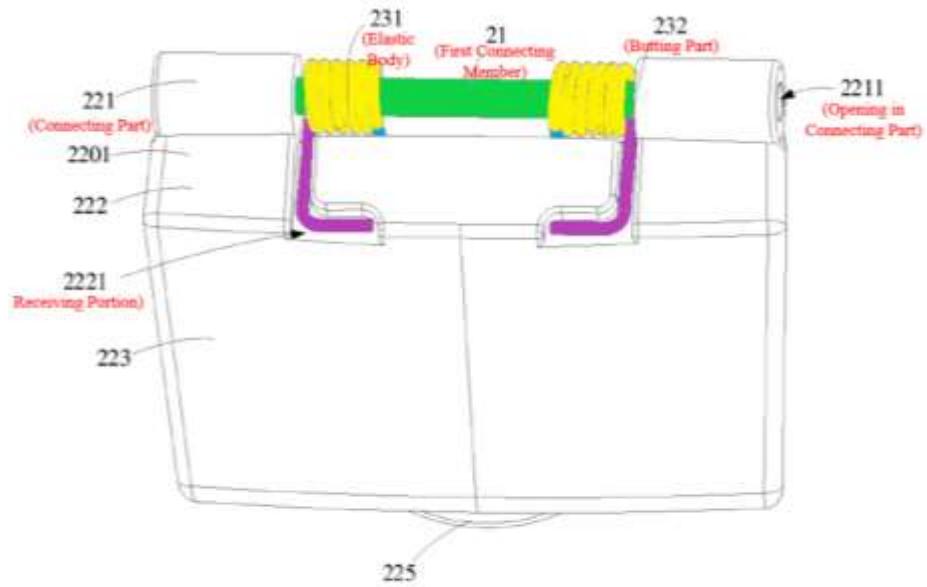
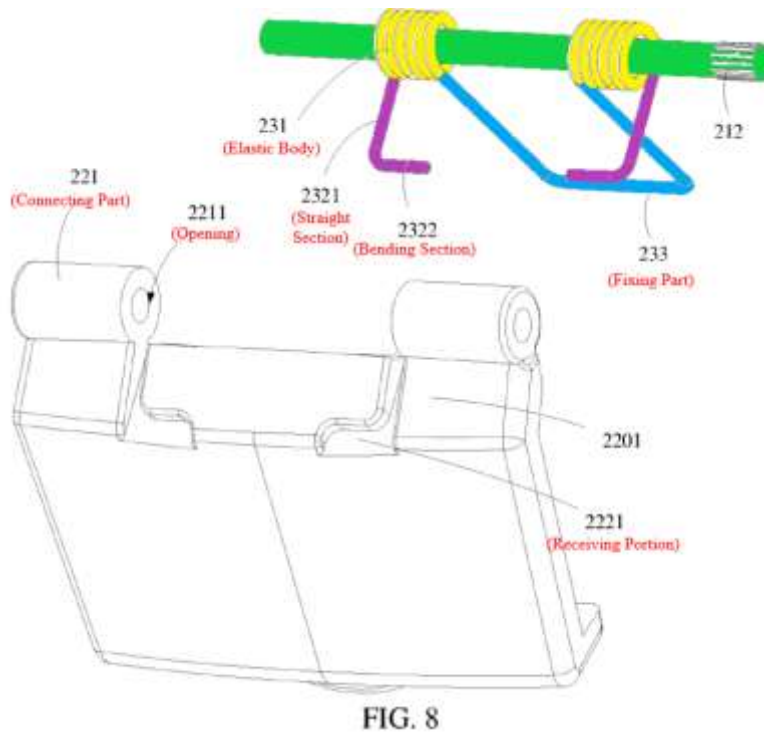


FIG. 7



Ex. 1001, 4:37-5:48; Ex. 1002 ¶81.

The Specification explains:

The first mounting member 22 is rotatably connected with the first connecting member 21 by the elastic member 23. The first mounting member 22 is clamped with the earmuff 201 under the elastic force of the elastic member 23, the clamping strength between the first mounting member 22 and the earmuff 201 is increased. The first mounting member 22 can be separated from the earmuff 201 after overcoming the elastic force of the elastic member 23.

Ex. 1001, 5:48-61. That is, first mounting assembly 20 “clamps” onto earmuff 201 because of a rotational, spring-biased force but can be rotated away from the earmuff cup to allow it to be released and separated from the first mounting assembly. Ex. 1002 ¶82.

Figures 11 and 12 depict additional embodiments of elastic members, which are torsion springs having different designs than Figures 6-8 embodiment. *See* Ex. 1001, 6:29-52. For example, the elastic member of Figures 11 and 12 each have a single “elastic body” design, rather than the dual-body design of Figures 6-8, and the Figure 12 embodiment does not appear to have the component identified as a “fixing part” in the other embodiments. Ex. 1002 ¶83.

C. Prosecution History

The application for the '855 Patent was subject to prioritized Track One examination. Ex. 1003, 84. The Examiner issued a single office action rejecting claims 1, 14-17 and 20 as obvious over U.S. Patent Publication No. 2018/0176673 (“Madsen”) and claims 18 and 19 as anticipated by Madsen. *Id.*, 43-47. Claims 2-13 were objected to as being dependent upon a rejected base claim, but the Examiner stated those claims would be allowable if rewritten in independent form including all limitations of the base claim and intervening claims. *Id.*, 47.

The patentee amended then-independent claims 1 and 18 to incorporate the limitations of dependent claim 2, as shown below:

1. (Currently amended) A communication device for a hearing protection equipment, the hearing protection equipment comprising at least one earmuff, at least one loudspeaker and an audio input member, wherein the communication device comprises:

- a housing;

- a first mounting assembly, rotatably arranged on a first end of the housing;

- a second mounting assembly, arranged on a second end of the housing, the first mounting assembly and the second mounting assembly are connected to two ends of the earmuff respectively to releasably connect the communication device with the hearing protection equipment;

- a microphone, configured for capturing an audio;

- a radio transceiver, configured for wirelessly transmitting the audio captured by the microphone to user and wirelessly receiving a wireless signal containing an audio from the user; and

- an audio output member, communicated with the audio input member and configured for transmitting the wireless signal containing the audio to the at least one loudspeaker, wherein

- the first mounting assembly comprises:

- a first connecting member, connected with the housing;

- an elastic member;

- a first mounting member, rotatably connected with the first connecting member by the elastic member, the first mounting member is coupled with the earmuff under an elastic force of the elastic member; and the first mounting member is separated from the earmuff after overcoming the elastic force of the elastic member.

18. (Currently amended) A system for connecting a communication device to a hearing protection equipment, the system comprising:
a communication device, comprising:
a housing;
a first mounting assembly, rotatably arranged on a first end of the housing; and
a second mounting assembly, arranged on a second end of the housing;
and a hearing protection equipment, comprising:
at least one earmuff, comprising two fixing parts, the first mounting assembly and the second mounting assembly are installed on the two fixing parts respectively, to connect the communication device to the hearing protection equipment, wherein
the first mounting assembly comprises:
a first connecting member, connected with the housing;
an elastic member;
a first mounting member, rotatably connected with the first connecting member by the elastic member, the first mounting member is coupled with the earmuff under an elastic force of the elastic member; and the first mounting member is separated from the earmuff after overcoming the elastic force of the elastic member.

Id., 33, 36-39. A Notice of Allowance then issued without explanation. *Id.*, 10-14. It therefore appears that the claims were allowed over the art of record because of the added limitations related to the “first mounting assembly.” Ex. 1002 ¶85.

D. Level of Ordinary Skill in the Art

As of January 10, 2023, a person having ordinary skill in the art (“POSITA”) would have had a bachelor’s degree in mechanical engineering or a similar field and at least one year of practical mechanical design experience with electro-mechanical products. *Id.* ¶86. A person could also have qualified as a POSITA with some combination of more formal education (e.g., a Ph.D.) and less experience or less formal education and more experience in the foregoing fields. *Id.* Dr. Janet far

exceeds the qualifications of a POSITA. *Id.* ¶¶87, 4-31; Ex. 2024.

E. Claim Construction

Claim construction is governed by 37 C.F.R. § 42.200(b). GSM does not believe any terms need to be construed to resolve the prior art issues presented in this Petition. Ex. 1002 ¶89. GSM reserves the right to respond to any construction issues raised by Patent Owner.

VI. GROUND 1: CLAIMS 1-19 ARE OBVIOUS OVER UNGER AND SMITH

A. Summary of References

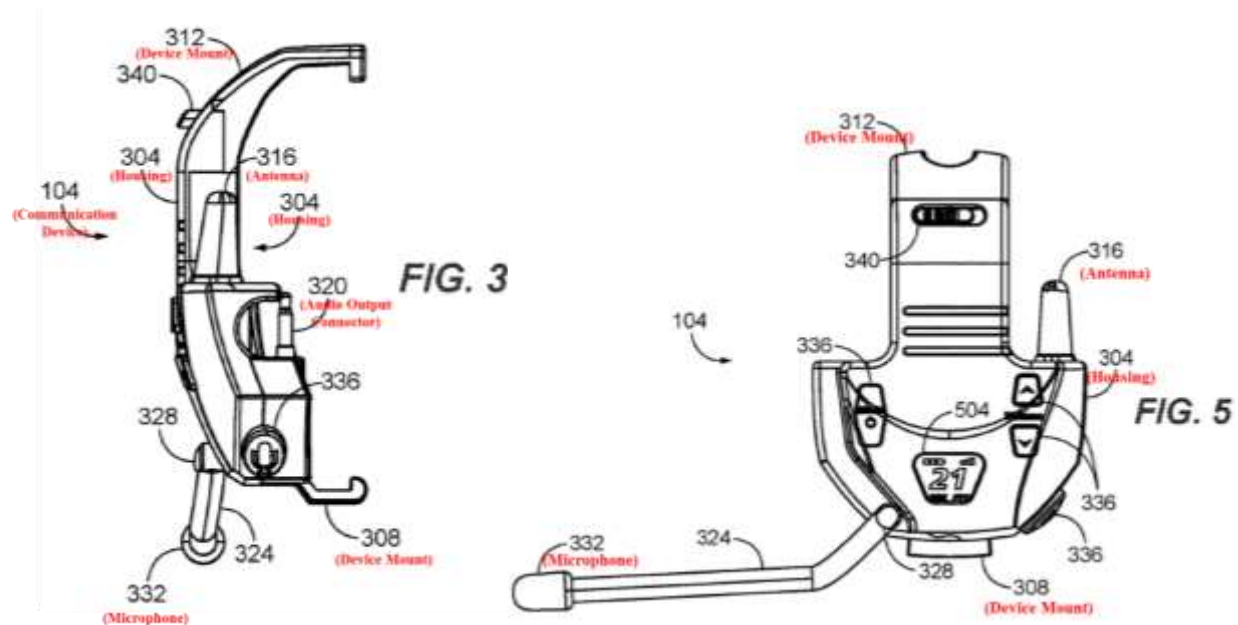
1. Unger

The non-provisional application for Unger was filed on August 2, 2019, published on February 13, 2020, and issued as a patent on September 20, 2022. Ex. 1004, 1. Unger is prior art under both 35 U.S.C. § 102(a)(1) and (a)(2). Unger was not before the Office during prosecution. *See* Ex. 1001, 1-2.²

Unger discloses a two-way radio communication device that is attachable and

² Given the remarkable similarities between the communication device 104 depicted in Figure 1 of the '855 Patent and Figure 5 of Unger (e.g., same antenna design, same button layout and shape, same arm-type mounts, same unique LCD display shape), it seems likely Patent Owner was aware of Unger when drafting the '855 Patent. Unger was not disclosed to the Office by Patent Owner.

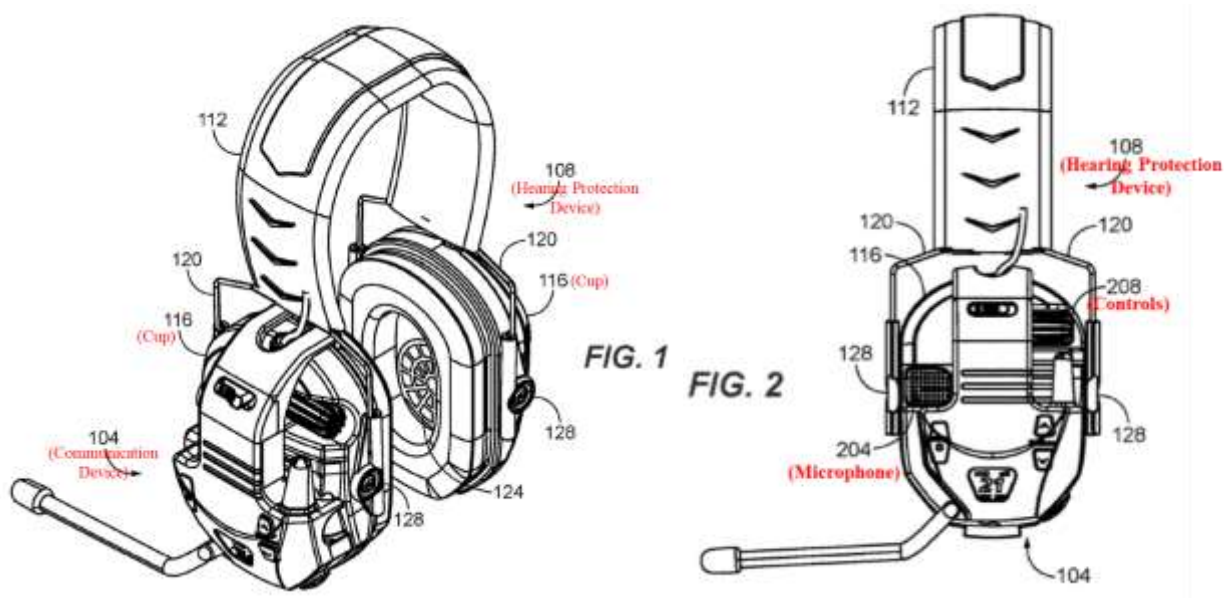
detachable from hearing protection devices, such as earmuffs. See Ex. 1004, Abstract. Figures 3 and 5 (annotated below) depict one embodiment of such a communication device 104:



Communication device 104 includes housing 304 that houses or supports various components (*id.*, 4:5-9), such as microphone 332 for receiving a user's voice or other audio (*id.*, 5:3-12), antenna 316 for transmission and reception of wireless signals to allow communication between users of multiple communication devices (*id.*, 5:13-16), and audio output connector 320 for insertion into an audio input connector of a hearing protection device (*id.*, 4:48-56). Housing 304 has an upper mount 312 and lower mount 308, which enable the communication device to be removably attached to a hearing protection device. *Id.*, 4:10-22.

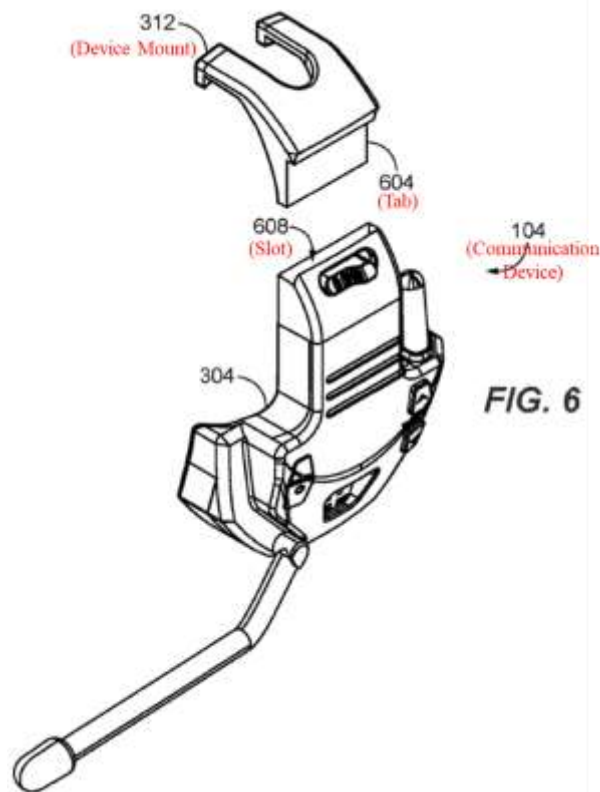
Figures 1 and 2 (annotated below) show communication device 104 attached

to cup 116 of hearing protection device 108 (earmuffs) via upper mount 312 and lower mount 308:



Id., 3:55-61. The hearing protection device 108 features active noise cancelling via a speaker 124 in each of the cups 112 and may include a microphone 204 for active noise cancellation as well. *Id.*, 3:64-4:5. The hearing protection device 108 also includes controls 208 (e.g., volume, active noise cancellation controls). *Id.* When communication device 104 is attached to cup 116, “audio output connector 320 is automatically inserted into the corresponding connector at the cup, thereby allowing communication of audio signals therebetween.” *Id.*, 4:64-5:2.

In Figure 6 (annotated below), upper mount 312 is detachable from the rest of housing 304 via tab or member 604 that is received within a corresponding groove, slot or compartment 608:



Id., 5:65-6:8. To attach communication device 104 to a hearing protection device, (1) the upper mount 312 may first be removed from housing 304, (2) then the lower mount 308 is engaged with the lower portion of earmuff cup 116, and (3) the upper mount 312 is then reattached to the housing 304 while engaging the upper portion of earmuff cup 116. *Id.*, 5:42-55. To remove communication device 104, a reverse procedure is used where the mount 312 is removed from housing 304, and then the rest of the communication device 104 can be detached. *Id.*, 6:9-19.

Unger expressly teaches and suggests various other embodiments of device mounts 308, 312 where they can be manipulated (e.g., through bending, flexibility or resilience) between two states—a “normal or at rest” state” and a “manipulated”

state—to facilitate attachment and detachment with hearing protection equipment. *Id.*, 6:20-37.

2. Smith

Smith was filed on January 19, 2007 and issued on November 1, 2011, and thus constitutes prior art under 35 U.S.C. § 102(a)(1) and (a)(2). Ex. 1005, 1. Smith was not before the Office during prosecution. See Ex. 1001, 1-2.

Smith explains that headphones or ear protectors are designed for noisy environments and “include features that reduce or eliminate environmental noises,” but that they are “often uncomfortable due to the pressures they exert on a user’s head and ears.” Ex. 1005, 1:11-15. To address this concern, Figure 1 of Smith (annotated below) “shows a mechanism that allows headset clamping pressure to be adjusted while the headset is being worn.” *Id.*, 5:55-56.

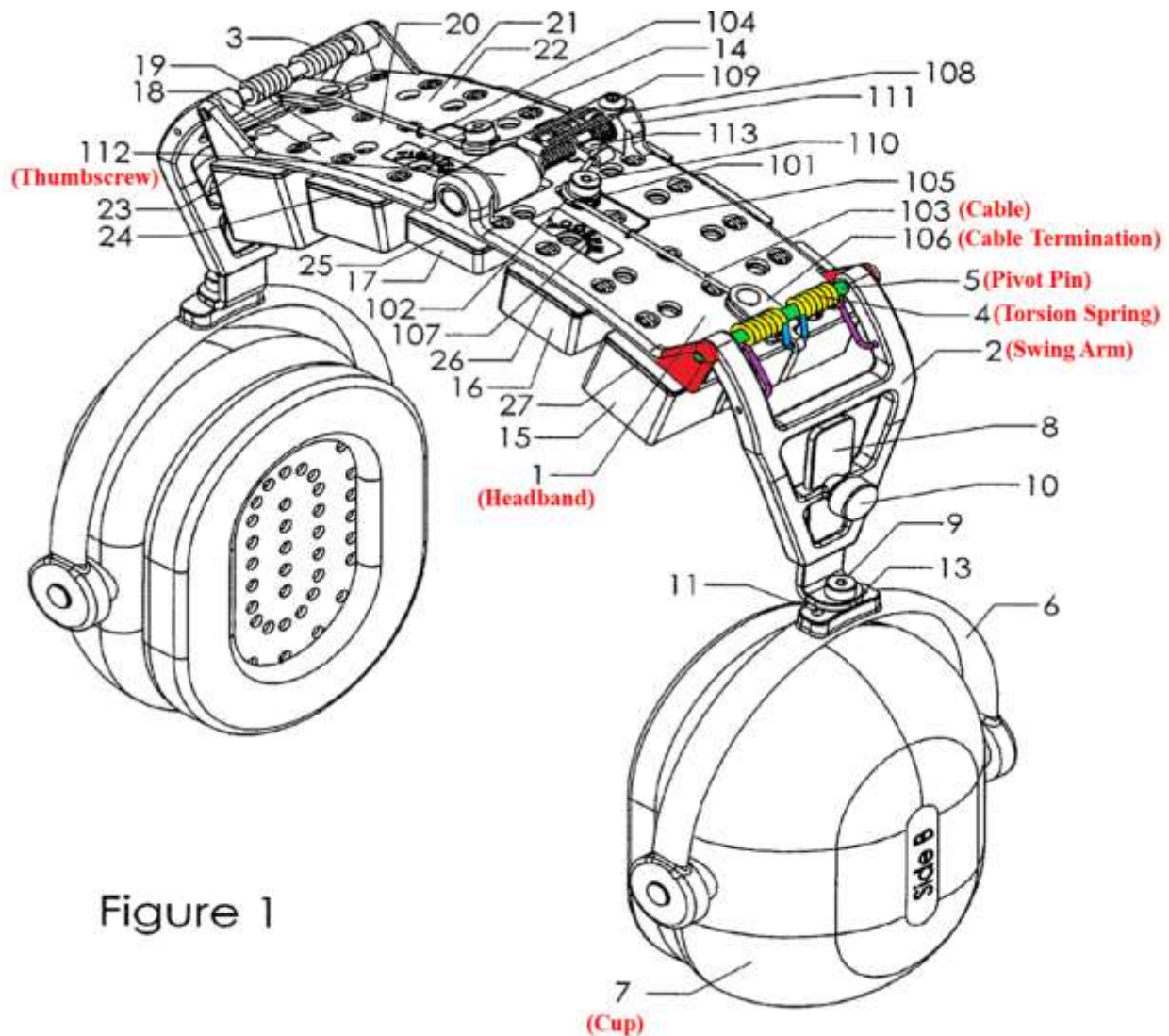
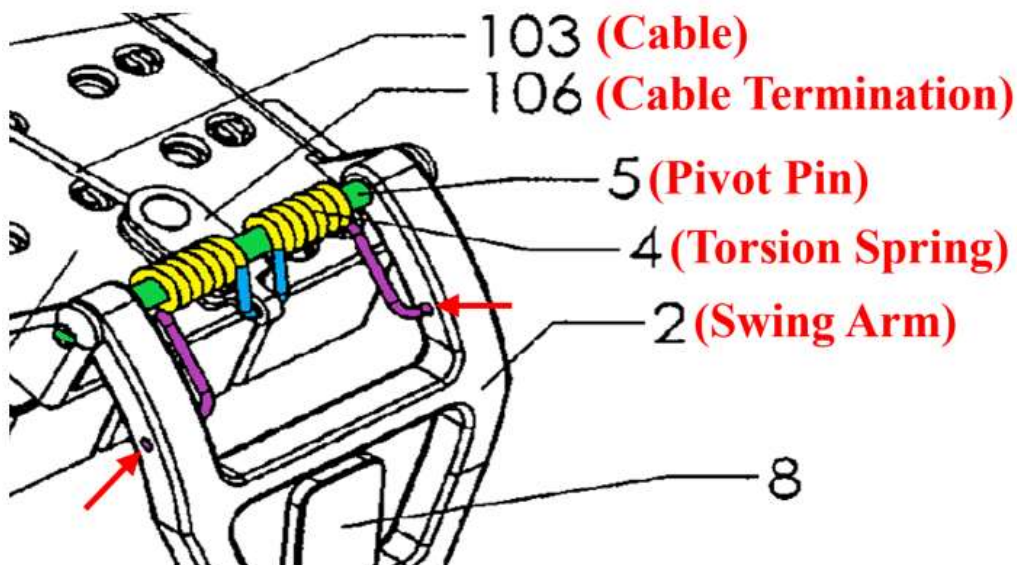


Figure 1

Torsion spring 4 (combination of yellow, blue and purple) is wound about pivot pin 5 (green) that couples arm 2 to headband 1. *Id.*, 5:55-61, 6:64-65. Specifically, as shown each end of pivot pin 5 (green) extends through opposing through-holes in the arm 2 and into through-holes of opposing lobe-portions (red) of headband 1,

thereby rotatably coupling the arm 2 to the headband 1 about the pivot pin 5.³ Ex. 1002 ¶102. One portion (blue) of spring 4 is fixed to the headband 1 via cable termination 106, and other portions (purple) of spring 4 are connected to swing arm 2 by bending portions that extend into through-holes in swing arm 2. Ex. 1005, 4:63-65, 5:59-6:1. The connection of the bending portions to swing arm 2 is not discussed but is clearly visible, as shown by the red arrows in Figure 1 (partial, annotated below) pointing to the through-holes in arm 2 that the bending portions extend into:



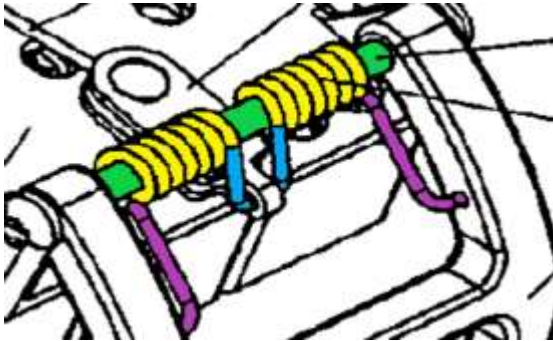
Ex. 1002 ¶102. Smith details how the torsion spring can be adjusted. Thumbscrew 112 can be rotated counterclockwise by the user to retract cable 103 to pull the blue-portion of torsion spring 4 in the direction of cable termination 106, which causes

³ Figure 2 depicts an alternative “driveshaft” embodiment where pivot pin 5 also extends through openings in the arm 2 and lobes. *Id.*, 7:27-43; Ex. 1002 ¶104.

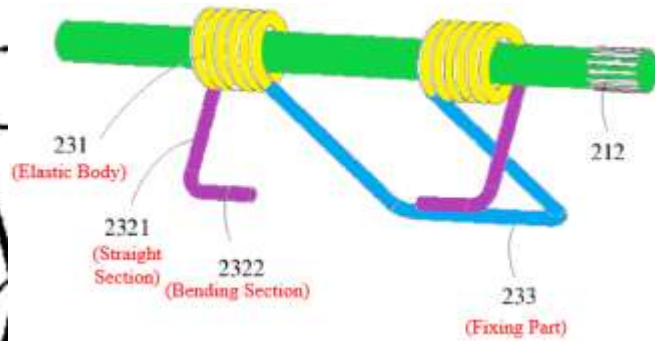
spring 4 to apply more inward pressure to earcup 7. Ex. 1005, 6:3-10. Rotating thumbscrew 112 in the opposite direction allows the blue-portion of spring 4 to pull cable 103 in the direction away from cable termination 106, lessening the clamping pressure applied to earcup 7 by spring 4. *Id.*, 6:10-15. An identical spring mechanism (e.g., comprising torsion spring 3) is on the opposite end of headband 1. *Id.*, 6:1-2, 15-17. Consequently, just as the torsion spring mechanism of the '855 Patent provides spring-biased rotational freedom to the lower mount assembly to facilitate attachment and detachment, Smith's torsion spring mechanism provides spring-biased rotational freedom to the swing arms and earmuff cups, allowing each cup to be rotated away from the wearer's head. This makes it easier to put the earmuffs on, while applying a clamping force to the wearer's head to provide a more comfortable fit. Ex. 1002 ¶105.

Smith's torsion spring has identical constituent parts as the Figure 8 torsion spring of the '855 patent (partial, annotated below), as shown by a side-by-side comparison with Smith's Figure 1 (partial, annotated below):

Smith, Figure 1



'855 Patent, Figure 8



Id. ¶106. Like the Figure 8 mechanism, Smith’s torsion spring mechanism includes a spring 4 comprising two spaced apart elastic bodies (yellow), two butting parts (purple) each having a straight section and bending section, and a fixing part (blue), where the spring’s bodies are sleeved on a connecting member (green). *Id.* ¶107.

Smith thus discloses a torsion spring mechanism that applies a rotatable clamping force to the swing arm 2, which can be adjusted so that the cups are more comfortable for the wearer. *Id.* ¶108. Smith explains: “embodiments herein disclosed allow a user to easily adjust the pressure of headset earphones while wearing the headset so that he or she can choose the optimum balance between clamping pressure and passive noise reduction.” Ex. 1005, 11:11-22.

B. The Combination of Unger and Smith was Obvious.

Unger expressly teaches all elements of the Challenged Claims, except certain elements specific to the structure and arrangement of the first mounting assembly. As explained below, it was obvious to incorporate Smith’s torsion spring mechanism into Unger’s communication device to facilitate attachment and removal. The

combination satisfies all claim elements.

1. The Prior Art is Analogous

Unger and Smith are from the same field of endeavor as the claimed invention, which is the design of hearing protection equipment and communication devices. *See e.g.*, Ex. 1001, Claims 1 and 17 (reciting structure of hearing protection equipment and communication device); Ex. 1002 ¶¶91-92. Like the claimed invention, Unger and Smith are directed toward the design of hearing protection equipment (e.g., earmuffs) and Unger is also directed toward the design of communication devices (e.g., walkie-talkies). *Id.* ¶¶99, 109.

Unger and Smith are both reasonably pertinent to the problem faced by the inventor. *Id.* 1002 ¶92. Specifically, one problem recited in the '855 patent relates to attaching and detaching communication devices. *See* 1001, 1:32-35, 4:14-36. Unger focuses on more effectively attaching a communication device to hearing protection equipment using removable, flexible and/or resilient components, while Smith focuses on more effectively attaching headphones or hearing protection equipment to a wearer's head using an adjustable torsion spring mechanism. *Supra* Section VI.A. A POSITA would have looked toward Unger and Smith because they are pertinent to the problem of more effectively attaching and removing hearing-related devices. Ex 1002 ¶¶99, 110.

2. Articulated Rationales to Combine

A POSITA would have found it obvious to modify Unger's lower and/or upper mount to incorporate a torsional spring mechanism as taught by Smith for several reasons.

a. Express Teaching, Suggestion, and Motivation

Unger contains an express teaching, suggestion and/or motivation to incorporate an element such as Smith's torsional spring into the lower and/or upper mount assemblies 308, 312 to facilitate attachment and detachment:

In some embodiments, device mounts 308, 312 need not be removable. As set forth above, a device mount 308, 312 may be **flexible or resilient** such as to allow malleability during attachment to and removal from a hearing protection device 108. To illustrate, one or more device mounts 308, 312 may be **bent or otherwise manipulated** when a cup 316 or other portion of a hearing protection device 108 is received or engaged by the enclosure 304 of a communication device 104. A device mount 308, 312 **can then be allowed returned [sic] to a normal or at rest state** to secure a communication device 104 to a hearing protection device 108. Likewise, one or more device mounts 308, 312 can be bent or manipulated to allow a cup 316 to be disengaged from an enclosure 304 when removing the communication device 104 from a hearing protection device 108. **It is contemplated that one or more portions of an enclosure may be formed of a resilient material to aid in attachment and removal as well.**

Ex. 1004, 6:20-37.⁴ A POSITA would understand this passage to teach that mount arms 308, 312 could be removable from housing 304 (e.g., as mount arm 312 is in Figure 6) and/or they could be designed to be “flexible” or “resilient” such that they can be manipulated. Ex. 1002 ¶117. A POSITA would also understand that “resilient” is defined as “bouncing or *springing back* into shape, position, etc. after being stretched, *bent*, or, esp., *compressed*.” *Id.* (citing Ex. 1014, 6; Ex. 1015, 6-7; 1016, 5). Consequently, this teaching suggests using a torsion spring.

The passage further teaches that the arms could be “bent or otherwise manipulated” in one direction by an applied force to allow for easier attachment of the mounts to the cups of hearing protection equipment, while also being biased in the opposite direction when the applied force ceases such that the arms attempt to return to their “normal or at rest” state. A POSITA would understand this to also suggest the use of a torsion spring to facilitate attachment and detachment, because torsion springs are designed to impart this functionality. *Id.* ¶118.

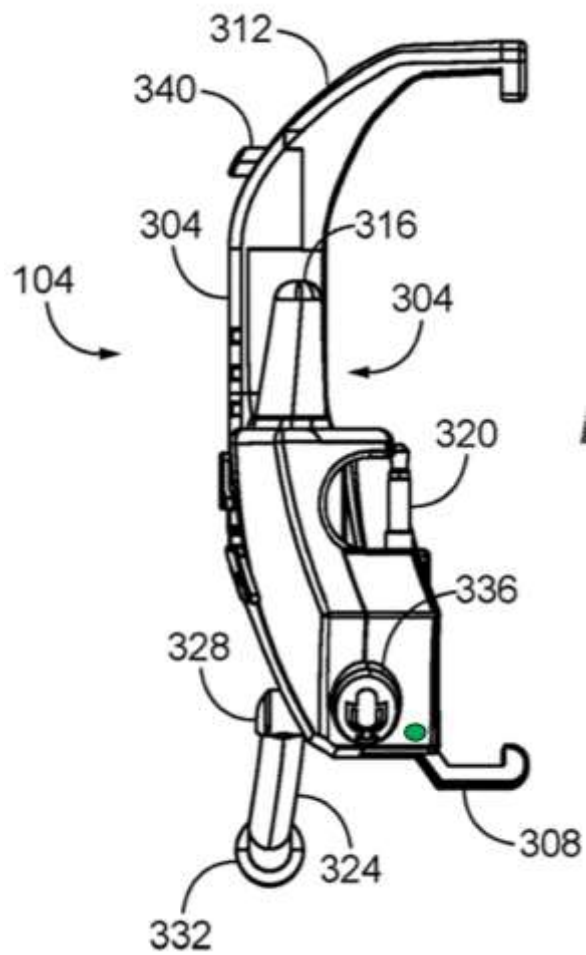
The last sentence of the passage also teaches that one or more portions of the enclosure (i.e., housing 304) may be formed of a “**resilient** material,” in addition to or instead of the mounts being made of a resilient or flexible material. This further suggests to a POSITA incorporating a spring (a “resilient” component) in the

⁴ All emphasis herein has been added unless otherwise noted.

housing to “aid in attachment and removal,” in addition to or instead of forming the mount arms of a flexible or resilient material. *Id.* ¶119.

A POSITA understood that there were a limited number of ways to impart the referenced resilient or flexible “manipulation,” such as forming the mounts of a resilient or flexible materials and/or relying on a resilient component (e.g., rubber, plastic, a spring) mechanism in housing 304 to apply a biasing-force to the arms. *Id.* ¶120. A POSITA would have been motivated to look to various known solutions to impart the suggested functionality, including the torsional spring mechanism of Smith that is used in a similar hearing protection device application for a similar purpose as Unger’s mounting arms (to apply a clamping force). *Id.* ¶¶120-121.

A POSITA understood that Smith’s torsional spring mechanism would “aid in attachment and removal” when incorporated into Unger’s upper and/or lower arms 308, 312. Using Smith’s spring mechanism in Unger’s communication device was understood to allow the upper and/or lower mount arms to be more easily attached and detached from the communication device by allowing easier and greater manipulation of the arms. *Id.* ¶122. For example, Figure 3 of Unger is annotated below to show where a POSITA would have understood that the pivot pin (green) of Smith could be incorporated through the lower end of Unger’s housing or enclosure 304 and through the base of a separately fabricated mount arm 308:



Id.

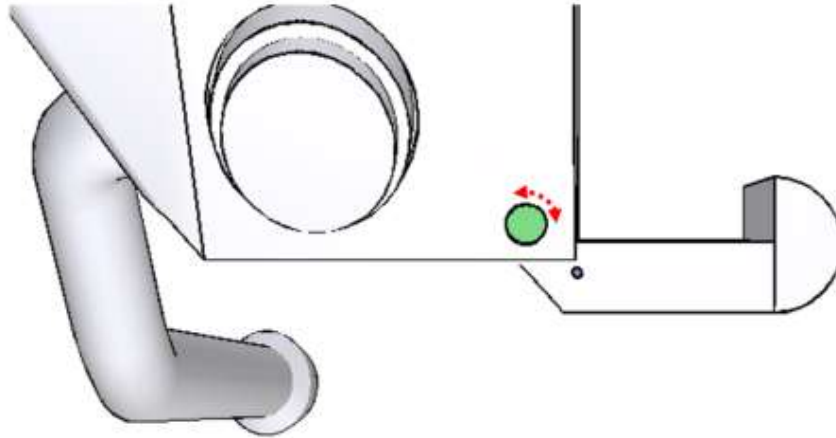
GSM is not required to demonstrate bodily incorporation of Smith's torsion spring mechanism. *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*,

825 F.3d 1373, 1381 (Fed. Cir. 2016).⁵ Nevertheless, GSM provides images of a computer-generated model below showing one way that a POSITA understood Smith's torsion spring (combination of yellow, purple, blue) could be sleeved on the pivot pin (green) and the pin inserted through openings in housing 304 and base of lower arm 308 to firmly couple those components together. Ex. 1002 ¶123. The red-dashed arrow indicates how the mount arm rotates about the pin. *Id.* However, it is important to note that Smith's torsion spring could be incorporated into the upper arm 312 of Unger in the same manner, and that the model below is only an example intended to show how simple it would have been to incorporate Smith's torsion spring into Unger. *Id.* This is only one example of how a POSITA understood Smith's torsional spring mechanism could be incorporated into Unger's mounting assemblies, but a POSITA recognized that there were numerous different obvious

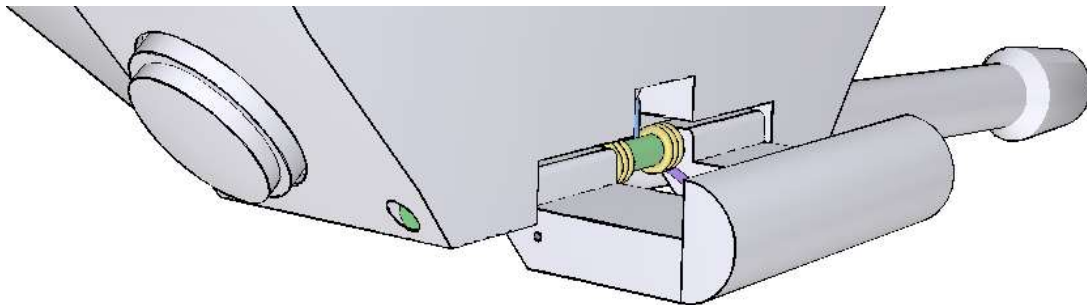
⁵ For example, GSM is not required to demonstrate bodily incorporation into the precise design shown in Unger's figures, where the audio output member 320 protrudes vertically from the lower end of the communication device 104. Unger expressly teaches that the output member 320 is placed to align with the audio input of the earcup (wherever it may be) and thus can be relocated as necessary to accommodate a given design and/or may even rely on a cable. Ex. 1002 ¶123, n3; Ex. 1004, 7:47-59.

ways to incorporate the torsion spring mechanism into Unger to provide the advantages discussed here. *Id.*

Side-View

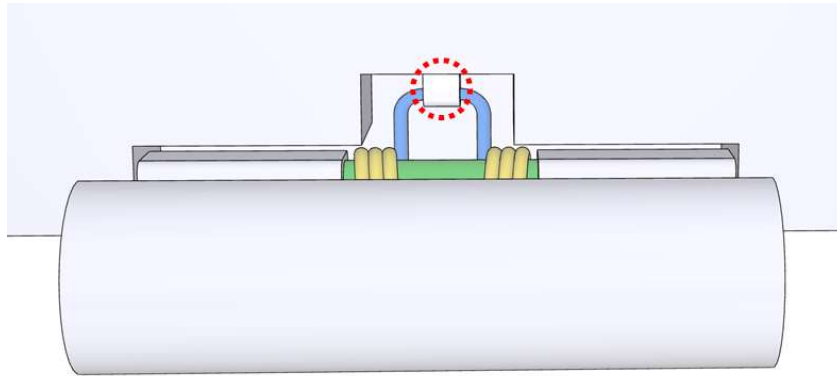


Perspective View



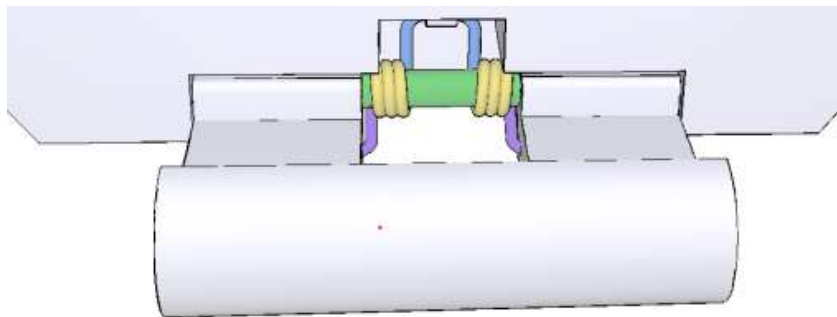
The first front view below shows how the blue end of the spring is fixed to housing 304 via a though-hole in a ring-lobe (red-dashed circle) of housing 304:

First Front View



Id. ¶124. Another front view below shows how the purple ends of the spring bend into openings inside the lower mount arm, securely connecting the purple ends to the lower arm.

Second Front View

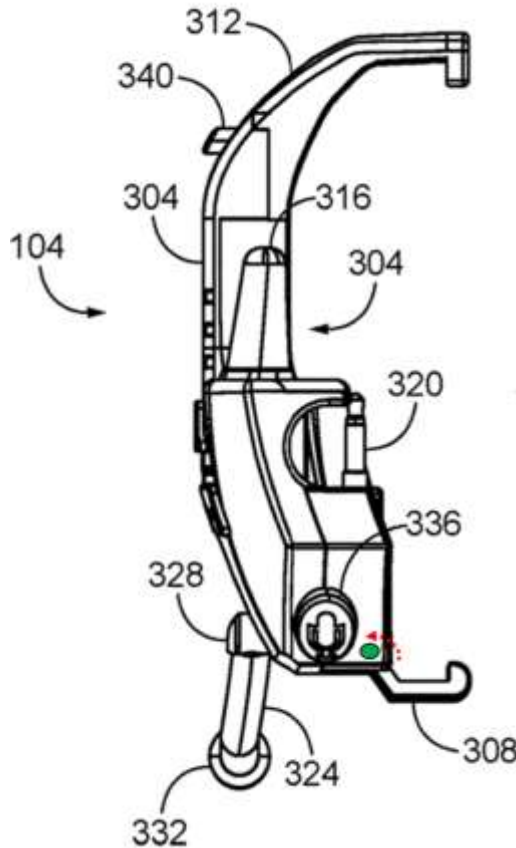
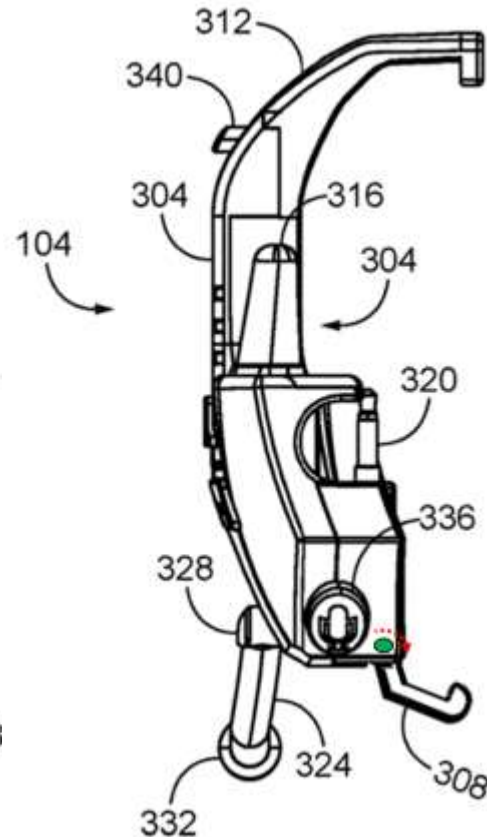


Id. As shown in annotated versions of Unger’s Figure 3 below, a POSITA understood that such incorporation of Smith’s torsion spring into Unger allowed one to rotate the lower mount arm away from the hearing protection device to more easily attach/detach the communication device (see right figure below), while also rotationally biasing the lower mount arm toward the hearing protection device so that it returns to its “normal or at rest” state to securely clamp the mount to the cup

of the hearing protection device once attached (see left figure below). *Id.* ¶125.

“Normal or at Rest” State

“Manipulated” State



An animation of the 3D model has been provided as well showing how this lower mount can be rotated. *See* Ex. 1020. A POSITA understood that this design would make it easier to attach to and detach from the earmuffs, as compared to using only a rigidly coupled monolithic lower mount 308 made of resilient material (e.g., rubber, plastic). Ex. 1002 ¶125. Specifically, a POSITA would understand that such a rigidly coupled mount arms provided some flexibility to allow for attachment/detachment (e.g., by bending the arms slightly to initially attach and

initially detach), but that flexibility is limited because the arm material must still be sufficiently rigid to ensure a secure coupling without the arm breaking. *Id.* In contrast, a multi-part mount assembly incorporating Smith's torsion spring mechanism would be easier to attach and detach because the torsion spring mechanism provides more freedom for the mounting arm to be manipulated (i.e., rotated away) relative to the earmuff cups while still providing a spring-biased "clamping" force to ensure a secure coupling. *Id.*

A POSITA would have understood this added freedom of movement allowed the communication device to adapt to a wider array of hearing protection equipment having external profiles (outer earmuff shape) that do not conform to the communication device's inner profile. *Id.* ¶126. In fact, Unger expressly teaches that one of its goals is to "allow[] a communication device 104 to connect to *a wide variety* of hearing protection devices 108" (Ex. 1004, 7:56-59), further motivating one of skill in the art to look toward known mechanisms that allowed the communication device to attach to as many hearing protection device designs as possible. Ex. 1002 ¶126.

While in the 3D model the torsion spring mechanism is only depicted for the lower device mount 308, a POSITA would have readily understood that Unger teaches that the upper device mount 312 need not be removable and thus could be identical to lower device mount 308. *Id.* ¶127. A POSITA would thus understand

that the torsion spring mechanism could be incorporated into upper device mount 312, in the same manner the spring mechanism is incorporated in the lower device mount 308 shown above. *Id.* The spring could be incorporated into the upper mount 312 in addition to the spring of lower mount 308, or instead of placing the torsion spring in lower mount 308. *Id.* A POSITA would understand that the former would provide the added benefit of providing more flexibility and freedom of movement for attachment and detachment, as both arms would have more freedom of manipulation. *Id.*

b. Application of a Known Technique to Device Ready for Improvement

Incorporating Smith’s torsional spring mechanism into Unger’s lower and/or upper device mount would have involved applying a known technique to a known device ready for improvement to yield predictable results. *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380 (Fed. Cir. 2023). Unger’s communication device is a “base” device upon which the claimed invention would be seen as an improvement by allowing for mount arm manipulation to make attachment/detachment easier and for attachment to a wider array of earmuffs. Ex. 1002 ¶131. Smith discloses the known technique of using a torsion spring to impart a rotational “clamping” force to earmuff cups to better adapt earmuffs to a wearer’s head, and applying that technique to Unger as discussed above would improve Unger’s communication device in the same way by better adapting the communication device to the earmuffs. *Id.* This

involves simply using Smith's dual-body torsion spring in the same manner in Unger as it is used in Smith, and thus it is well within the skill of a POSITA. *Id.*

c. Combining Prior Art Elements Using Known Methods

Incorporating Smith's torsion spring mechanism into the lower and/or upper mount of Unger constitutes combining prior art elements using known methods to achieve predictable results. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). As shown in Section VI.C., the combination of Unger and Smith contains all claim elements. A POSITA would have readily understood and appreciated how the known torsion spring mechanism of Smith would be incorporated into Unger using known methods (as demonstrated by the model images above), and the torsion spring mechanism merely performs the same function (i.e., applying a spring-biased rotational clamping force) in that combination as it does separately in Smith. Ex. 1002 ¶133.

d. Simple Substitution of One Known Element Into Another

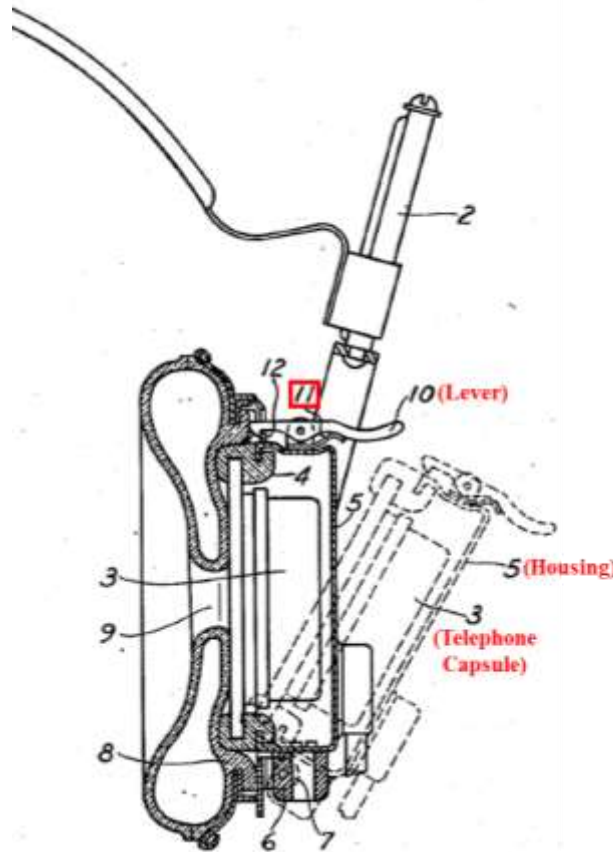
Incorporating Smith's torsion spring mechanism into Unger's lower and/or upper mount is merely the simple substitution of one known element (i.e., Smith's torsion spring mechanism) into another (i.e., the connection point of Unger's lower mount arm 308 and housing 304). *See Apple Inc. v. Samsung Elecs. Co., Ltd.*, 839 F.3d 1034, 1077 (Fed. Cir. 2016). The function of Smith's torsion spring mechanism and Unger's rigidly coupled mount arms 308, 312 were both well-known in the art,

as were their designs. Ex. 1002 ¶135. For example, as explained in Section VI.B.3, it was well-known that torsion springs like Smith's typically comprised a spring winding mounted on a shaft to allow for a rotational force to be exerted in a desired direction.

3. Reasonable Expectation of Success and Predictable Results

A POSITA had a reasonable expectation of success in incorporating Smith's torsion spring mechanism into Unger and would have found the result predictable. The use of spring mechanisms, including torsion springs, to provide additional freedom of manipulation and to impart a rotational biasing force in headset devices was ubiquitous. *Id.* ¶¶136-37.

U.S. Patent No. 2,235,372 (1941) is directed toward a telephone apparatus, attachable to earphones or a helmet. Ex. 1008, 1:1-3. The telephone apparatus comprises a capsule 3 and housing 5, which are attachable and detachable from headphones with a rotatable locking lever 10 that is biased to the latching position by spring 11. *See id.*, Figure 1 (partial, annotated below), 1:51-2:24.



It was thus long-known that springs could be used to aid in coupling a communication device (e.g., telephone apparatus) to a hearing device. Ex. 1002 ¶138.

U.S. Patent 3,160,717 (1964) is directed toward an “ear-protector.” Ex. 1007, 1:8-11. Figures 4 and 6 (annotated below) show that the ear protector incorporates two torsion springs 32 (yellow) wound about pivot pin 28 (green) to apply a spring-biased force to rotatable door 24 in the direction of ear canal 66 so that the end portion 42 creates an “airtight” fit within the canal when the ear protector is worn:

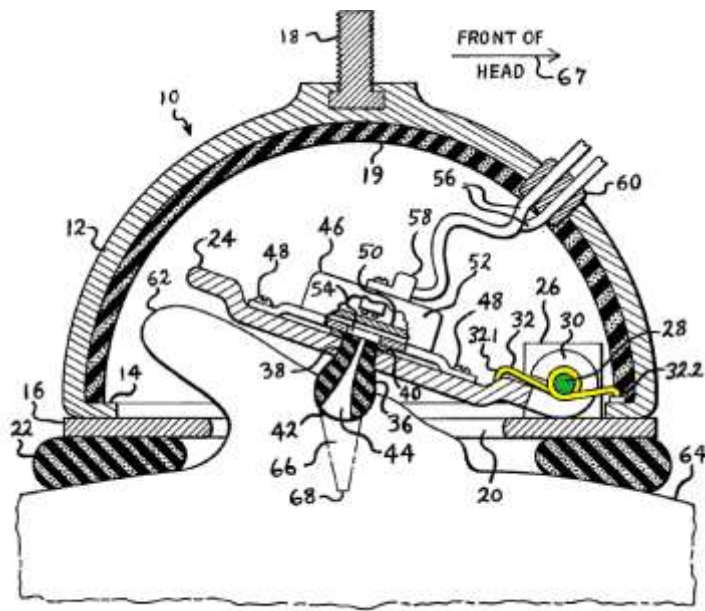


Fig. 6

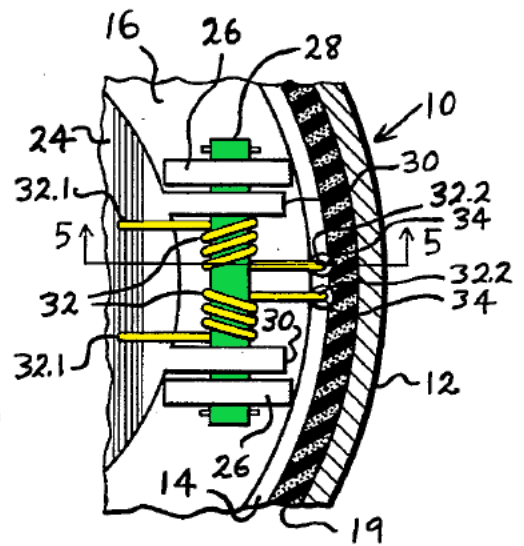


Fig. 4

Id., 3:15-32, 4:39-72, 5:19-43. Thus, it was long-known that torsion springs could be used to provide spring-biased rotational movement to aid in attaching a hearing protection device. Ex. 1002 ¶139.

U.S. Patent No. 8,488,814 (2013) is directed toward an acoustic headset. Ex. 1006, 1:11-13. Figure 1 (annotated below) shows that the assembled acoustic headset includes two abutment plates 16, 18 coupled to acoustic modules 4, 6 respectively:

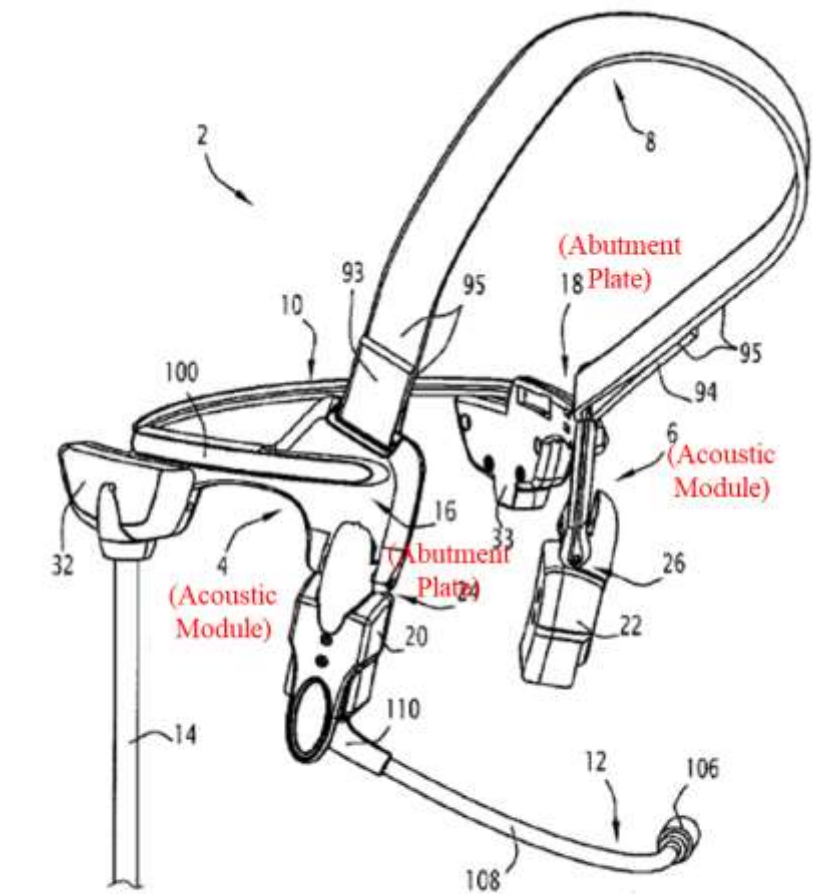
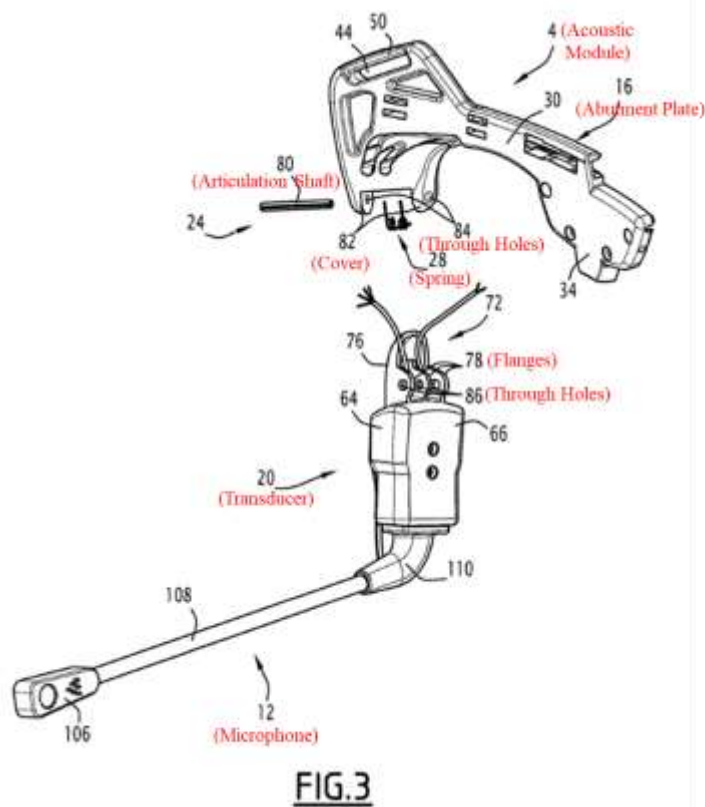
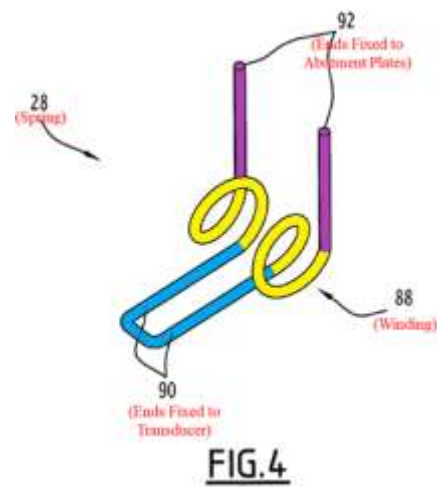


FIG. 1

Id., 2:30-37. Each acoustic module 4, 6 is biased toward the wearer's face by a torsion spring mechanism. Each spring mechanism comprises torsional spring 28 mounted on articulation shaft 80, which is received within through holes 86 of transducer 20 and mounted to through holes 84 of an abutment plate. *Id.*, Figures 3 and 4 (annotated below), 3:30-64.



Spring ends 90 are fixed to transducer 20 and spring ends 92 are fixed to abutment plates 16 of acoustic module 4. *Id.*, 3:57-62. This spring comprises the same parts as the spring depicted in Figure 8 of the '855 patent—two spaced apart spring “bodies” (yellow) indirectly connected with one another via a “fixing part” (blue) and “butting parts” (purple). Ex. 1002 ¶140. The spring applies rotational force to each transducer toward the wearer’s head, while allowing the transducer to be rotated away from the wearer’s face to facilitate removal of the headset. *Id.* ¶141 (citing Ex.1006, 3:56-62, 5:9-11).

Moreover, torsion spring design was part of a standard mechanical engineering curriculum, demonstrating that their design, functions and capabilities

were well-known and predictable. Ex. 1002 ¶¶142-143 (citing Ex. 1017, 8-11 (discussing formulas, properties, and “design rules” for designing helical torsion springs); Ex. 1019, 12-19 (same)). For example, Smith’s torsion spring design is a common design known as a “double torsion” spring. *Id.* (citing Ex. 1019, 12-13). A POSITA would have thus readily known how to incorporate Smith’s mechanism into Unger and to determine the optimal design to provide sufficient clamping force to the earmuffs, while also making it sufficiently easy to rotate the lower mount away from the earmuffs to provide for easier attachment and detachment. *Id.* ¶¶143-146. (citing Ex. 1019, 13-17).

A POSITA had a reasonable expectation of success in making this modification, as it only involves the application of basic mechanical engineering principles. *Id.* ¶147. This is shown by the images of the 3D model discussed in Section VI.B.2, which provide one example of how a POSITA would have understood to modify Unger’s lower mount arm 308 and housing 304 to incorporate Smith’s torsion spring mechanism to provide the advantages discussed. As shown by those model images, this modification involved simply: (1) adding a through-hole in the protruding side portions of housing 304 and to the base of the lower mount 308 for receiving Smith’s pivot pin 5 (green); (2) sleeving Smith’s dual-body (yellow) torsion spring 4 on the shaft; (3) fixing one end of the spring (blue end of spring 4 in Smith) to the housing 304; and (4) fixing the other ends of the spring

(purple ends of spring 4 in Smith) to small openings in the lower mount 308. This achieves the predictable result of a lower mount 308 that is rotationally biased toward the hearing protection device, which provides the benefits of (1) allowing the communication device to be easily attached and removed from hearing protection equipment while also providing a secure “clamping” force and (2) allowing the communication device to adapt to a wider variety of hearing protection device designs. *Id.* ¶¶147-148.

Identical modifications could be made to a non-removable upper mount 312, either in lieu of adding the torsion spring mechanism to the lower mount 308 or in addition to doing so. *Id.* ¶149. This would achieve the same predictable result with upper mount 312 with the same reasonable expectation of success. *Id.*⁶

C. Element-by-Element Analysis

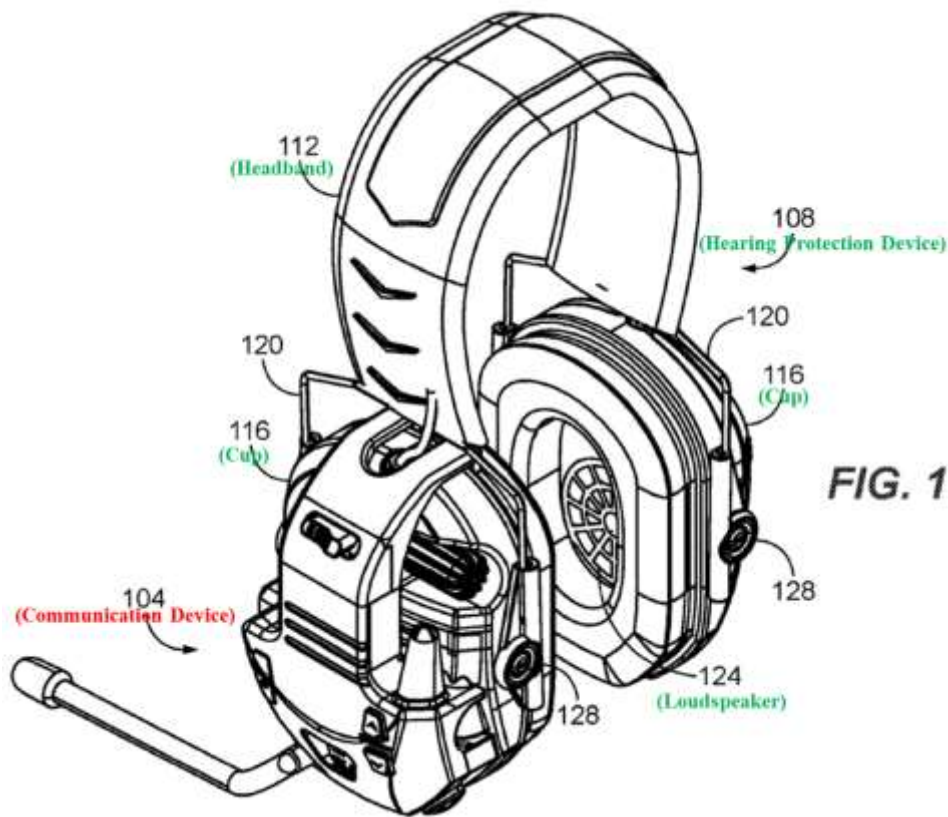
As shown below, each element of the Challenged Claims is disclosed by Ground 1, where Unger incorporates the torsion spring mechanism of Smith to improve Unger’s device as discussed in Section VI.B above.

⁶ GSM is unaware of any arguments or evidence related to secondary considerations of non-obviousness. Should Patent Owner advance such arguments or evidence, GSM will respond accordingly.

Claim 1

[Preamble]: A communication device for a hearing protection equipment, the hearing protection equipment comprising at least one earmuff, at least one loudspeaker and an audio input member, wherein the communication device comprises:

If the preamble of claim 1 is limiting, Unger discloses it. In reference to Figure 1 below, Unger discloses *communication device 104* for *hearing protection equipment 108* (“hearing protection device”):⁷



⁷ Italics emphasis is used throughout Sections VI.C. and VII. when quoting the language of the Challenge Claims.

See Ex. 1004, 3:55-57. Hearing protection equipment 108 includes *earmuffs* that comprise headband 112, cups 116 and active noise cancellation via speaker 124 in the cups. *Id.*, 3:57-66. A POSITA would understand speaker 124 to be a *loudspeaker*, which converts electrical impulses or signals into audible sound. Ex. 1002 ¶153 (citing Ex. 1016, 4; Ex. 1015, 5; Ex. 1014, 5, 8). Unger expressly teaches that communication device 104 outputs a remote user's voice via speaker 124 of hearing protection device 108, which necessarily requires converting electrical signals into audible sound. See *id.* (citing Ex. 1004, 8:31-43).

While not shown in Figure 1, Unger teaches in reference to Figure 8 (annotated below) that *hearing protection device* 108 has an audio connector 824 (green circle) that connects to audio output 320 (red circle) of communication device 104:

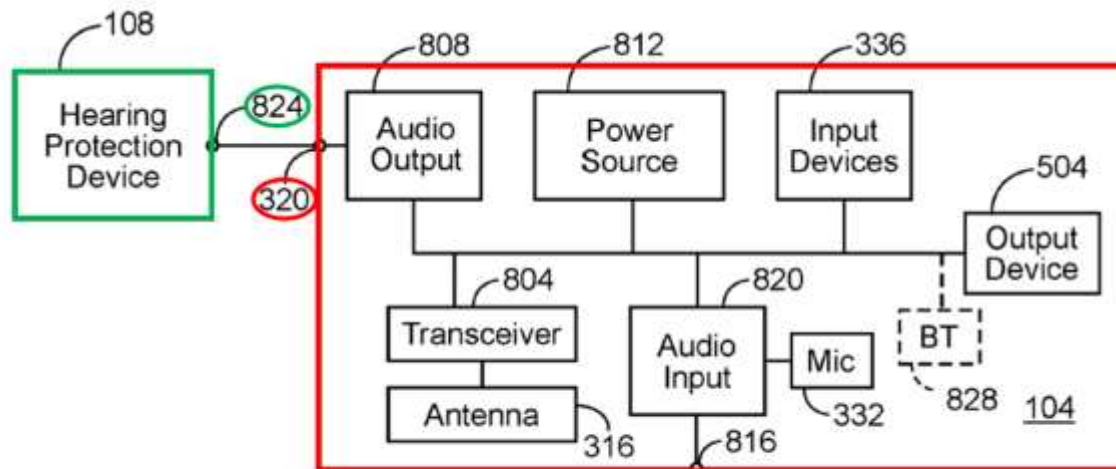
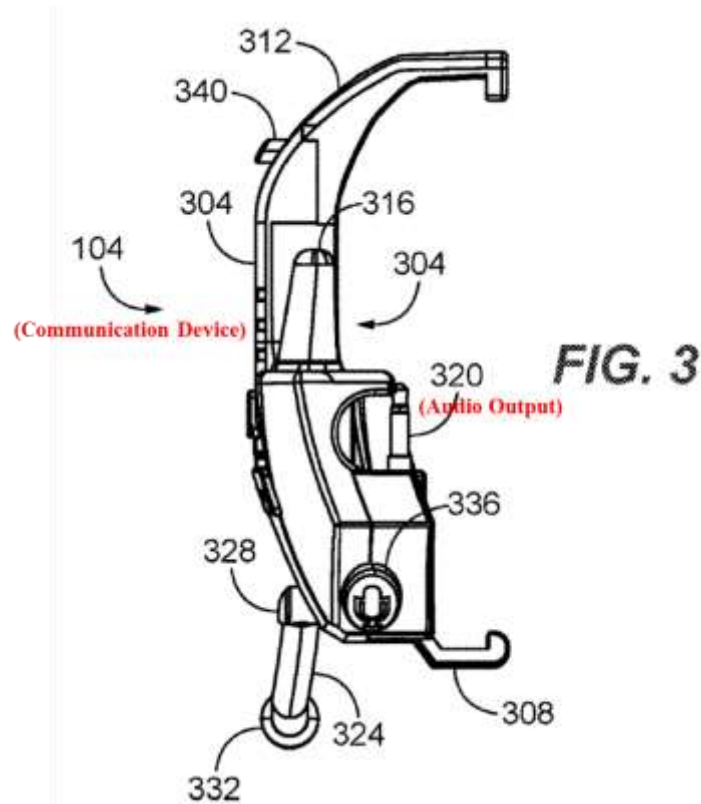


FIG. 8

Ex. 1004, 7:46-53 (“[O]ne or more audio output connectors 320 of the

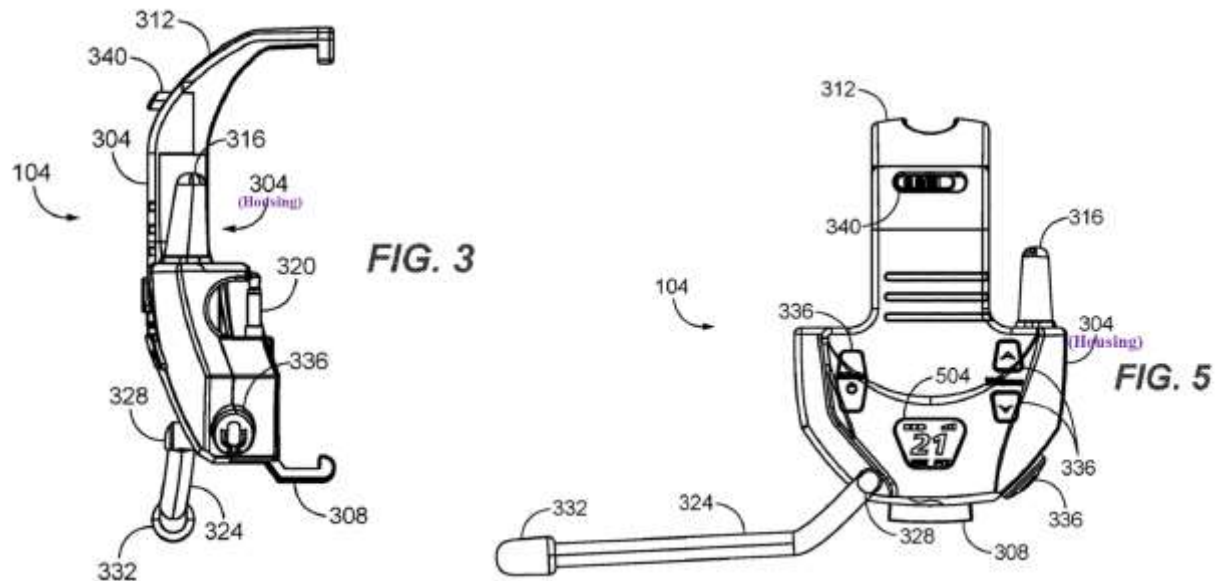
communication device 104 ... connect to **a corresponding connector 824 of the hearing protection device.**"). Figure 3 depicts the audio output 320 of communication device 104 as a male-type auxiliary audio output port:



Id., 4:48-5:2. A POSITA understood that output 320 of communication device 104 inserts into the female-type audio input member 824 of hearing protection device 108 when the devices are coupled (as shown in Figure 1 above). *See id.*, 4:66-5:2; Ex. 1002 ¶154-55. Consequently, audio connector 824 of hearing protection device 108 is an *audio input member* that receives audio signals from the audio output 320 of communication device 104.

[1.1] a housing;

Unger discloses that communication device 104 has a *housing 304* (also referred to as “enclosure”), which is identified in Figures 3 and 5 below:



Ex. 1004, 4:5-12 (“A communication device 104 may comprise a **housing** or enclosure 304 that houses or supports various components of the communication device.”); Ex. 1002 ¶156.

[1.2] a first mounting assembly, rotatably arranged on a first end of the housing;

Unger discloses a *first mounting assembly* (lower “device mount 308”) *arranged on a first end* (lower end) of the *housing 304* for mounting the communication device 104 to the hearing protection device 108.

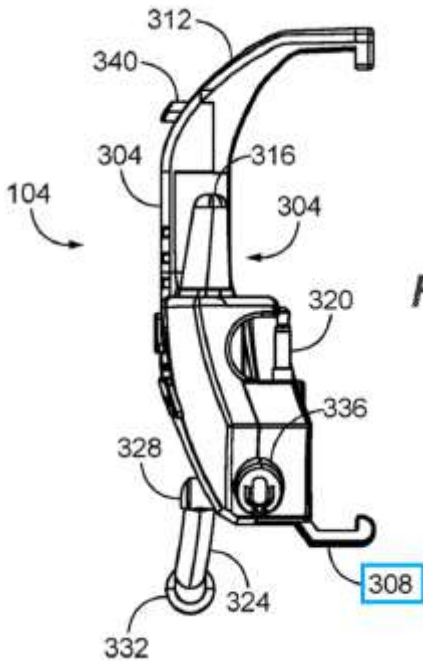


FIG. 3

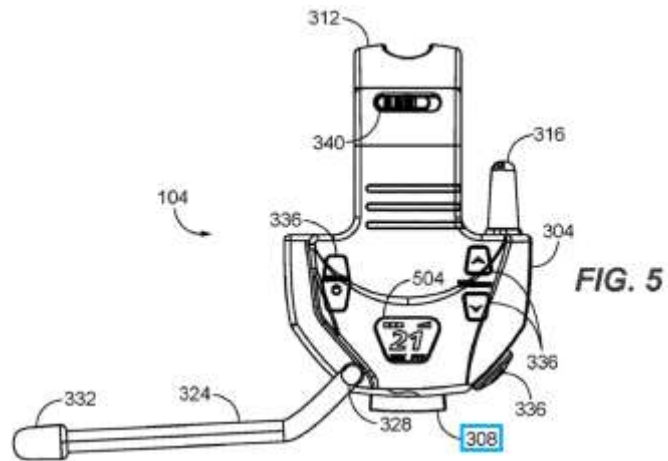


FIG. 5

Ex. 1004, Figs. 3, 5; 4:16-22 (“[A] device mount 308, 312 may be shaped to engage a hearing protection device to attach a communication device 104 thereto.”); 4:34-40 (“As shown, a first device mount 308 is **at a one end** of the enclosure 304....”); Ex. 1002 ¶157.

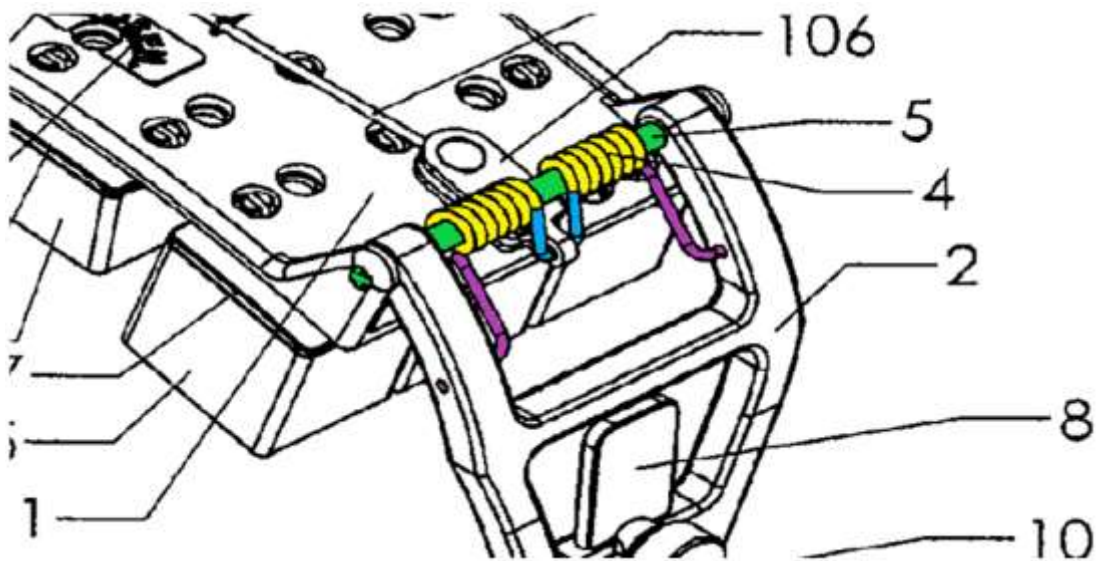
Unger explains that lower and upper device mounts 308, 312 “may be a hook or hook shaped ... or may comprise other structures that facilitate removable attachment to a hearing protection.” Ex. 1004, 4:23-32; *see also id.*, 5:57-60. Consequently, lower device mount 308 is a *first mounting assembly* for mounting communication device 104 to hearing protection device 108. Ex. 1002 ¶158.

Alternatively, upper mount 312 could be considered the *first mounting assembly* if modified to incorporate the torsion spring mechanism of Smith as discussed in Section VI.B.2. In that case, the *first end of the housing* would be the

upper end of housing 304. *Id.* ¶159.

Unger does not expressly disclose that either device mount 308, 312 is *rotatably* arranged on the housing's first end. However, as discussed in Section VI.B it was obvious to incorporate Smith's torsion spring mechanism into Unger's lower and/or upper mounting assembly. This combination satisfies this limitation as discussed below.

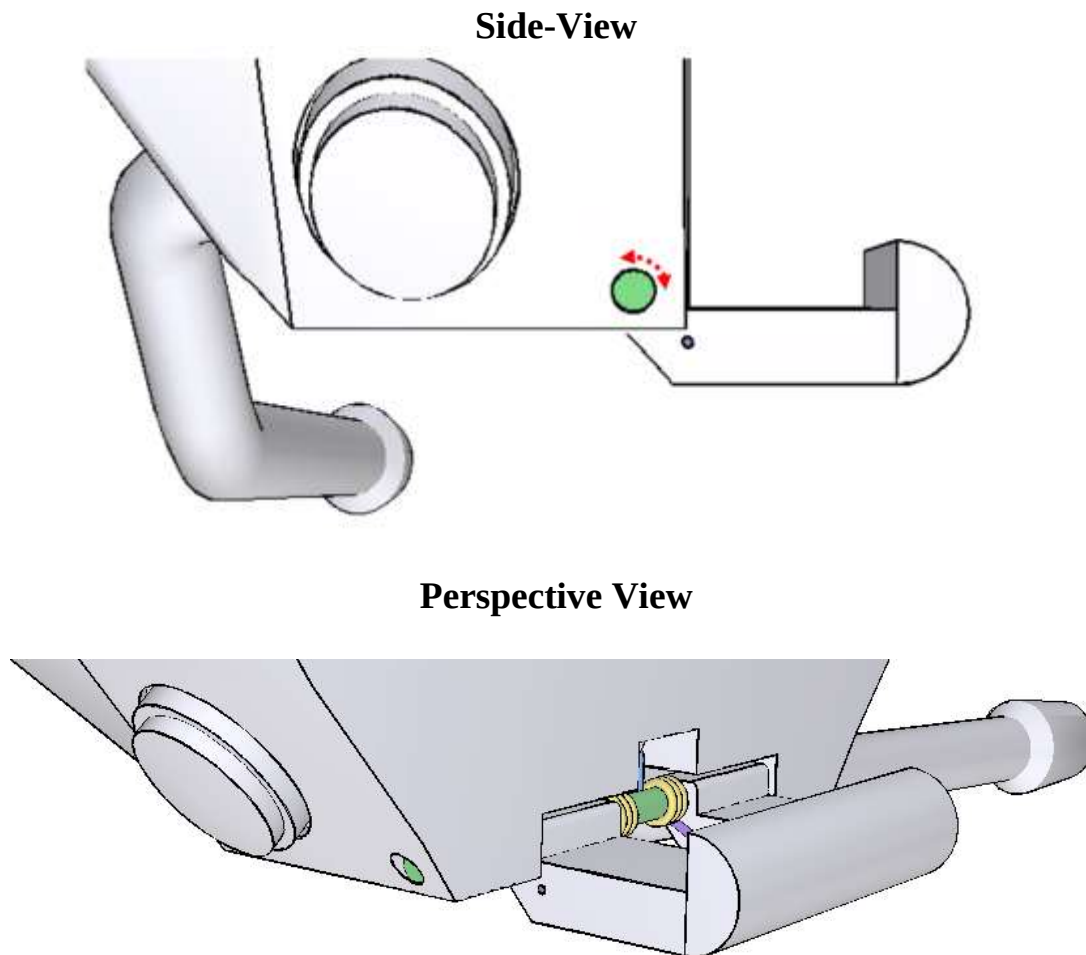
Smith Fig. 1 (partial, annotated below) independently discloses an assembly comprising pivot pin 5 (green) and torsion spring 28 (comprising two spaced apart elastic bodies (yellow), butting parts (purple), and fixing part (blue)):



Ex. 1005, 5:55-6:16, 7:39-56. The assembly is *rotatably arranged* on a first end of the housing of headband 1, as the arm 2 and torsion spring 4 can rotate about the pin 5 to manipulate movement of the swing arm 2 and earcup 7. *Id.*, 5:49-61 (“Torsion spring 4 applies inward **rotational** force to swing arm 2, which pivots on the same

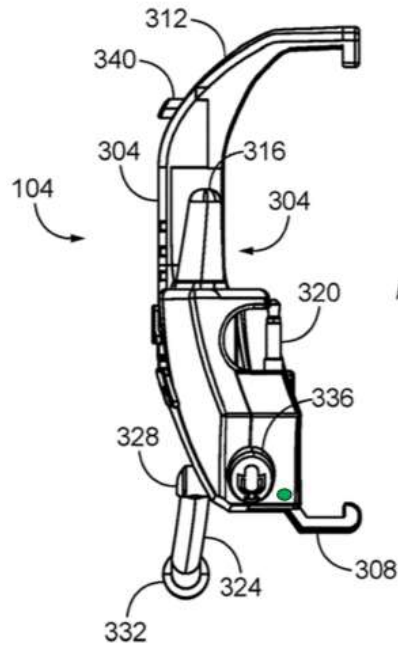
axis that torsion spring 4 **rotates on.**”); Ex. 1002 ¶161.

When the torsion spring mechanism of Smith is incorporated into Unger as shown in the model images below, the torsion spring (combination of yellow, blue, purple) and lower mount arm are rotatable about the pivot pin (green) as indicated by the red-dashed arrow:

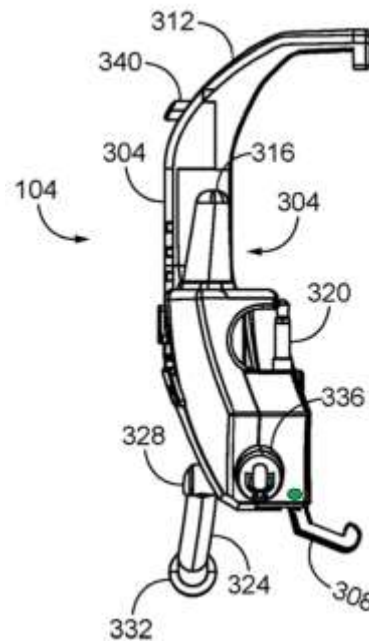


Ex. 1002 ¶162. Unger Figure 3 is annotated below to show where the pivot pin (green) would be placed, and how the lower mount arm 308 would be *rotatably arranged on a first end of the housing* as claimed:

“Normal or at Rest” State



“Manipulated” State

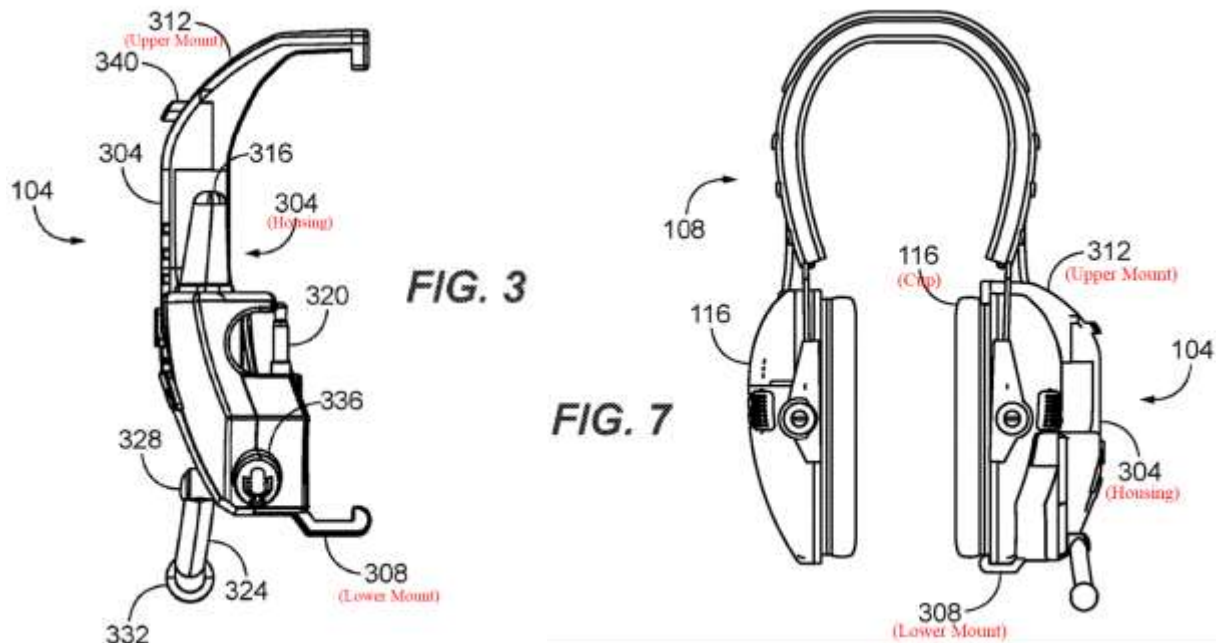


Id. This torsion spring mechanism could be incorporated into the upper device mount 312 in the same manner. *Id.* Thus, the combination of Unger and Smith discloses this limitation regardless of whether the torsion spring mechanism is incorporated into the lower mount 308 or upper mount 312. *Id.*

[1.3] a second mounting assembly, arranged on a second end of the housing, the first mounting assembly and the second mounting assembly are connected to two ends of the earmuff respectively to releasably connect the communication device with the hearing protection equipment;

As shown in Figures 3 and 7 (annotated below), Unger discloses a *second mounting assembly* (upper “device mount 312”) arranged on a *second end* (upper end) of *housing 304*, and the *first mounting assembly* (lower mount 308) and the

second mounting assembly (upper mount 312) are connected to two ends of the earmuff respectively (upper mount 312 is connected to an upper end of the earmuff cup 116 and lower mount 308 is connected to a lower end of the earmuff cup 116) to releasably connect the communication device 104 with the hearing protection equipment 108:



Ex. 1004, 4:33-40 (“As shown, a first device mount 308 is **at a one end** of the enclosure 304 while a second device mount is at **an opposite end.**”); *see also id.*, 5:49-55; Ex. 1002 ¶163.

Alternatively, the lower mount 308 could be considered the *second mounting assembly* and the upper mount 312 the *first mounting assembly* when the torsion spring is incorporated into the upper mount assembly 312, in which case the *second end of the housing* would be the lower end of cup 116 and the *first end of the housing*

would be the upper end of cup 116, as discussed in Claim 1.2. Ex. 1002 ¶164.

The first and second device mounts also *releasably connect the communication device with the hearing protection equipment*. *Id.* ¶165. In Unger, “device mounts 308, 312 [are] for removably attaching the communication device to a hearing protection device.” Ex. 1004, 4:13-22. Unger also teaches that: (1) the mounts may include “structures” (e.g., hook shapes) that “facilitate removable attachment to hearing protection equipment” (*id.*, 4:23-26) (2) the mounts may be “flexible or resilient such as to allow malleability during attachment to and removal from a hearing protection device 108” (*Id.*, 4:26-30, 6:20-35); (3) “fasteners, such as screws, pins, or the like may be used to secure a communication device 104” (*id.*, 4:30-33) and (4) that the housing or enclosure 304 may include a resilient material to aid in attachment and detachment of the mounts from the hearing protection device (*id.*, 6:35-37). A POSITA understood that device mounts 308 and 312 were *releasably connected* to the hearing protection device 108 because they can be released from the hearing protection device 108 by manipulating the mounts. Ex. 1002 ¶165. For example, a flexible or resilient device mount can be bent or manipulated to unhook from the earmuff cups, whereas a removable device mount (element 312 in Figure 6) can also be released by separating the mount 312 from the housing 304. *Id.* Moreover, when Unger’s lower mount 308 and/or upper mount 312 incorporate the torsion spring mechanism of Smith, they are further *releasable* by

rotating the mounts away from the earmuffs. *Id.*

[1.4] a microphone, configured for capturing an audio;

As shown in Figures 3, 5, and 8 (annotated below), Unger discloses that the communication device 104 includes “one or more *microphones* 332 to receive a user’s voice or other audio:”

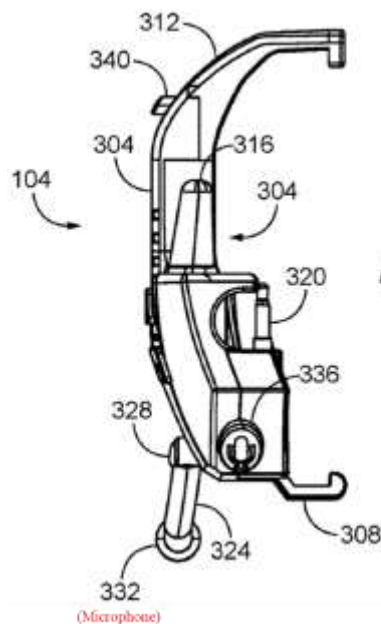


FIG. 3

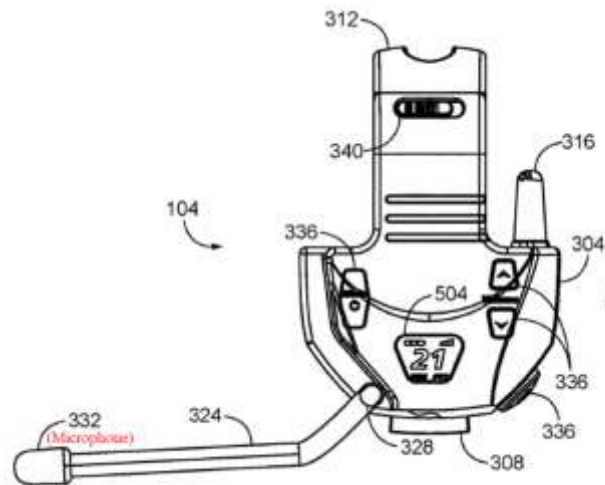


FIG. 5

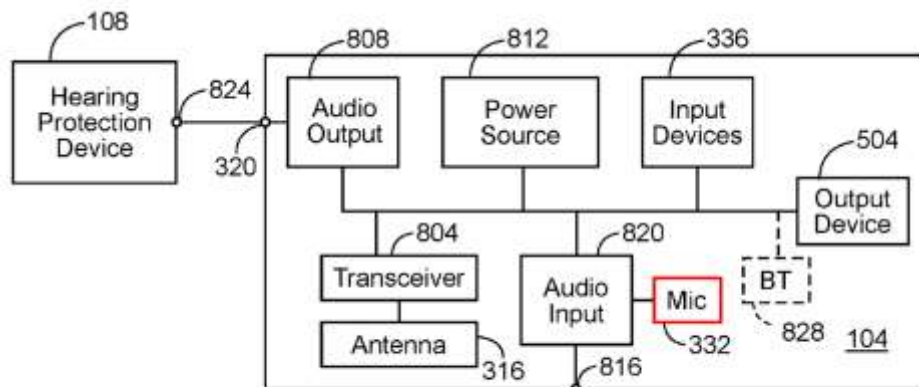


FIG. 8

Ex. 1004, 5:3-12 (“A communication will typically include one or more recording

devices, such as one or more microphones 332 to receive a user's voice or other audio.”); *See also id.*, 7:16-22; Ex. 1002 ¶166.

[1.5] a radio transceiver, configured for wirelessly transmitting the audio captured by the microphone to user and wirelessly receiving a wireless signal containing an audio from the user; and

As an initial matter, this claim does not require *user* to be the wearer (or local user) of the specifically claimed *communication device*. Indeed, a POSITA would understand this claim to necessarily be referring to a *user* of another communication device that is communicating with the claimed *communication device*. Ex. 1002 ¶167. The claim would be nonsensical if *user* refers to the local user because it would require the transceiver to wirelessly transmit the wearer’s audio back to himself or herself and to wirelessly receive the wearer’s own audio. *Id.* ¶¶168-170. A POSITA would understand that the received wireless signals are instead those containing audio of a user of another communication device (a remote user) that is communicating with the wearer of the claimed *communication device*. *Id.*

Unger teaches that communication device 104 includes “one or more *radio transceivers 804*” that “may wirelessly transmit audio or other signals, receive such signals, or both:”

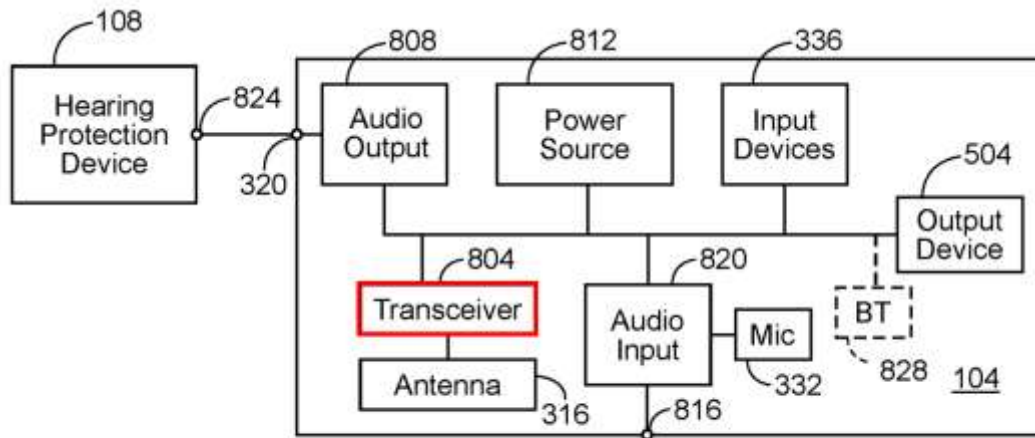


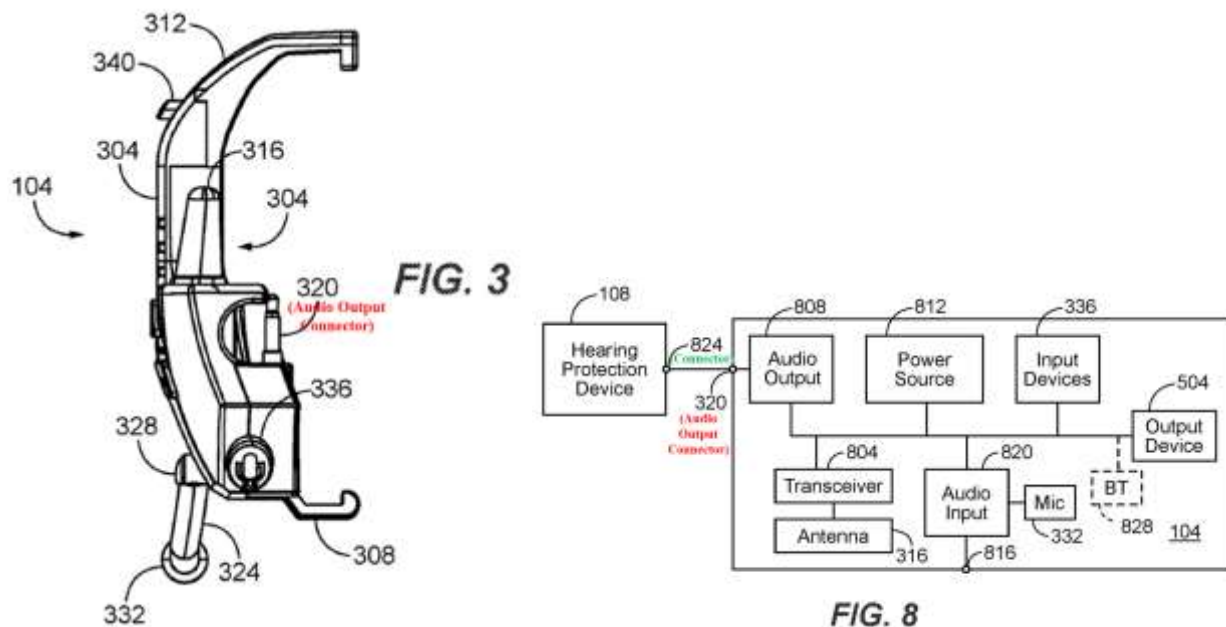
FIG. 8

Ex. 1004, Figure 8 (annotated), 6:43-57. Unger further explains that “[t]he communication device also includes a microphone that captures audio, a *radio transceiver* that wirelessly transmits the audio captured by the microphone **to a remote user** and wirelessly receives one or more wireless signals carrying audio **from the remote user**, and an audio output that connects to the audio input of the hearing protection device. The audio carried by the wireless signals is transmitted to the speakers via the audio output.” *Id.*, 1:53-61; *see also id.*, 9:7-10, 9:44-45. Consequently, *transceiver 804 is configured for wirelessly transmitting the audio captured locally by the microphone to a user (a remote user) and wirelessly receive a wireless signal containing audio from the user (“the remote user”).* Ex. 1002 ¶171.

[1.6] an audio output member, communicated with the audio input member and configured for transmitting the wireless signal containing the audio to the at least one loudspeaker,

Unger teaches that communication device 104 has an *audio output member*

(audio output connector 320) that extends outward from housing 304. Ex. 1004, 4:48-5:2. Audio output connector 320 is depicted in Figure 3 (annotated below) as a male-type member that a POSITA would understand to be received within a female-type *audio input member* (audio connector 824, Figure 8) of hearing protection device 108. Ex. 1002 ¶172.



Unger explains that when the communication device 104 is attached to a cup, “the audio output connector 320 is automatically **inserted into** the corresponding connector at the cup, thereby allowing communication of audio signals therebetween.” Ex. 1004, 4:66-5:2; *see also id.*, 7:47-59. Thus, the connector 824 of hearing protection device 108 is an *audio input member* that receives audio from audio output 320. Ex. 1002 ¶173.

Unger further teaches that “[a]s each user speaks, their voice is captured and

transmitted from their communication device 104 to other communication devices via one or more wireless connections 904. The receiving communication devices 104 output the user's voice **via a speaker** of the attached hearing protection device 108.” Ex. 1004, 8:31-36; *see also id.*, 2:12-15. Thus, as shown in Figure 8 (annotated below), when the communication device 104 receives a wireless signal (red dashed line) from a remote user of another communication device, the signal is received at transceiver 804 (via antenna 316), passed to audio output 808, then to audio output connector 320, then to connector 824 and then played through the loudspeaker 124 of hearing protection device 108:

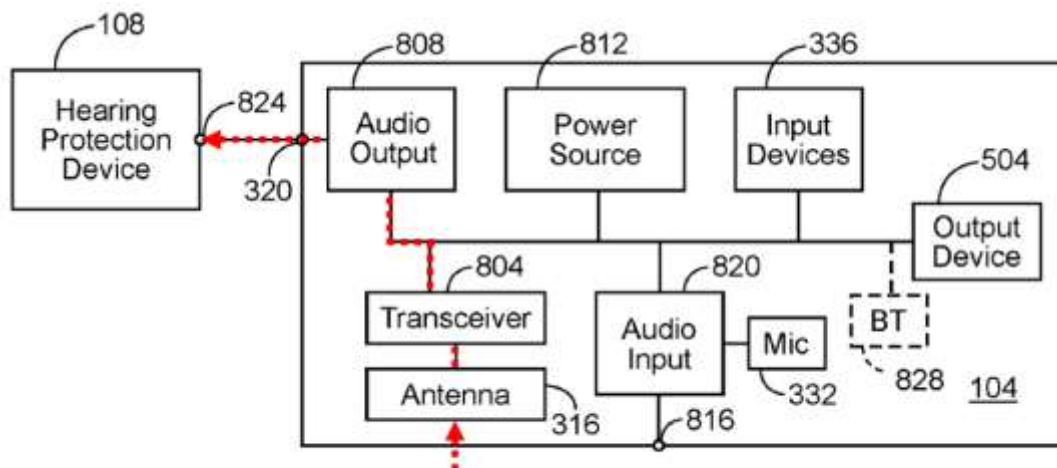


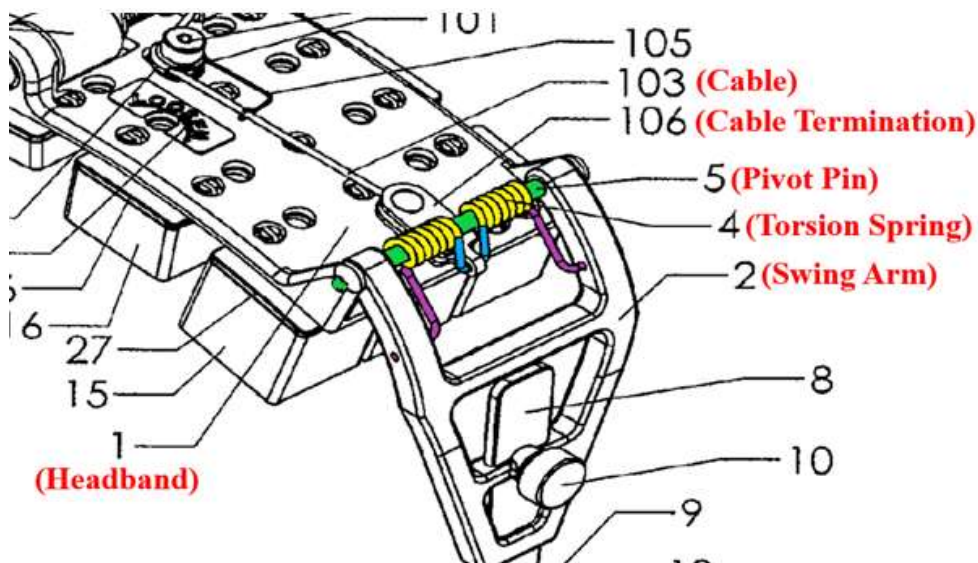
FIG. 8

Ex. 1002 ¶174.

[1.7] wherein the first mounting assembly comprises: [A] a first connecting member, connected with the housing; [B] an elastic member; [C] a first mounting member, rotatably connected with the first connecting member by the elastic member, the first mounting member is coupled with the earmuff under an elastic

force of the elastic member; and the first mounting member is separated from the earmuff after overcoming the elastic force of the elastic member.

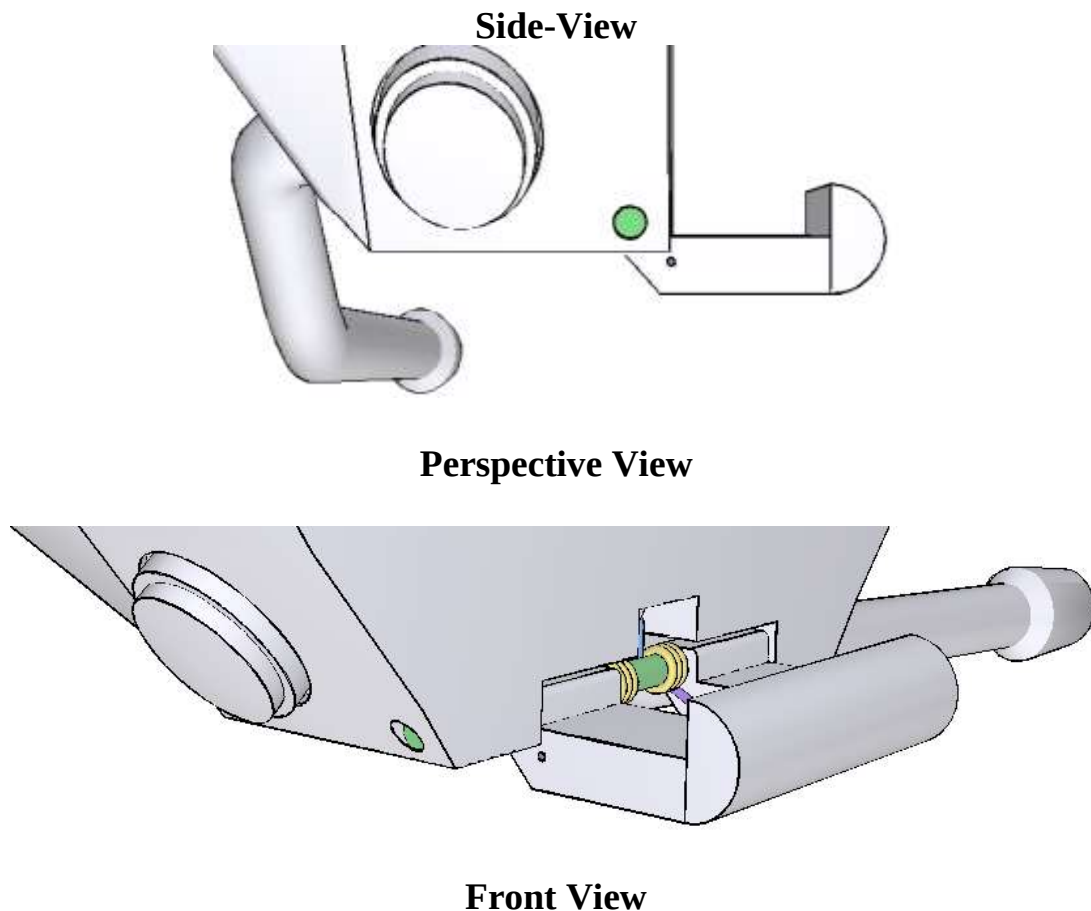
Unger as modified by Smith renders this limitation obvious.⁸ As shown in Smith's Figure 1 (partial, annotated below), Smith expressly discloses a torsion spring assembly comprising a *first connecting member* (green pivot pin 5) connected with a *housing* (enclosure of headband 1), an *elastic member* (double-bodied spring 4, colored yellow, blue, purple), a *first mounting member* (swing arm 2 and attached earcup 7, used to mount the headset to a wearers head), *rotatably connected with the first connecting member* (pivot pin 5) *by the elastic member* (spring 4):

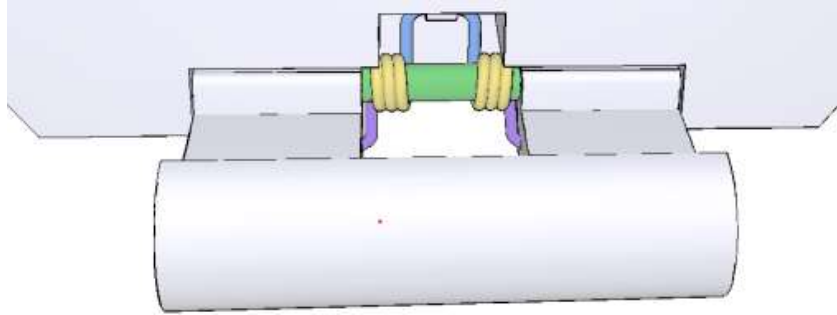


⁸ For any element not expressly taught by Unger, the analysis will first begin with showing where that element is found in Smith. The analysis will then explain how the element is satisfied by the combination of Unger as modified by Smith.

Ex. 1002 ¶176. Swing arm 2 is *coupled with* the wearer's head *under an elastic force of the elastic member* and is *separated from* the wearer's head *after overcoming an elastic force of the elastic member*. See *id.* (citing Ex. 1005, 5:59-65).

Unger expressly discloses that its upper mount 312 and lower mount 308 may be manipulated to attach and detach the communication device 104, including manipulation between a “normal or at rest” state and a “manipulated” state. See Ex. 1004, 4:12-40, 5:41-64, 6:9-37. When the torsion spring mechanism of Smith is incorporated into Unger as shown in the model images below, all of these limitations are taught by the combination.



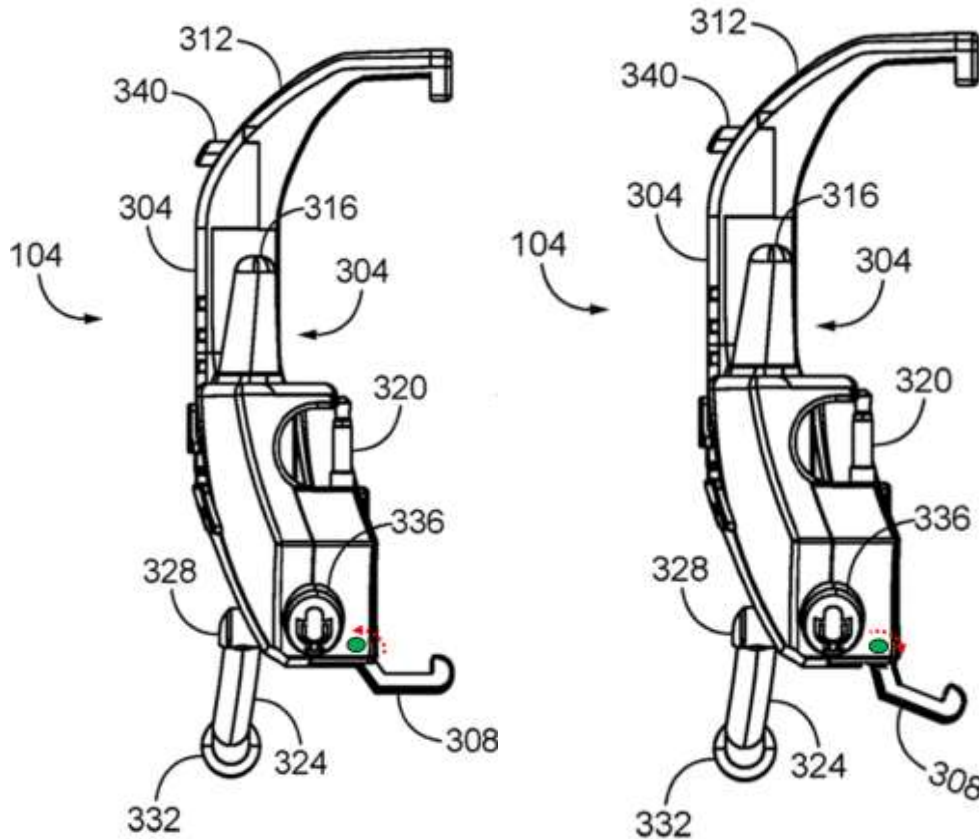


Unger as modified by Smith includes a *first mounting assembly* comprising: [A] a *first connecting member* (green pivot pin), *connected with the housing* (lower end of housing 304); [B] an *elastic member* (double-bodied torsion spring colored yellow, purple, blue); and [C] a *first mounting member* (lower mount arm 308), *rotatably connected with the first connecting member* (green pivot pin) *by the elastic member* (torsion spring, colored yellow, purple, blue). Ex. 1002 ¶177.

Unger's Figure 3, annotated below, shows where the pivot pin (green) is placed, and how in the "normal or at rest" state the *elastic member* (torsion spring) applies an elastic force to the *first mounting member* (lower mount arm 308) to facilitate attachment of the mounting member to the earmuff, and in the "manipulated state" *the elastic force of the elastic member* is overcome to facilitate separating the mounting member from the earmuff:

“Normal or at Rest” State

“Manipulated” State

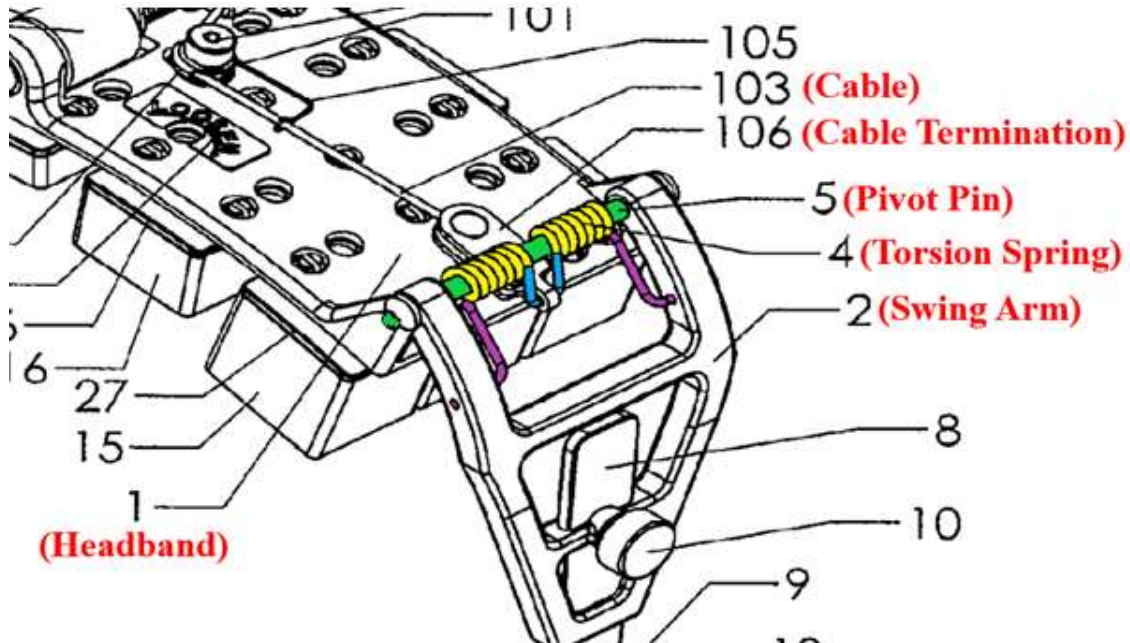


Id. ¶178; *see also* Ex. 1020 (animation). Thus, the combination of Unger and Smith discloses this limitation.

Claim 2 The communication device according to claim 1, wherein the elastic member comprises: at least one elastic body, arranged on the first connecting member; and at least one butting part, connected with the elastic body and butted against the first mounting member, wherein when a pressure is applied on the first mounting member, the first mounting member rotates in a direction away from the housing, so that the butting part rotates to compress the elastic body; and the elastic body in a compressed state rotates the first mounting member to an initial state when the pressure applied on the first mounting member is released.

Unger as modified by Smith renders this limitation obvious. As shown in

Smith's Figure 1 (partial, annotated below), Smith expressly discloses an *elastic member* (torsion spring 4) comprising *at least one elastic body* (e.g., yellow-highlighted winding body to left of blue) *arranged on the first connecting member* (green-highlighted pin 5) *and at least one butting part connected with the elastic body* (the left purple-highlighted portion connected to the left yellow-highlighted winding) *and butted against the first mounting member* (swing arm 2 and attached cup 7):

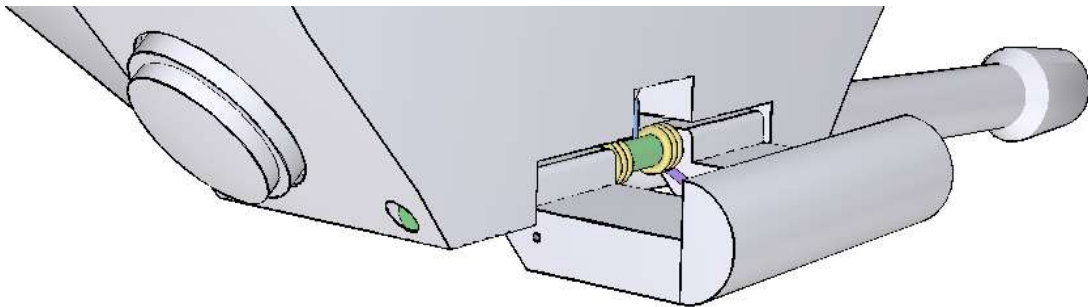


Ex. 1002 ¶179. Moreover, *when a pressure is applied on the first mounting member* (swing arm 2 and cup 7), *the first mounting member rotates in a direction away from the housing* (housing of headband 1), *so that the butting part* (left purple-portion) *rotates to compress the elastic body* (the yellow-highlighted winding body). *Id.* (citing Ex. 1005, 5:59-65). A POSITA understood that *when the pressure applied*

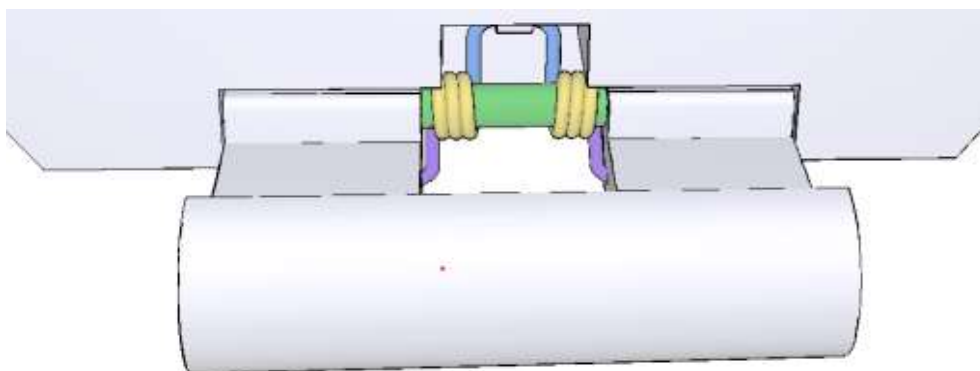
on the first mounting member is released, the elastic body (the left yellow-highlighted winding) in a compressed state rotates the first mounting member (swing arm 2) to an initial state (normal or at rest state). *Id.* ¶180. That is, as the windings spring back from their compressed state, they impart a rotational force to swing arm 2 and attached cup 7 to place them back in their initial, unmanipulated position. *Id.*

When Smith's torsion spring mechanism is incorporated into Unger as shown below, all of these limitations are taught by the combination.

Perspective View



Front View



The combination expressly discloses an *elastic member* (torsion spring 4)

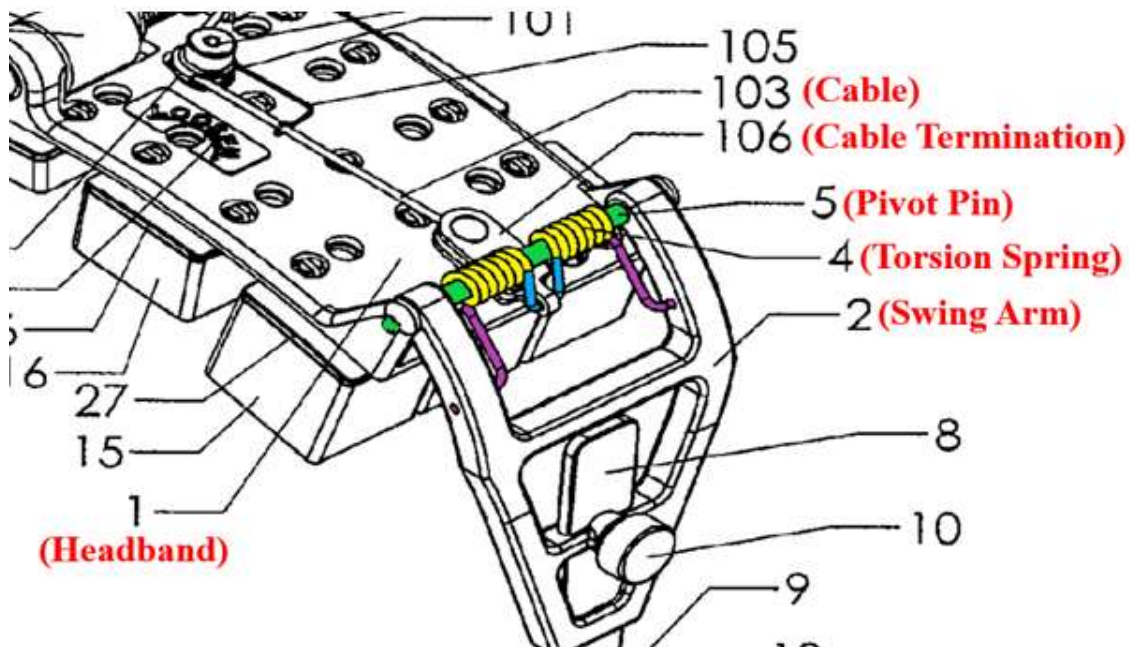
comprising *at least one elastic body* (e.g., left yellow-highlighted winding body) *arranged on the first connecting member* (green-highlighted pin 5) *and at least one butting part connected with the elastic body* (the left purple-highlighted portion directly connected to the left yellow-highlighted winding) *and butted against the first mounting member* (lower mount arm 308). *Id.* ¶¶181-82.

Moreover, *when a pressure is applied on the first mounting member* (downward force applied to the top of lower arm 308), *the first mounting member rotates in a direction away from the housing* (communication device housing 304), *so that the butting part* (left purple-highlighted portion) *rotates to compress the elastic body* (the left yellow-highlighted winding body). *Id.* ¶183. A POSITA understood that *when the pressure applied on the first mounting member is released, the elastic body* (the left yellow-highlighted winding body) *in a compressed state rotates the first mounting member* (lower mounting arm 308) *to an initial state* (normal or at-rest state). Thus, as the windings spring back from their compressed state, they impart a rotational force on the mounting arm 308 to move it back in its initial unmanipulated state, which clamps the communication device to the cup of the earmuffs. *Id.*

Claim 3 The communication device according to claim 1, wherein the at least one elastic body sleeves on the first connecting member.

Unger as modified by Smith renders this limitation obvious. As shown in

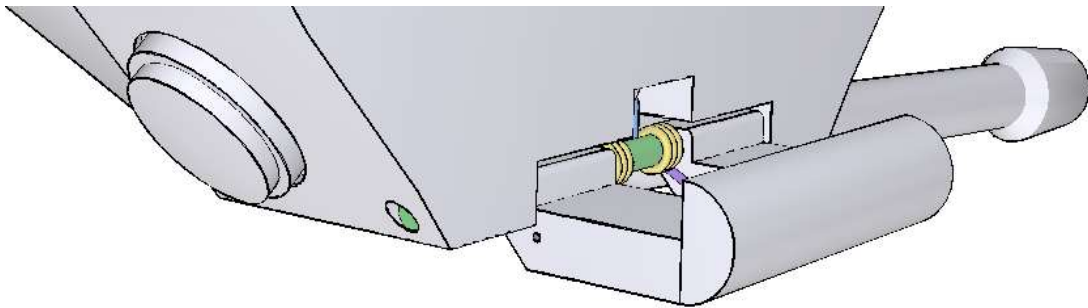
Smith Figure 1 (partial, annotated below), Smith discloses that *the at least one elastic body* (the left, yellow-highlighted winding) *sleeves on the first connecting member* (green-highlighted pivot pin 5):



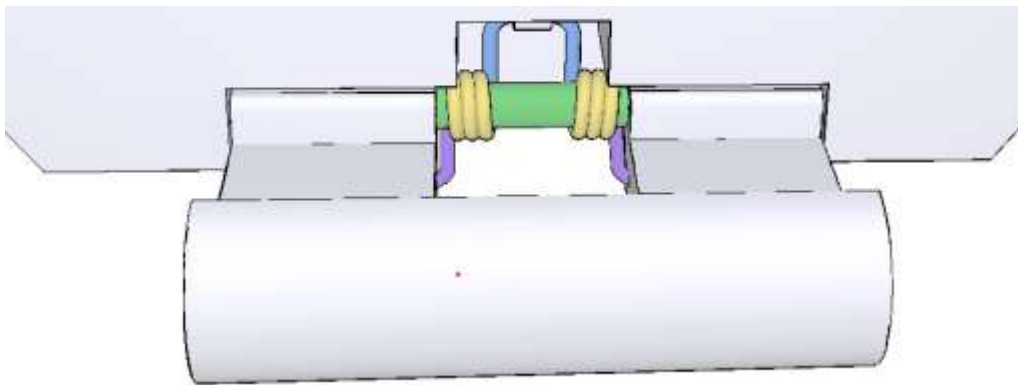
Id. ¶184 (citing Ex. 5:59-65). Here, a POSITA would understand that “sleeves” refers to how the elastic body fits over the connecting member (e.g., similar to the sleeve of a shirt over a person’s arm). *Id.* ¶185 (citing *See, e.g.*, Ex. 1014, 7; Ex. 1015, 8; Ex. 1016, 6 (defining “sleeve”); Ex. 1001, 4:56-57).

When the torsion spring mechanism of Smith is incorporated into Unger as shown below, the *at least one elastic body* (left yellow-highlighted winding body) *sleeves on the first connecting member* (green pivot pin 5):

Perspective View



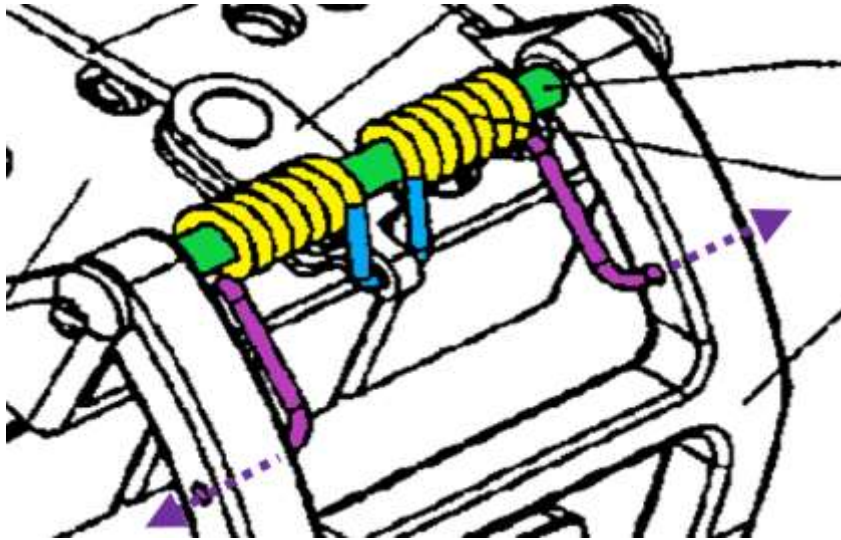
Front View



Id. ¶186. Therefore, Unger as modified by Smith renders this limitation obvious.

Claim 4 The communication device according to claim 1, wherein the first mounting member comprises: a receiving portion, the at least one butting part is received in the receiving portion.

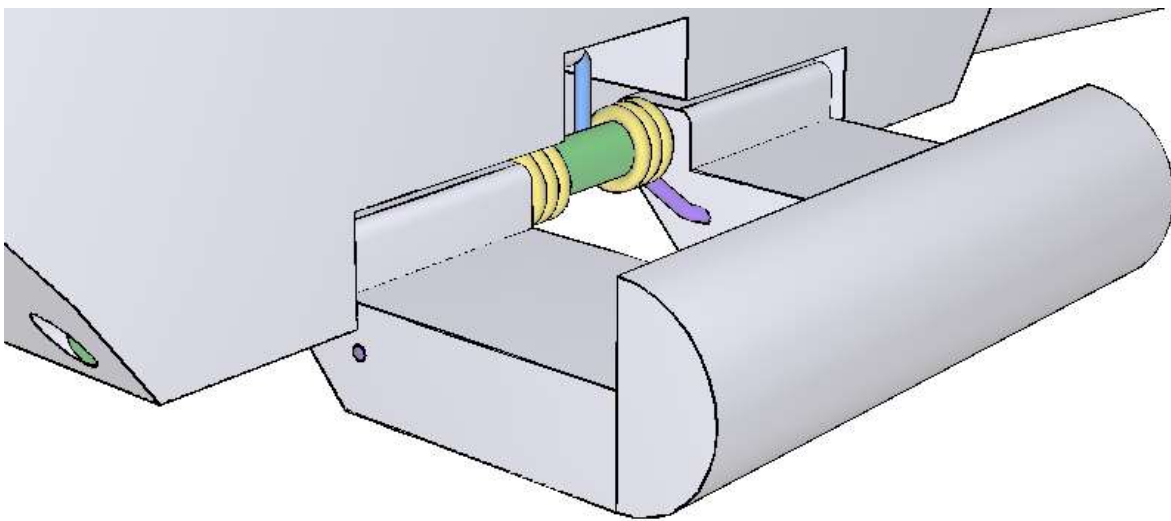
Unger as modified by Smith renders this limitation obvious. As shown in Smith's Figure 1 (partial, annotated below), Smith independently discloses *a first mounting member* (swing arm 2 and attached earcup 7) that *comprises a receiving portion* (a through-hole in the swing arm, as indicated by purple dashed arrows), *the at least one butting part* (i.e., each purple portion of spring 5) *is received in the receiving portion*:



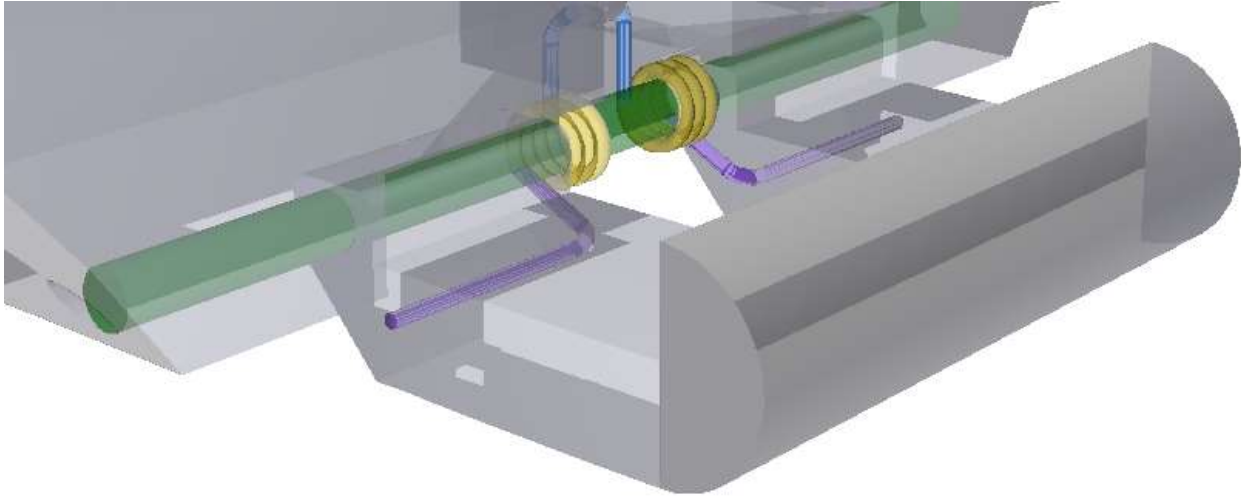
Id. ¶187. As shown, the bending portion of the *at least one* *butting part* (purple-highlighted parts) extends into the through-holes (indicated by purple-dashed arrow), thereby making each through-hole a *receiving portion*. *Id.* ¶188.

When Smith's torsion spring mechanism is incorporated into Unger as shown below, this same arrangement is maintained:

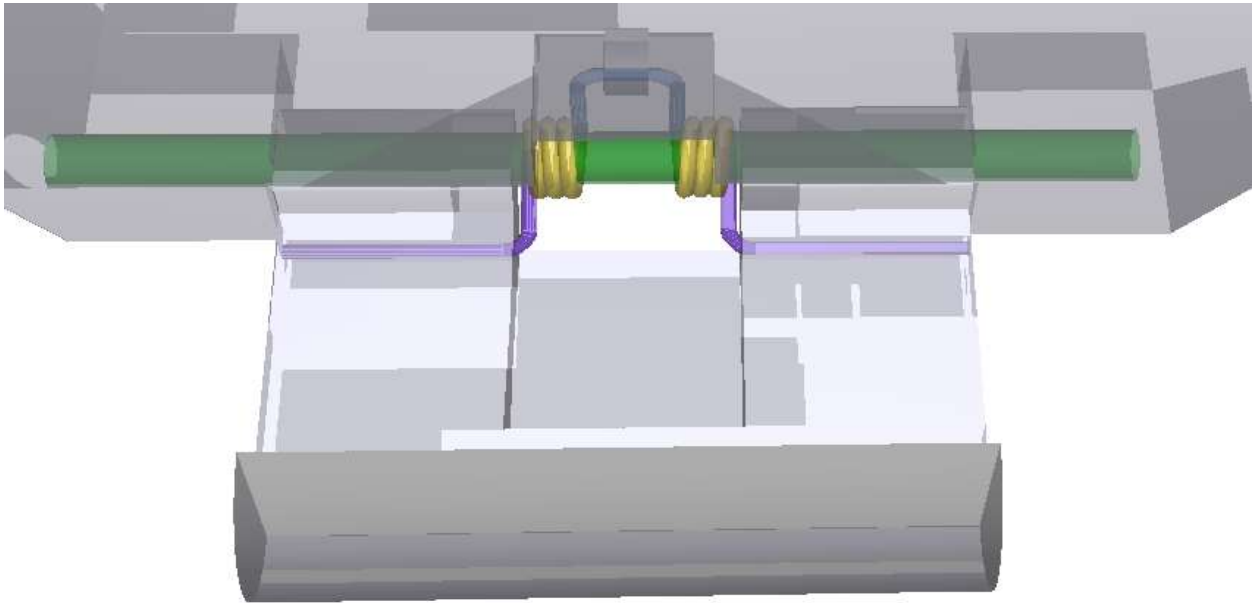
Perspective View



Transparent Perspective View



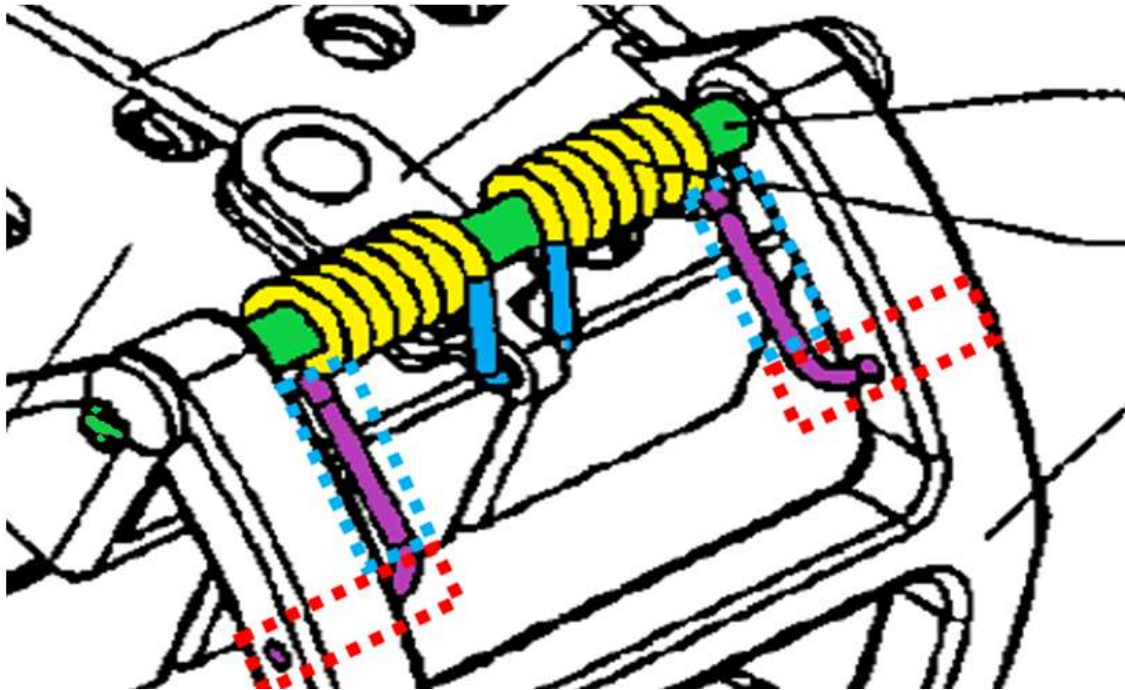
Transparent Front View



Id. As shown by the transparent perspective views, the *first mounting member* (lower mount 308) *comprises a receiving portion* (each through-hole on each side of the mount 308), and *the at least one butting part* (each purple portion of spring 5) *is received in the receiving portion*, as each purple portion extends into a through-hole. *Id.*

Claim 5 The communication device according to claim 1, wherein the butting part comprises: a straight section, connected with the elastic body; and a bending section, connected with the straight section.

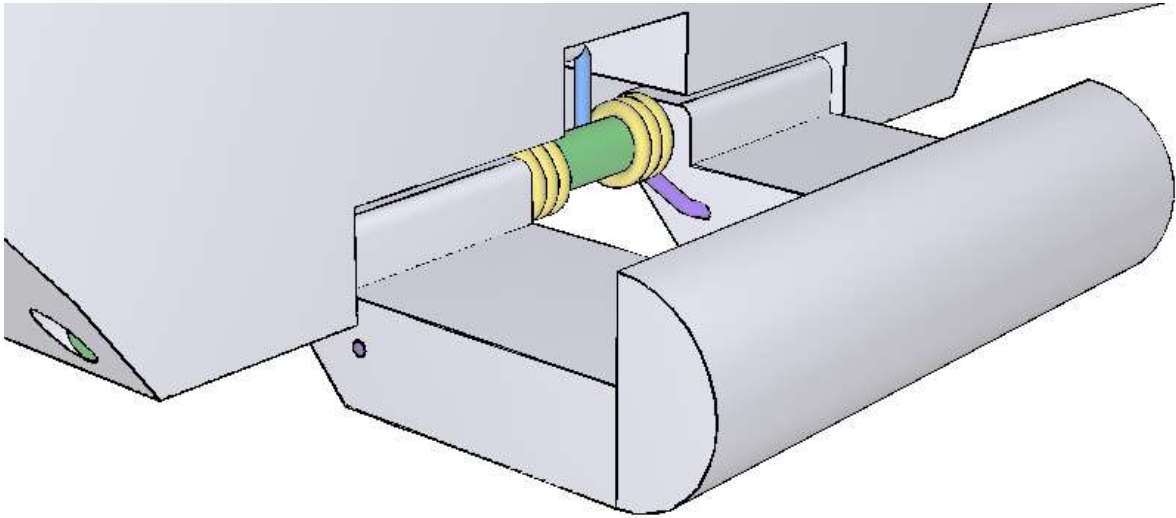
Unger as modified by Smith renders this limitation obvious. As shown in Smith's Figure 1 (partial, annotated below), Smith discloses this limitation:



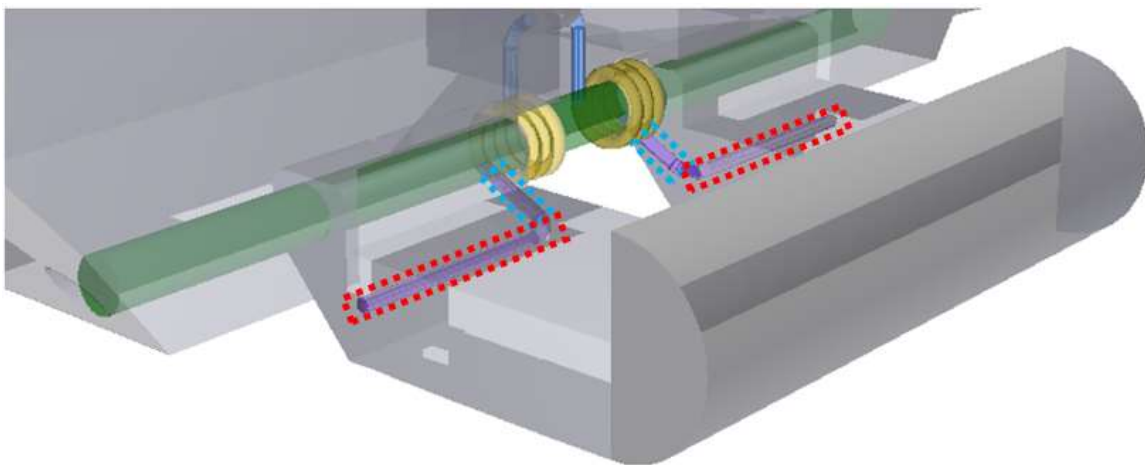
Id. ¶189. Specifically, *the butting part* (each separate purple portion) comprises a *straight section* (blue-dashed box), *connected with the elastic body* (a respective yellow-highlighted winding); *and a bending section* (each identified by red box), *connected with the straight section* (each blue-dashed box). *Id.* Each *bending section* extends into a respective through-hole (or *receiving portion*) in swing arm 2. *Id.*

When the torsion spring mechanism of Smith is incorporated into Unger as shown below, this same arrangement is maintained:

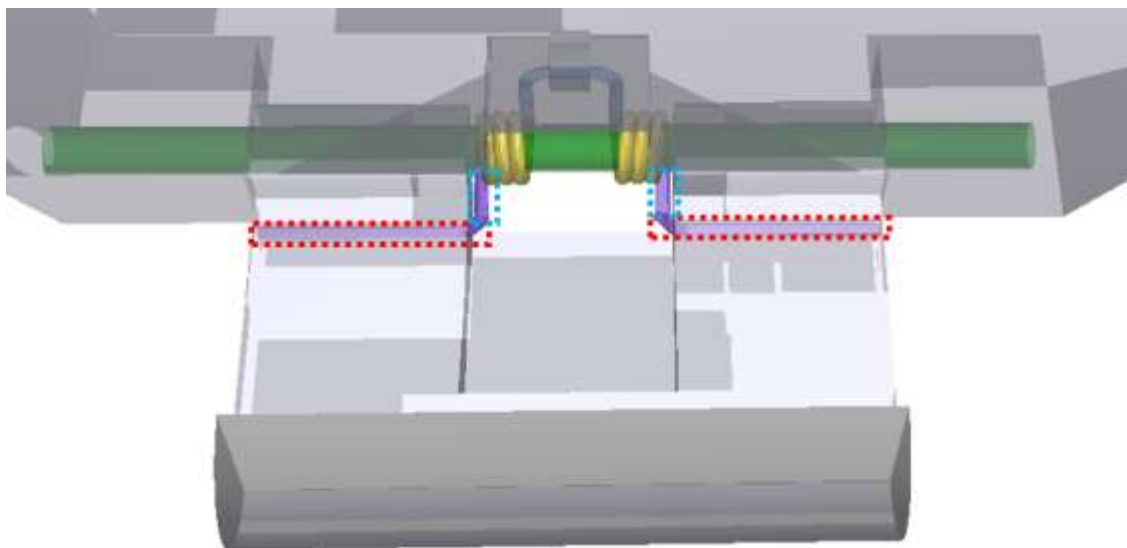
Perspective View



Transparent Perspective View



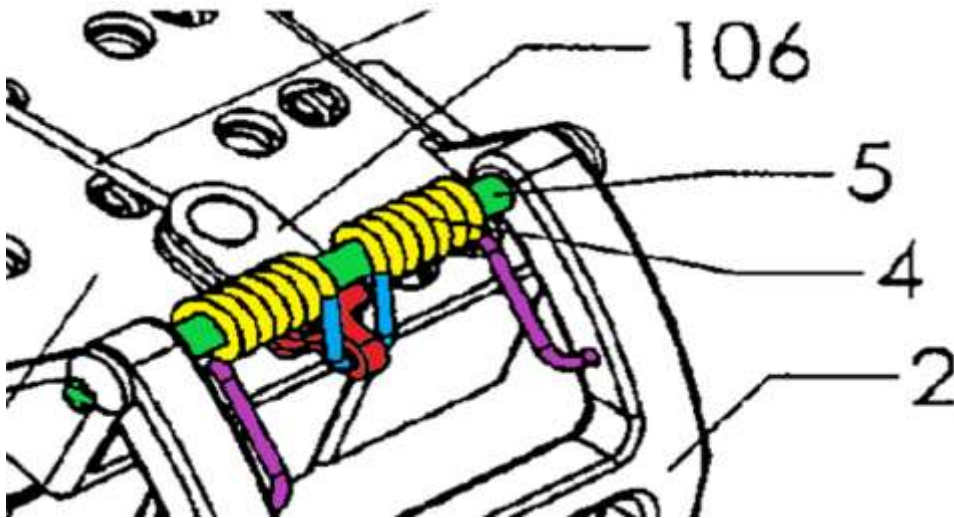
Transparent Front View



Id. ¶190. As shown, *the butting part* (each separate purple portion) comprises a *straight section* (blue-dashed box), *connected with the elastic body* (a respective yellow-highlighted winding); *and a bending section* (each identified by red box), *connected with the straight section* (each identified by blue-dashed box). *Id.* Each *bending section* extends into a respective through-hole (or *receiving portion*) in the lower mount 308. *Id.*

Claim 6 The communication device according to claim 1, wherein the elastic member further comprises: at least one fixing part, connected with the elastic body and fixed on the housing.

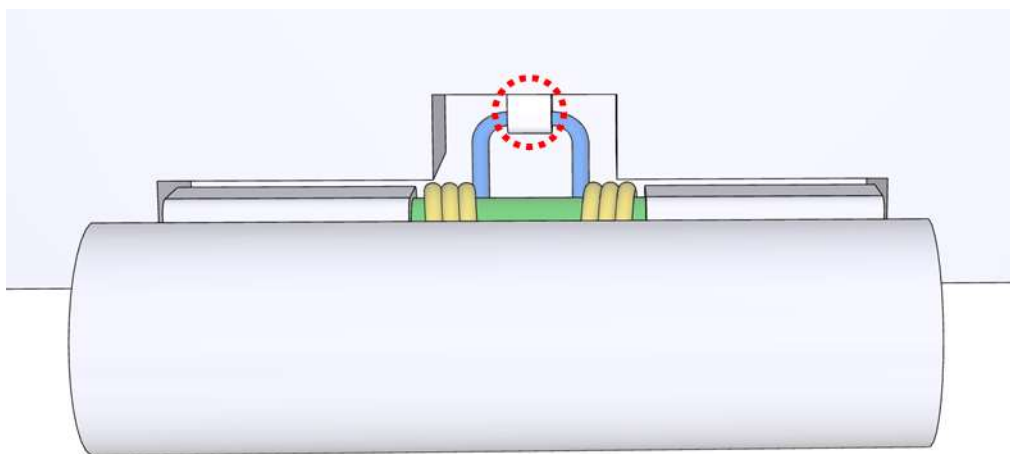
Unger as modified by Smith renders this limitation obvious. As shown in Smith's Figure 1 (partial, annotated below), Smith discloses this limitation:



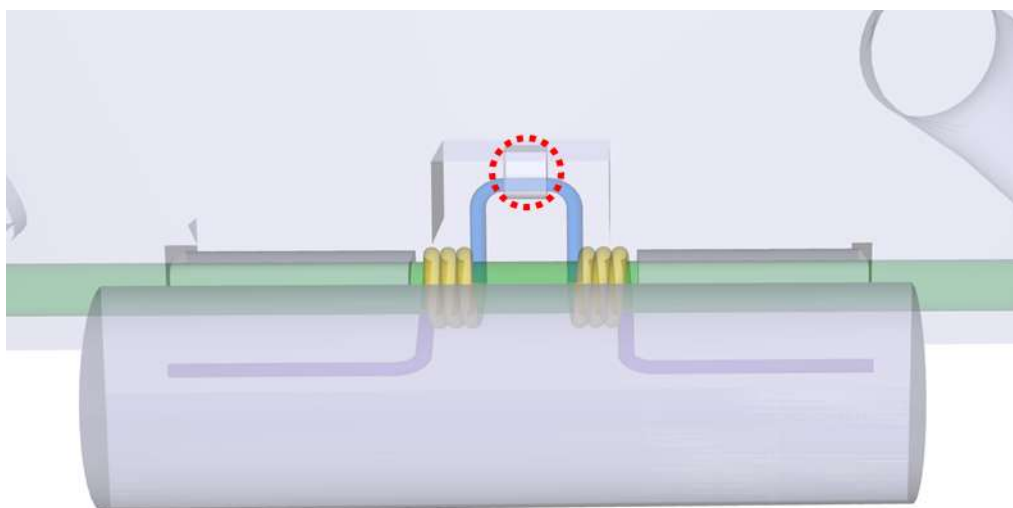
Smith discloses a *fixing part* (blue-highlighted portion of torsion spring 4), *connected with the elastic body* (either of the separate yellow-highlighted spring winding bodies) that is *fixed on the housing* via the hole of red-highlighted ring-lobe attached to the housing of headband 1. Ex. 1002 ¶191 (citing Ex. 1005, 5:61-65).

When Smith's torsion spring mechanism is incorporated into Unger as shown below, these limitations are also satisfied:

Front View



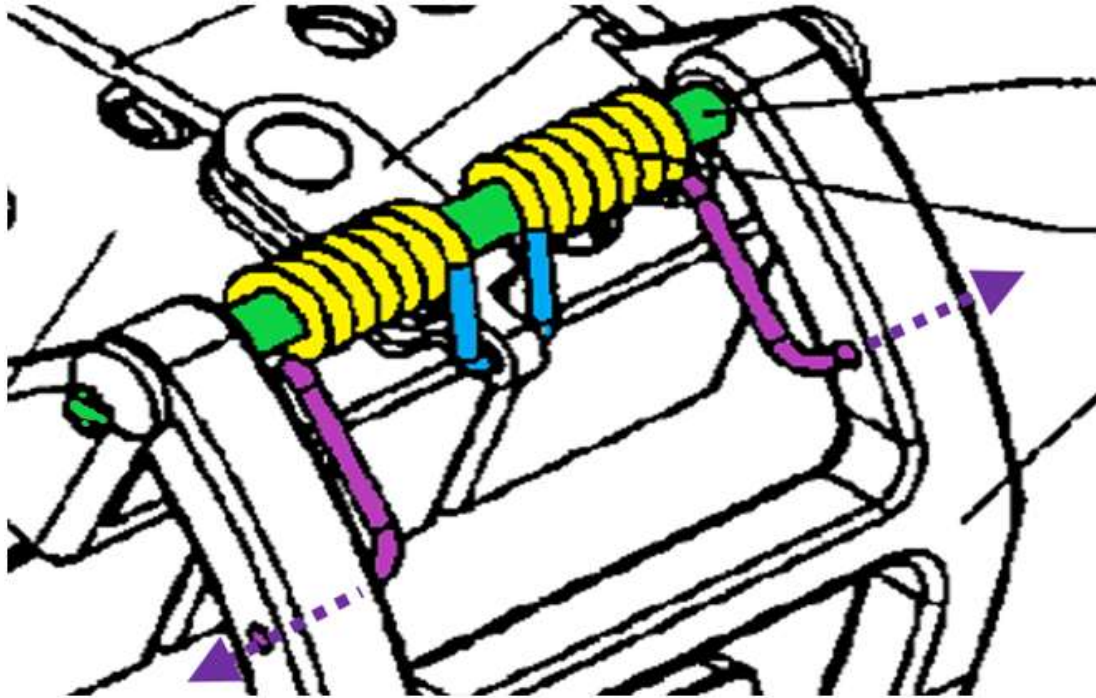
Transparent Front View



Id. ¶192. The combination thus comprises a *fixing part* (blue-highlighted portion of torsion spring 4), *connected with the elastic body* (either of the separate yellow-highlighted spring windings) that is *fixed on the housing* (via the hole of the ring-lobe in the red-dashed circle of housing 304).

Claim 7 The communication device according to claim 1, wherein the elastic member comprises: two elastic bodies, spaced apart from each other and arranged on the first connecting member; and two butting parts, spaced apart from each other and butted against the first mounting member, each butting part is connected with one corresponding elastic body.

Unger as modified by Smith renders this limitation obvious. As shown in Smith's Figure 1 (partial, annotated below), Smith discloses this limitation:

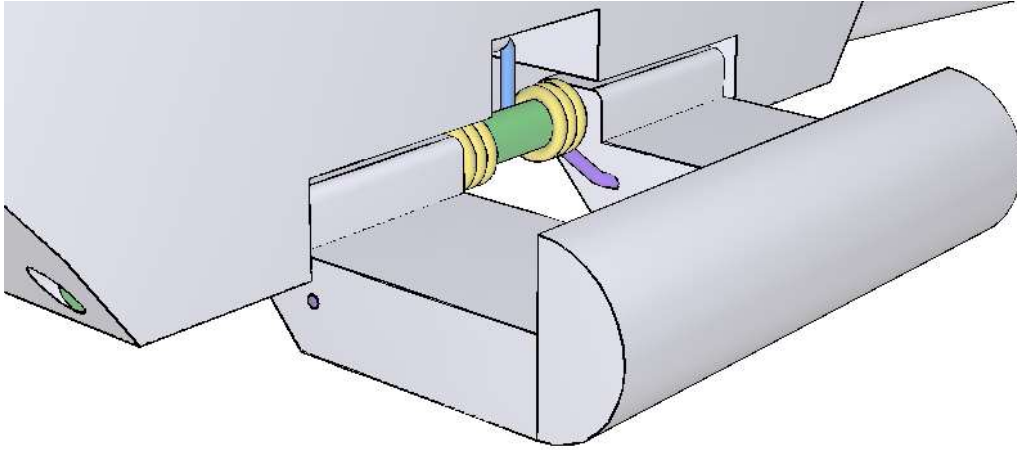


Smith depicts an elastic member (torsion spring 4) that comprises: two elastic bodies (each yellow-highlighted winding), spaced apart from each other and arranged on the first connecting member (green-highlighted pivot pin 5); and two butting parts, spaced apart from each other (two spaced apart purple-highlighted portions of spring 4) and butted against the first mounting member (swing arm 2 and attached earcup 7), where each butting part (each purple-highlighted portion of spring 4) is connected with one corresponding elastic body (the left butting part is directly connected with the left-yellow highlighted winding, the right butting part is directly connected with the right yellow-highlighted winding). *Id.* ¶193. The two purple-highlighted portions of spring 4 are received within the through-holes (purple dashed arrow) of swing arm 2, and thus butt against the swing-arm to facilitate rotational

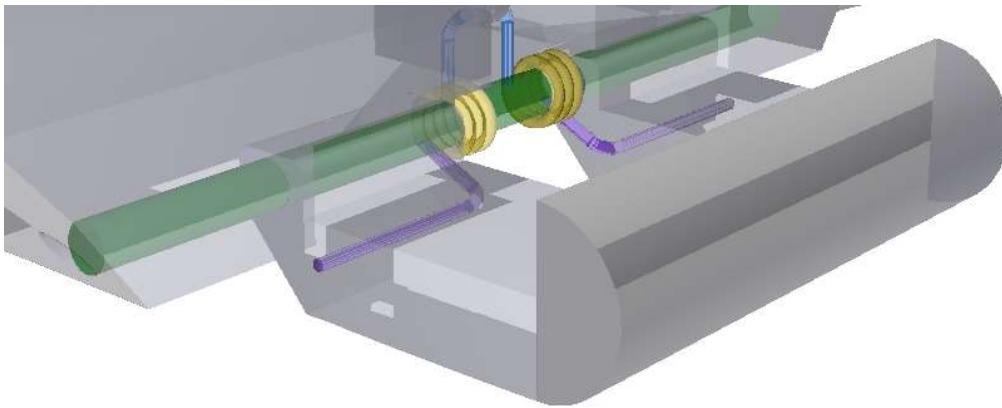
movement by the spring. *Id.* (citing Ex. 1005, 5:49-65).

When Smith's torsion spring mechanism is incorporated into Unger as shown below, this same arrangement is maintained:

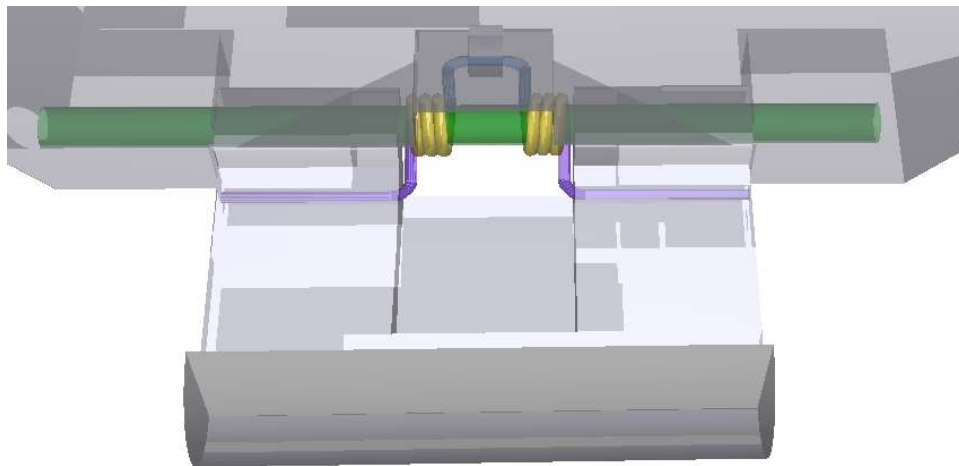
Perspective View



Transparent Perspective View



Transparent Front View

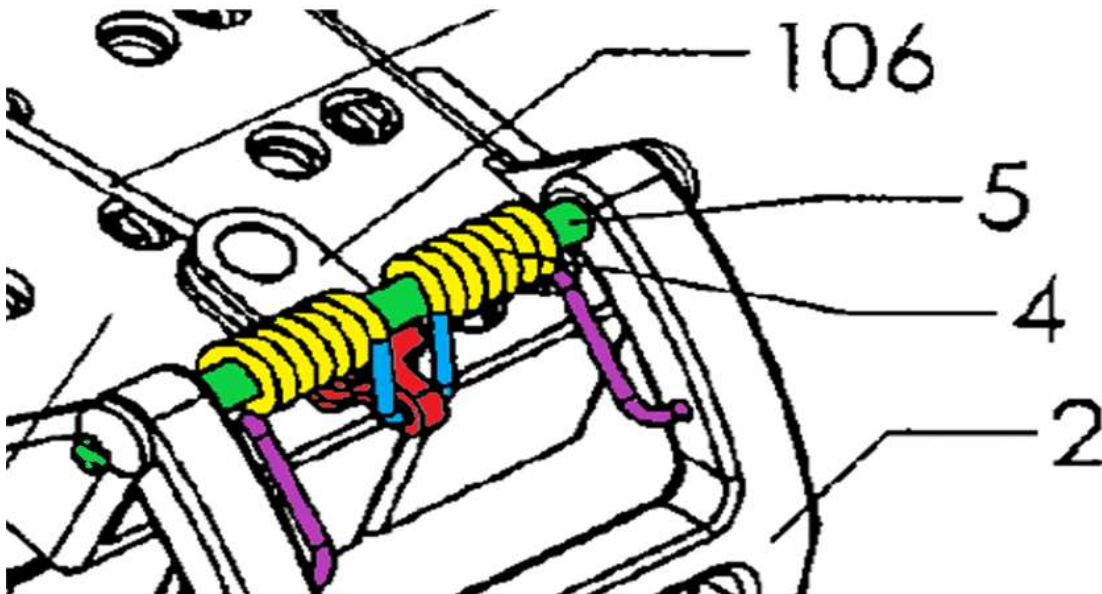


The combination discloses *an elastic member* (torsion spring 4) that *comprises: two elastic bodies* (each yellow-highlighted winding), *spaced apart from each other and arranged on the first connecting member* (green-highlighted pivot pin); *and two butting parts, spaced apart from each other* (two spaced apart purple-highlighted portions of spring) *and butted against the first mounting member* (lower mount 308), where *each butting part* (each purple-highlighted portion of spring 4) *is connected with one corresponding elastic body* (a respective yellow-highlighted winding). Ex. 1002 ¶194. The two purple-highlighted portions of the spring are received within the through-holes of lower arm 308, and thus *butt* against the lower mount to facilitate rotational movement by the spring. *Id.*

Claim 8 The communication device according to claim 1, wherein the elastic member further comprises: a fixing part, fixed on the housing, two ends of the fixing part are connected with the two elastic bodies, respectively.

Unger as modified by Smith renders obvious *the elastic member further*

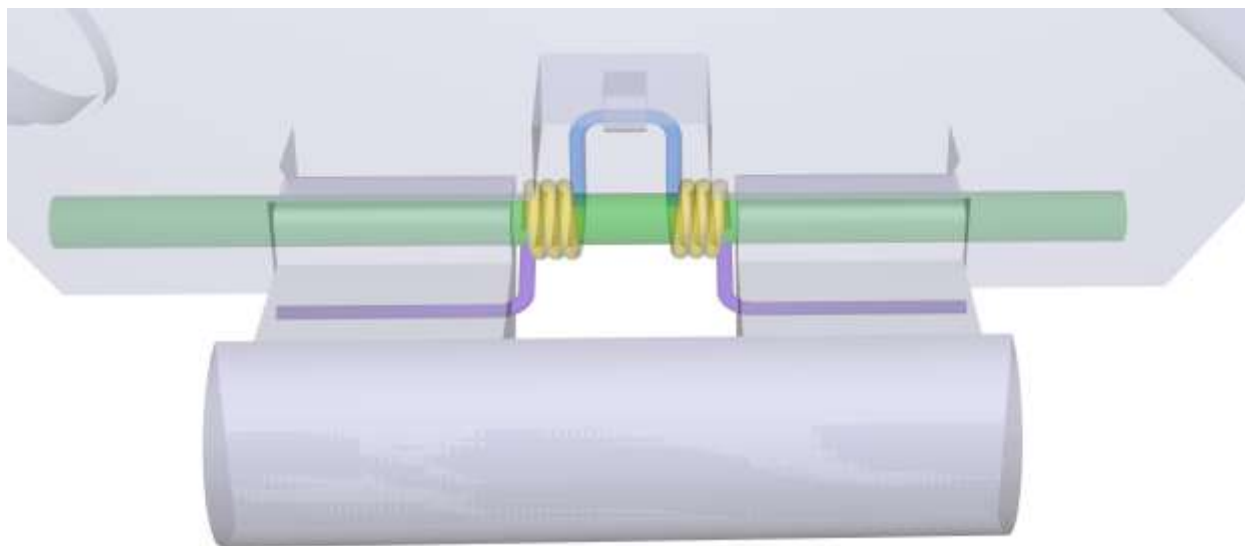
comprises, a fixing part, fixed on the housing. See *supra* Claim 6. As shown below, Smith further independently teaches two ends of the fixing part are connected with the two elastic bodies (two spaced apart yellow-highlighted windings), respectively:



One *fixing part end* (left end of blue-highlighted portion) is directly connected to one *elastic body* (left yellow-highlighted winding) and another *fixing part end* (right end of the blue-highlighted portion) is directly connected with another *elastic body* (right yellow-highlighted winding). Ex. 1002 ¶195 (citing Ex. 1005, 5:61-65)).

When the torsion spring mechanism of Smith is incorporated into Unger as shown in the model images below, these limitations are also satisfied:

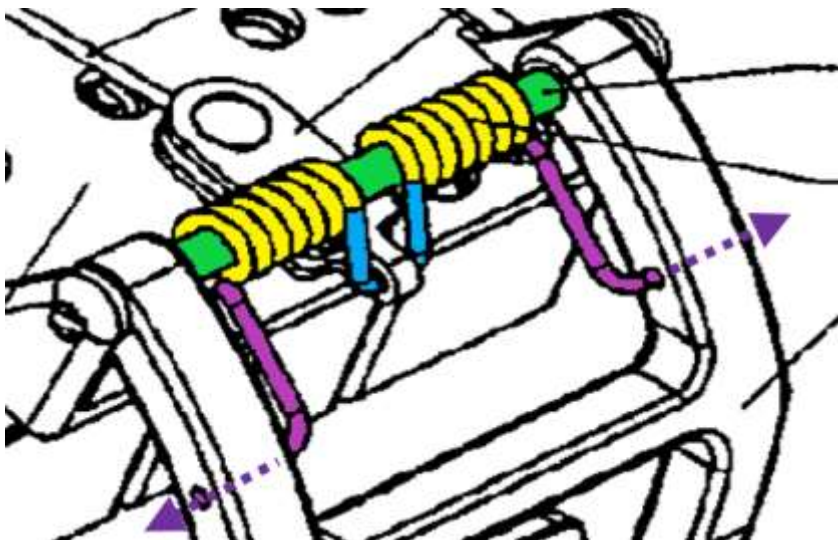
Transparent Front View



Two ends of the fixing part are connected with the two elastic bodies (two spaced apart yellow-highlighted windings), respectively. One fixing part end (left end of blue-highlighted portion) is directly connected with the left elastic body and another fixing part end (right end of the blue-highlighted portion) is directly connected with the right elastic body. Id. ¶196.

Claim 9 The communication device according to claim 1, wherein each butting part comprises: a bending section, the two bending sections extend towards each other or extend in opposite directions.

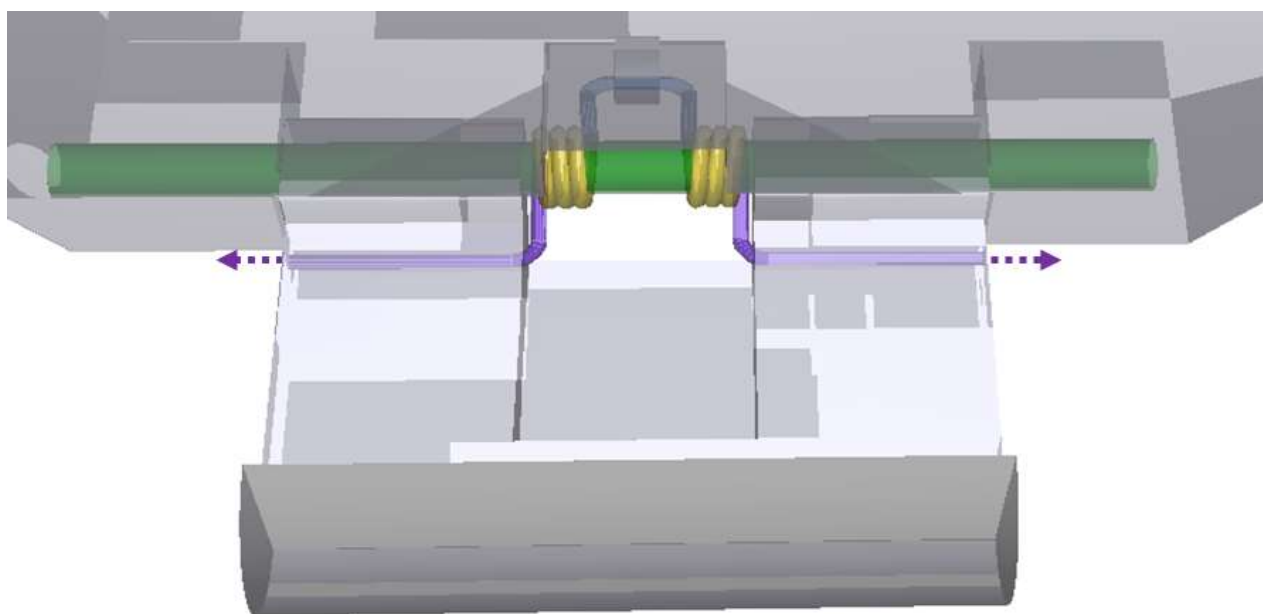
Unger as modified by Smith renders obvious an *elastic member* with two *bending sections*. See *supra* Claim 7. Additionally, Smith further discloses that *the two bending sections ... extend in opposite directions* (as indicated by opposite dashed-purple arrows) in Figure 1 (partial, annotated below):



Id. ¶197.

When Smith's torsion spring mechanism is incorporated into Unger as shown below, the *two bending sections* also *extend in opposite directions* (as indicated by the purple dashed arrows):

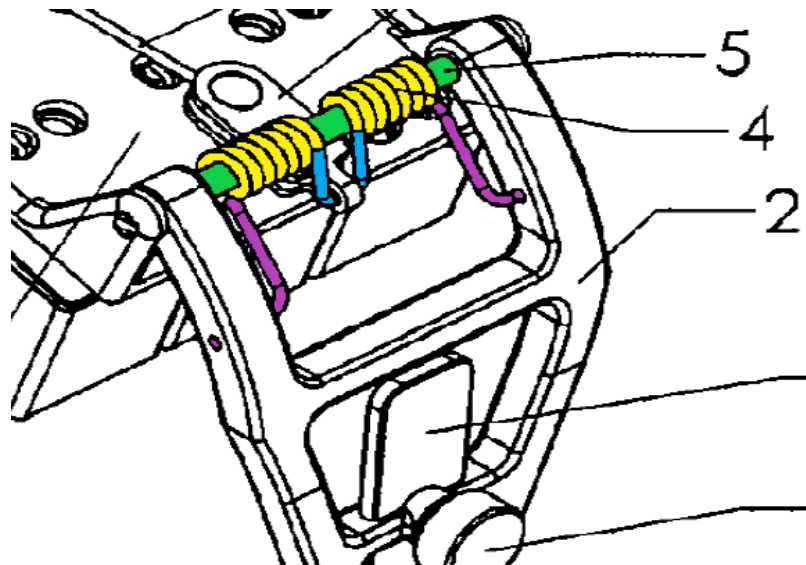
Transparent Front View



Id.

Claim 10 The communication device according to claim 1, wherein the elastic member comprises: an elastic body, arranged on the first connecting member; and two butting parts, spaced apart from each other and butted against the first mounting member, the two butting parts are both connected with the elastic body.

The combination of Unger and Smith discloses this limitation. As shown below, Smith discloses *an elastic body* (left or right yellow-highlighted winding of torsion spring 4) *arranged on the first connecting member* (green-highlighted pivot pin 5) *and two butting parts, spaced apart from each other* (the two spaced apart purple-highlighted portions of spring 4) *and butted against the first mounting member* (swing arm 2 and attached earcup 7):

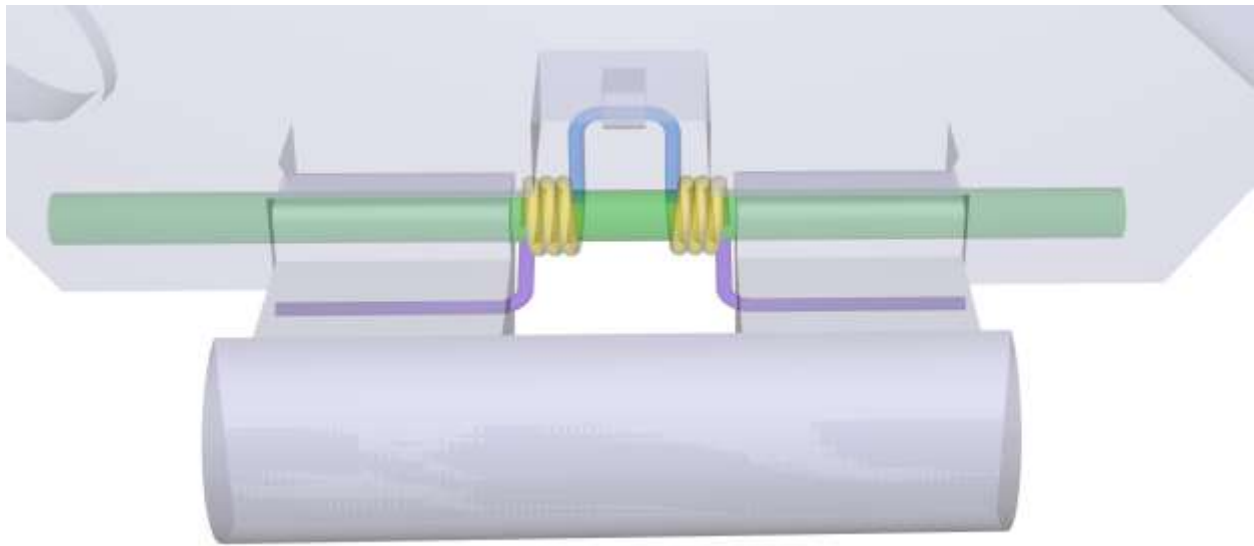


Id. ¶198. Additionally, the two butting parts are both connected with the elastic body. Specifically, the left butting part is directly connected with the left elastic body and indirectly connected with the right elastic body (via the left elastic body and blue-highlighted fixing part), while the right butting part is directly connected with

the right *elastic body* and indirectly *connected with the left elastic body* (via the right *elastic body* part and blue-highlighted *fixing part*). *Id.* ¶199.

When Smith's torsion spring mechanism is incorporated into Unger as shown below, these limitations are also satisfied:

Transparent Front View



The combination includes *an elastic body* (left or right yellow-highlighted winding of torsion spring) *arranged on the first connecting member* (green-highlighted pivot pin) *and two butting parts, spaced apart from each other* (the two spaced apart purple-highlighted portions of spring) *and butted against the first mounting member* (lower mount 308). *Id.* ¶200.

Additionally, *the two butting parts are both connected with the elastic body*. Specifically, the left *butting part* is directly *connected with the left elastic body* and indirectly *connected with the right elastic body* (via the left *elastic body* and blue-

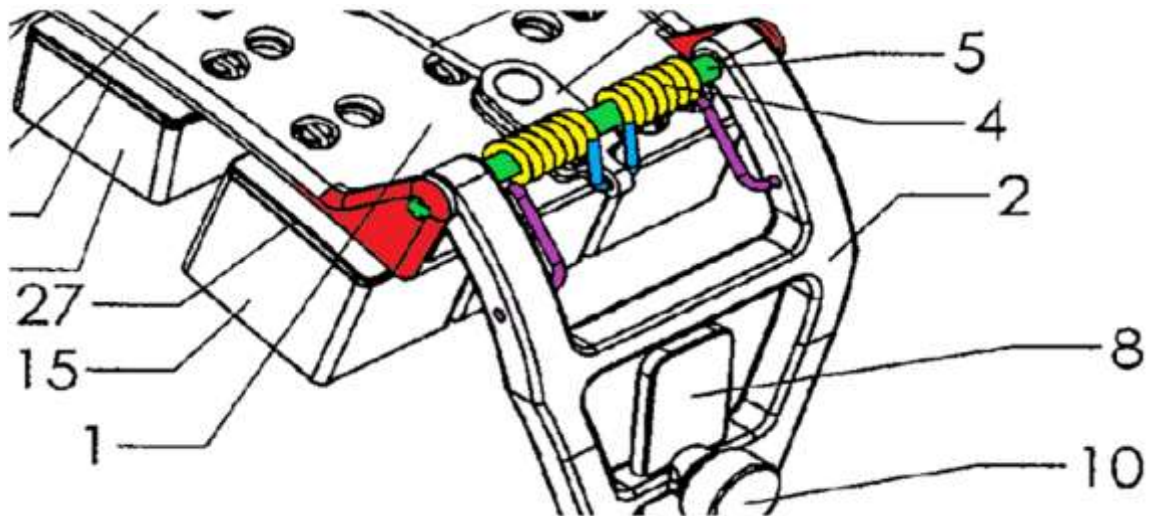
highlighted *fixing part*), while the right *butting part* is directly *connected* with the right *elastic body* and indirectly *connected* with the left *elastic body* (via the right *elastic body* part and blue-highlighted *fixing part*). *Id.* ¶201.

Claim 11 The communication device according to claim 1, wherein the elastic member comprises: an elastic body, arranged on the first connecting member; a butting part, connected with the elastic body and butted against the first mounting member; and a fixing part, connected with the elastic body and fixed on the housing.

The combination of Unger and Smith discloses this limitation, as shown above for Claim 2 (addressing *elastic body* sleeved *arranged on first connecting member*, and *butting part*) and Claim 6 (addressing *fixing part*). *Id.* ¶202.

Claim 12 The communication device according to claim 1, wherein the housing comprises: a connecting element, connected with the first connecting member to connect the first mounting member with the housing.

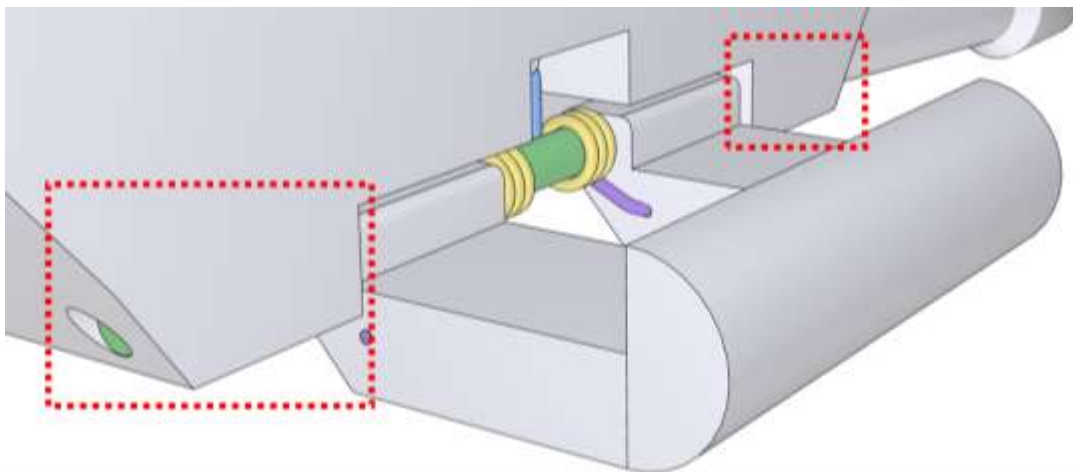
Unger as modified by Smith renders this limitation obvious. As shown below, Smith teaches a *housing* (housing of headband 1) *comprising a connecting element* (each red-highlighted ring-lobe), *connected with the first connecting member* (green-highlighted pivot pin 5) *to connect the first mounting member* (swing arm 2 and attached earcup 7) *with the housing* (housing of headband 1):



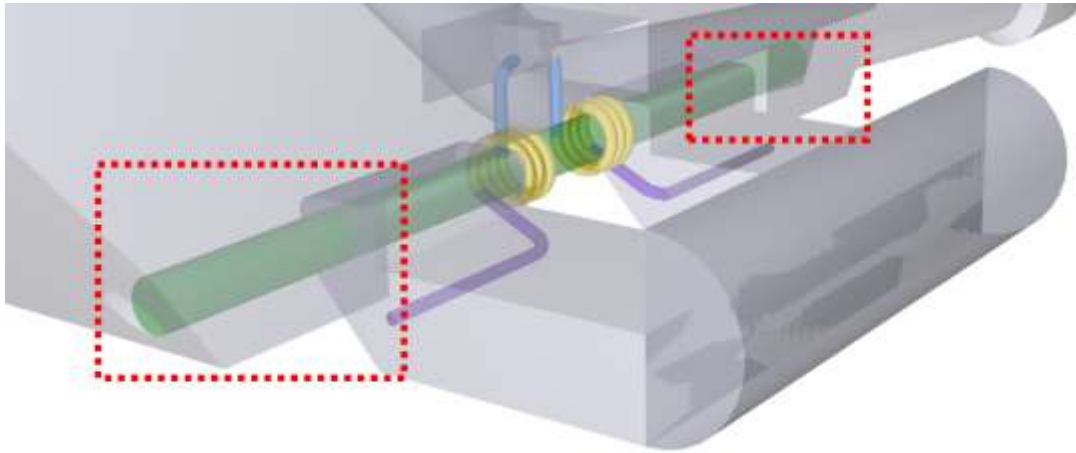
Id. ¶203. As shown, each end of pivot pin 5 (green) extends into a respective through-hole of each ring-lobe (red-highlighted) to couple the pin 5 to the housing of headband 1. *Id.*

When Smith's torsion spring mechanism is incorporated into Unger as shown below, these limitations are also satisfied by the combination:

Perspective View



Transparent Perspective View

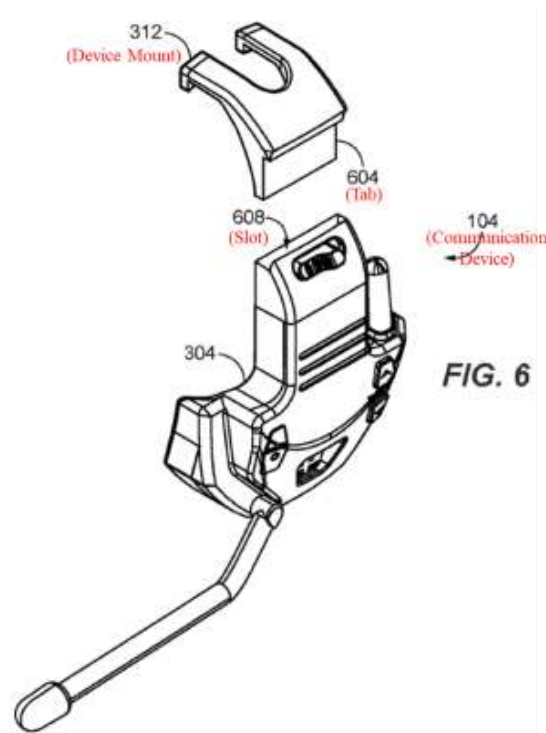


The combination teaches a *housing* (housing 304 of communication device 104) *comprising* a *connecting element* (each protruding-lobe identified with red-dashed box), *connected with the first connecting member* (green-highlighted pivot pin) *to connect the first mounting member* (lower mount arm 308) *with the housing* (lower end of housing 304). The left end of the pin (green) extends into the left ring-lobe (left red-dashed box) and the right end of the pin (green) extends into the right ring-lobe (right red-dashed box), and thus each *connecting element* (ring-lobe) is connected with the *first connecting member* (pivot pin) to connect the *first mounting member* (lower mount arm 308) with the *housing* 304. *Id.* ¶204.

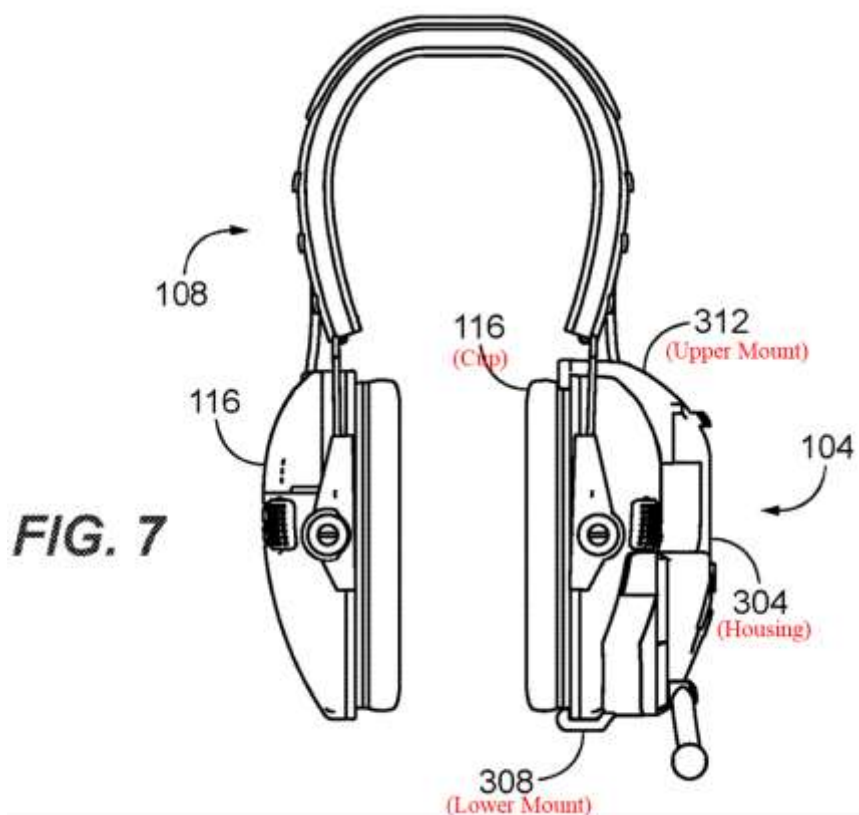
Claim 13 The communication device according to claim 1, wherein the second mounting assembly comprises: a second connecting member, connected with the housing; and a second mounting member, arranged on the second connecting member, and the second connecting member is detachably mounted on an end of the earmuff.

Unger discloses the claimed *second mounting assembly*. In Figure 6

(annotated below), Unger discloses a *second mounting assembly* attached to the top side of the housing 304, comprising a *second connecting member* (tab portion 604 of device mount 312) that is *connected* with *housing 304* via slot 608.



Id. ¶205 (citing Ex. 1004, 5:65-6:8). The *second mounting assembly* further comprises a *second mounting member* (upper mount arm 312) arranged on the *second connecting member* (tab portion 604). *Id.* The *second connecting member* (tab portion 604) is *detachably mounted* on an end of the earmuff as shown below:



More specifically, it is mounted on the upper end of earmuff cup 116. *Id.* It is *detachably mounted* because it can be decoupled from the housing 304 as shown in Figure 6 to detach from the cup, and/or the upper arm can be made of a flexible or resilient material allowing for detachment of the entire communication device 104 (including tab portion 604) by bending the mount arm 312 away from the cup. *Id.* (citing Ex. 1004, 6:20-37). Consequently, Unger expressly discloses the limitations of Claim 13. *Id.* (citing Ex. 1001, 5:61-67).

It was also obvious to modify Unger's upper mount 312 to incorporate an additional torsional spring mechanism identical to the torsional spring mechanism incorporated into the lower mount arm 308. *Id.* ¶206. A POSITA would have

recognized that this would provide rotational freedom to both mounts 308, 312, making it easier to attach/detach the communication device and to use it with a wider variety of hearing protection equipment designs. *Id.* The torsion spring mechanism in the upper mount 312 would comprise *a second connecting member* (a second pivot pin), *connected with the housing* (upper end of housing 304); *and a second mounting member* (the upper mount arm), *arranged on the second connecting member*, and the *second connecting member* would be *detachably mounted on an end of the earmuff* (the mount 312 could be rotated away from the cup of the earmuff to dismount the communication device). *Id.* Alternatively, if the lower mount 308 is considered the *second mounting assembly*, it also satisfies claim 13 for the same reason the torsion spring implementation of upper mount 312 does. *Id.*

Claim 14 The communication device according to claim 1, wherein the audio output member comprises: a connecting head, communicated with the audio input member, and configured for transmitting the wireless signal containing the audio to the at least one loudspeaker; and a connecting line, connected with the connecting head, the connecting line is flexible.

Unger discloses these claim limitations. Unger's communication device 104 comprises an *audio output member* (audio output connector 320) with a *connecting head* (red), which communicates audio signals to the *audio input member* (connector 824) of hearing protection device 108:

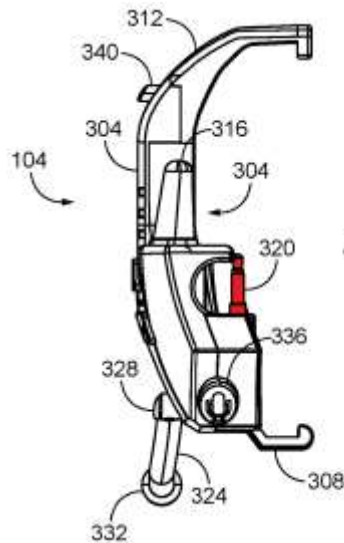


FIG. 3

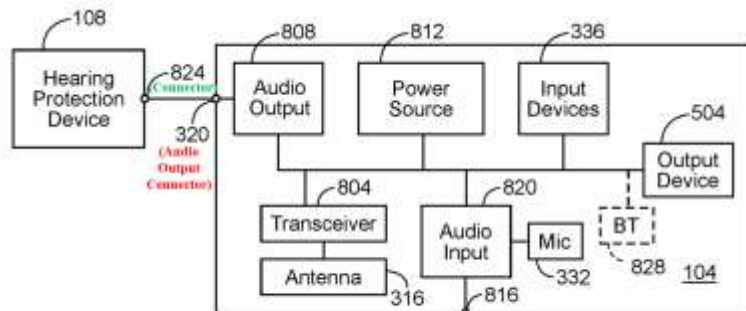


FIG. 8

Id. ¶207 (citing Ex. 1004, 4:48-5:2, 7:47-59). The audio output *transmits the wireless signal containing the audio of a remote user to the at least one loudspeaker of the hearing protection device.* *Id.* (citing Ex. 1004, 1:54-61 (“The communication device also includes a microphone that captures audio, a radio transceiver that wirelessly transmits the audio captured by the microphone to a remote user and wirelessly receives one or more wireless signals carrying audio from the remote user, and an audio output that connects to the audio input of the hearing protection device. The audio carried by the wireless signals is transmitted to the speakers via the audio output.”), 2:4-15, 8:31-39).

While Unger’s Figure 3 depicts audio output member 320 as being rigidly attached to communication device 104, Unger also teaches that “[i]t is contemplated that a *length of cable* between an audio output connector 320 and an audio output 808 may be provided in some embodiments,” which “allows a communication

device 104 to connect to a wide variety of hearing protection devices 108.” Ex. 1004, 7:54-59. Unger thus expressly teaches that the *connecting head* (red) can be attached to the *audio output* 808 via *connecting line* that is *flexible* (both the material and the length of cable are flexible). Ex. 1002 ¶208.

Claim 15 The communication device according to claim 1, further comprising at least one of at least one button, a display screen and a power supply.

Unger discloses these limitations in reference to Figure 8 (annotated below). Unger discloses that the communication device 104 has an input device 336 that “may be a *button*” such as a “push to talk button:”

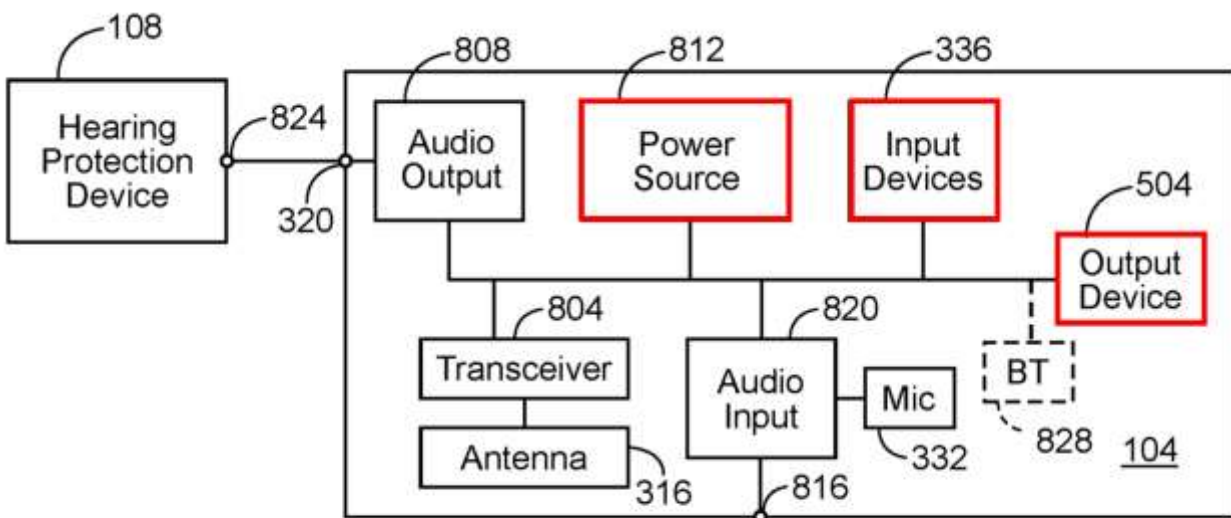


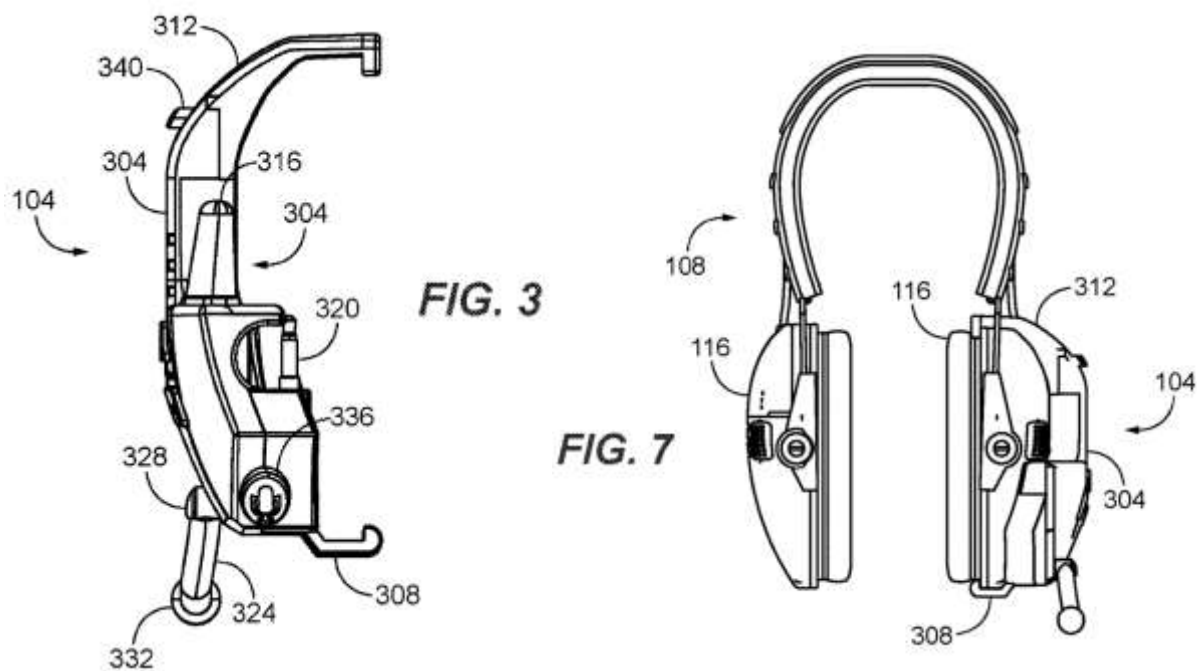
FIG. 8

Id. ¶209 (citing Ex. 1004, 5:24-34, 7:31-35). Unger also discloses that communication device 104 may have an output device 504 that comprises a *display screen* that displays battery levels, volume information, and the current channel. *Id.*

¶210 (citing Ex. 1004, 5:35-41. Unger further teaches that the communication device comprises *one or more power supplies* (“one or more power sources 812”), which can include one or more batteries or solar panels. *Id.* ¶211 (citing Ex. 1004, 6:43-52).

Claim 16 The communication device according to claim 1, wherein the housing is substantially arc-shaped, and the housing is adapted to the earmuff in shape.

“Substantially” arc-shaped renders this claim indefinite. *Infra* Section VIII (claim 16). Regardless, as shown in Figures 6 and 7 (produced below), each earmuff cup 116 of Unger has a pronounced outer convex *arc-shape* and the communication device housing 304 has a pronounced inner concaved *arc-shape*, so that *the housing is adapted to the earmuff in shape*:



Ex. 1002 ¶212. Unger teaches that “an enclosure 304 may be shaped to receive a cup

of a hearing protection device, such as to help secure a communication device 104. A back end of an enclosure 304 ***may have an arcuate shape, such as to correspond to and receive a cup therein.*** As shown in FIG. 3 for instance, the back end of the enclosure has a ***concave*** shape.” *Id.*, 4:41-47. Unger this expressly discloses that its housing has a pronounced arc-shape, which could be considered *substantially* arc-shaped. Ex. 1002 ¶212.

To the extent “substantially arc-shaped” is not found to render Claim 16 indefinite and is interpreted to require a more pronounced housing arc-shape than that depicted in Figures 3 and 7 above, it was obvious based on a POSITA’s general knowledge to design the housing to have a shape conforming to the shape of the cups of earmuffs, which typically have a very pronounced arc-shape. *Id.* ¶213. Unger provides an express motivation to include a housing that corresponds to the shape of an earmuff cup, which provides the obvious benefit of reducing the overall size of the devices when coupled together by more closely conforming the communication device to the hearing protection device. *Id.* A POSITA understood that earmuff cups typically had a convex-shaped outer surface, and that the degree of “convexity” between different earmuff cup designs varied. *Id.* ¶214. It was obvious to design the inner surface of the communication device housing 304 to have a *substantially arc-shaped* concave profile to match a corresponding *substantially arc-shaped* convex outer profile of an earmuff cup, to provide the obvious benefit recognized by Unger

of more effectively adapting the communication device to the cup. *Id.*

A POSITA had a reasonable expectation of success, as this involved nothing more than making simple design changes to the shape of the housing to match a substantially arc-shaped earmuff. *Id.* ¶215. Such changes are quite simple to make using off-the-shelf mechanical engineering design software, and a POSITA understood how and where to relocate internal electronic components (if necessary) to accommodate such shape changes. *Id.* A POSITA would also have found that modifying the shape of the housing to match a substantially arc-shaped earmuff cup would predictably result in better engagement between communication device and earmuff, as well as reduction of the overall size of the combined devices. *Id.* There was no appreciable or recognizable disadvantage to modifying the communication device housing to more closely match a highly-convex the earmuff cup shape. *Id.*

Claim 17

[Preamble] A system for connecting a communication device to a hearing protection equipment, the system comprising:

To the extent the preamble is deemed to be limiting, it is satisfied as shown in the analysis below.

[17.1] a communication device, comprising:

Unger discloses a *communication device*. *Supra* Claim 1[Preamble]; Ex. 1002 ¶217.

[17.1.1] a housing;

Unger discloses a *housing*. *Supra* Claim 1.1; Ex. 1002 ¶218.

[17.1.2] a first mounting assembly, rotatably arranged on a first end of the housing; and

The combination discloses this limitation. *Supra* Claim 1.2; Ex. 1002 ¶219.

[17.1.3] a second mounting assembly, arranged on a second end of the housing;

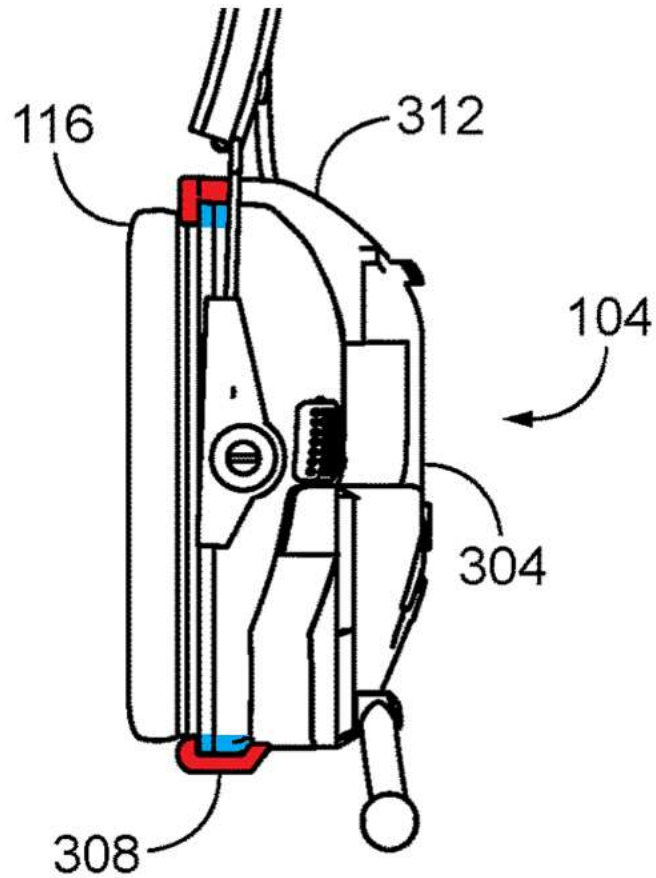
Unger discloses this limitation. *Supra* Claim 1.3; Ex. 1002 ¶220.

[17.2] and a hearing protection equipment, comprising:

Unger discloses this limitation. *Supra* Claim 1[Preamble]; Ex. 1002 ¶221.

[17.2.1] at least one earmuff, comprising two fixing parts, the first mounting assembly and the second mounting assembly are installed on the two fixing parts respectively, to connect the communication device to the hearing protection equipment,

Unger discloses these limitations. Unger's *hearing protection equipment* ("hearing protection device 108") comprises "an earmuff comprising a headband 112 and cups 116 that cover a user's ears." Ex. 1004, 3:55-60. As shown in Figure 7 (partial, annotated below), communication device 104 is attached at *two fixing parts* (blue) of cup 116—one *fixing part* is a lip on an upper end of the cup 116 and another *fixing part* is a lip on the lower end of the cup 116:



Ex. 1002 ¶222 (citing Ex. 1004, 4:12-22). These *fixing parts* are structurally identical to the “fixing parts 2013” of the earmuff 201 shown in Figure 10 of the ’855 Patent (partial, annotated below), which are lips that the mounting assemblies can “hook” onto:

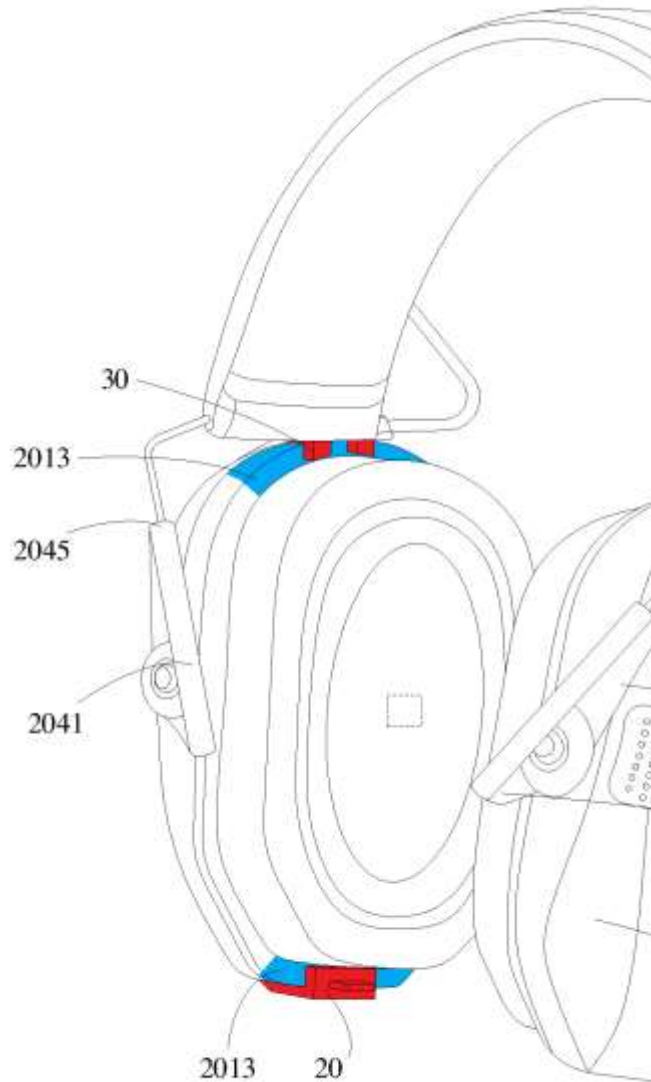


FIG. 10

Id. (citing Ex. 1001, 3:39-47). A POSITA understood that the blue-highlighted portions in both Unger and the '855 Patent were *fixing parts* because the *first mounting assembly* (lower mount 308 in Unger, lower mount 20 in the '855 Patent) and the *second mounting assembly* (upper mount 312 in Unger, upper mount 30 in the '855 Patent) are *installed on the lower and upper fixing parts, respectively* to fix

the communication device to the hearing protection equipment. *Id.*

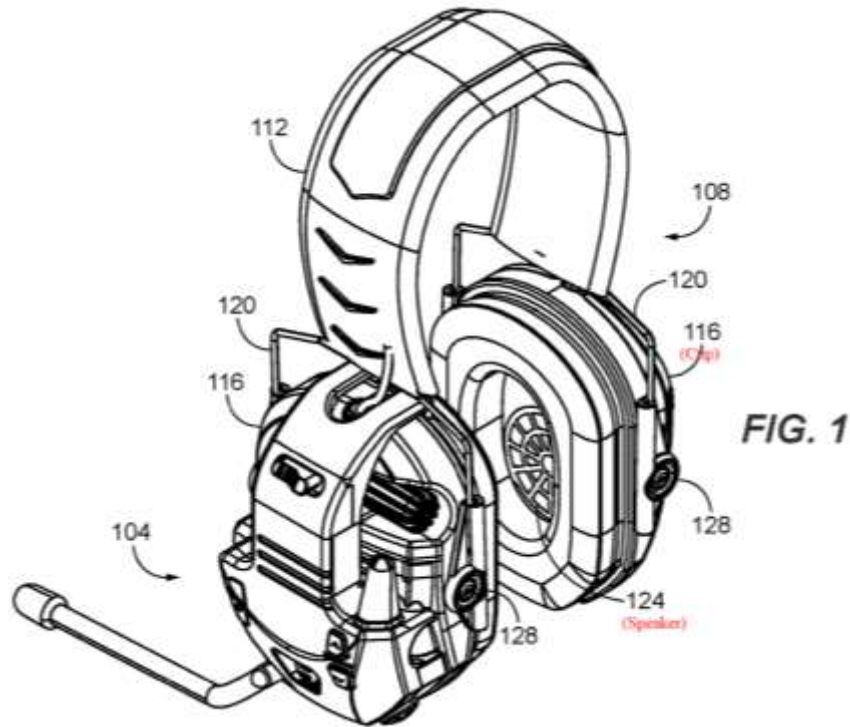
[17.3] wherein the first mounting assembly comprises: [A] a first connecting member, connected with the housing; [B] an elastic member; [C] a first mounting member, rotatably connected with the first connecting member by the elastic member, the first mounting member is coupled with the earmuff under an elastic force of the elastic member; and the first mounting member is separated from the earmuff after overcoming the elastic force of the elastic member.

The combination teaches these limitations. *Supra* Claim 1.7; Ex. 1002 ¶223.

Claim 18 The system according to claim 17, wherein the earmuff further comprises: a rigid housing, comprising the two fixing parts; and a flexible part, arranged on the housing.

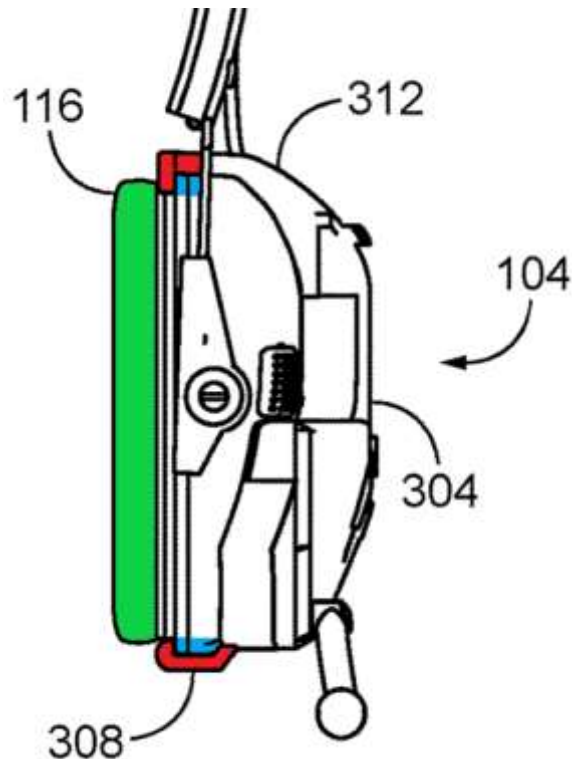
These limitations merely recite basic elements of hearing protection earmuffs.

Unger's earmuffs comprise cups 116 having a "speaker 124 in each of the cups," which is depicted in Figure 1 (annotated below) as being housed within cups 116:



Ex. 1004, 3:64-66. Cups 116 also house various components, such as a volume control knob 208 (see Fig. 2) and an audio input member for receiving the communication device's audio output connector. *Id.*, 1:47-50; 3:64-4:4. Thus, each cup 116 is a *housing* that houses or encloses various components. Ex. 1002 ¶224.

Moreover, as explained for Claim 17.2.1 in reference to Figure 7 (partial, annotated below), each cup 116 comprises upper and lower *fixing parts* (blue) that the upper mount 312 and lower mount 308 can be fixed to, respectively.



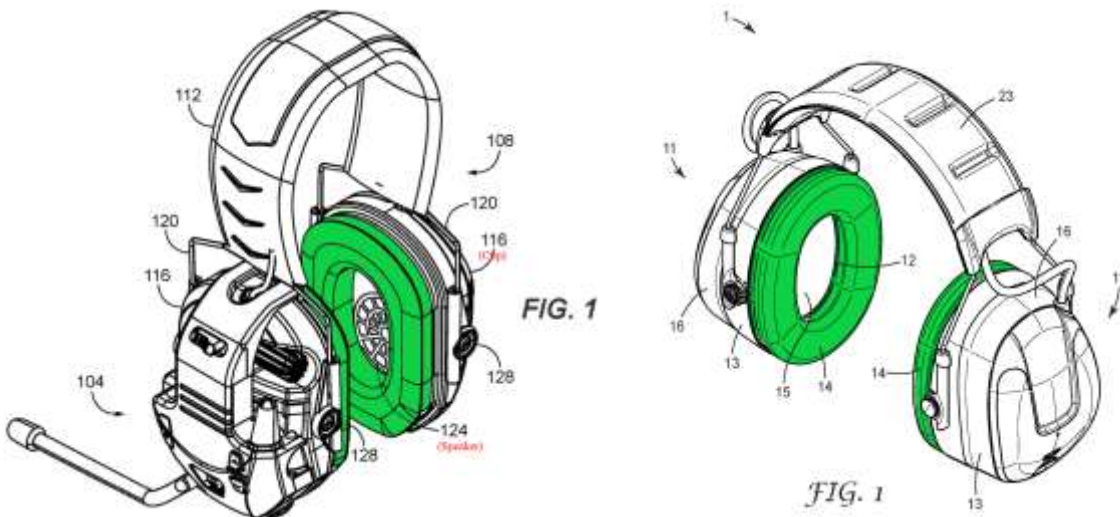
Id. ¶225.

While Unger does not expressly state that cups 116 are “rigid,” a POSITA understood that the *fixing part* of each cup 116 was necessarily rigid. The *fixing parts* must be rigid to allow for the upper mount 312 and lower mount 308 of the communication device 104 to securely attach or “fix” to cup 116. Ex. 1002 ¶226. Further, a POSITA understood that the base of cups for hearing protection devices was made of a rigid material (e.g., hard plastic), to which a non-rigid material (e.g., a cushion) was then attached for ear comfort. *Id.* Indeed, Figure 7 (annotated above) depicts a cushion (green) on the inside of cup 116, attached to the rigid part of the cup. *Id.*

Unger also teaches a *flexible part arranged on the housing* in the form of

sealing cushion (green) mounted on each cup. *Id.* ¶227. Although Unger does not expressly identify the green portion as a “cushion,” a POSITA understood the green portion to be a sealing cushion for several reasons.

First, Unger is directed toward “hearing protection devices,” which are specifically designed to protect the device wearer from loud sounds. *Id.* Second, Figure 1 (annotated below left) depicts seams spaced radially along the green portion, which a POSITA understood to be a common characteristic of earmuff sealing cushions. For example, Figure 1 of Hakansson (Ex. 1013) (annotated below right) depicts an earmuff cushion 14 (green) with seams like those in the cushion of Unger:



Ex. 1002 ¶228 (citing Ex. 1013, 5:8-21). The *flexible part* 2012 identified in the '855 Patent looks very similar to these cushions, as shown in annotated Figure 9 below. *Id.*

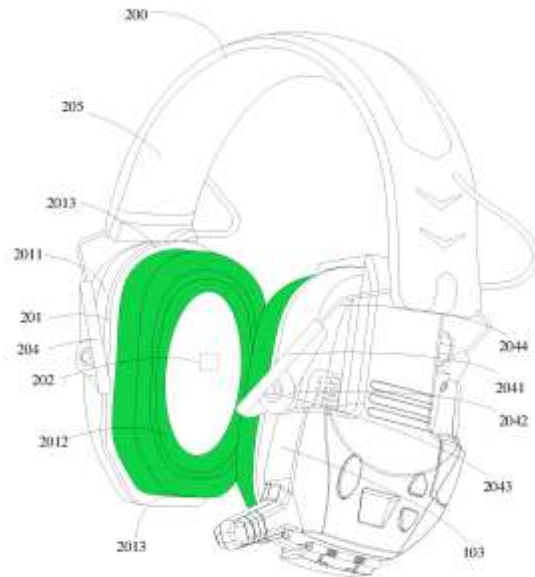
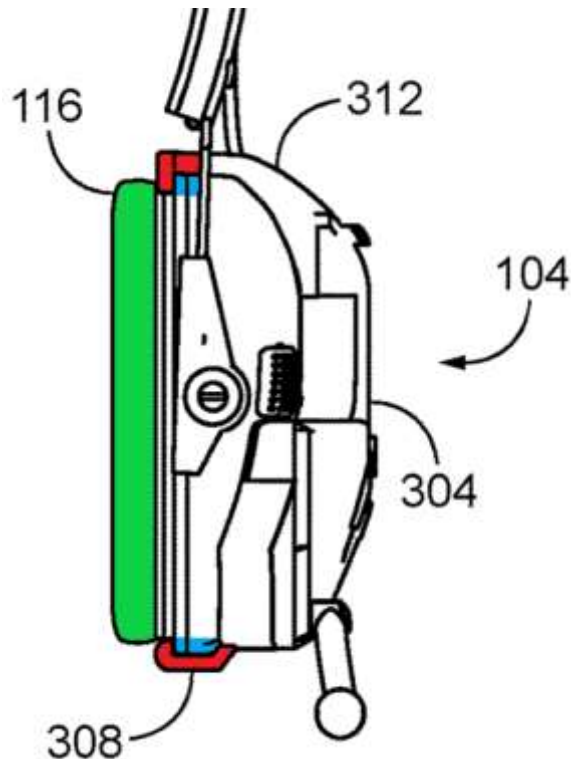


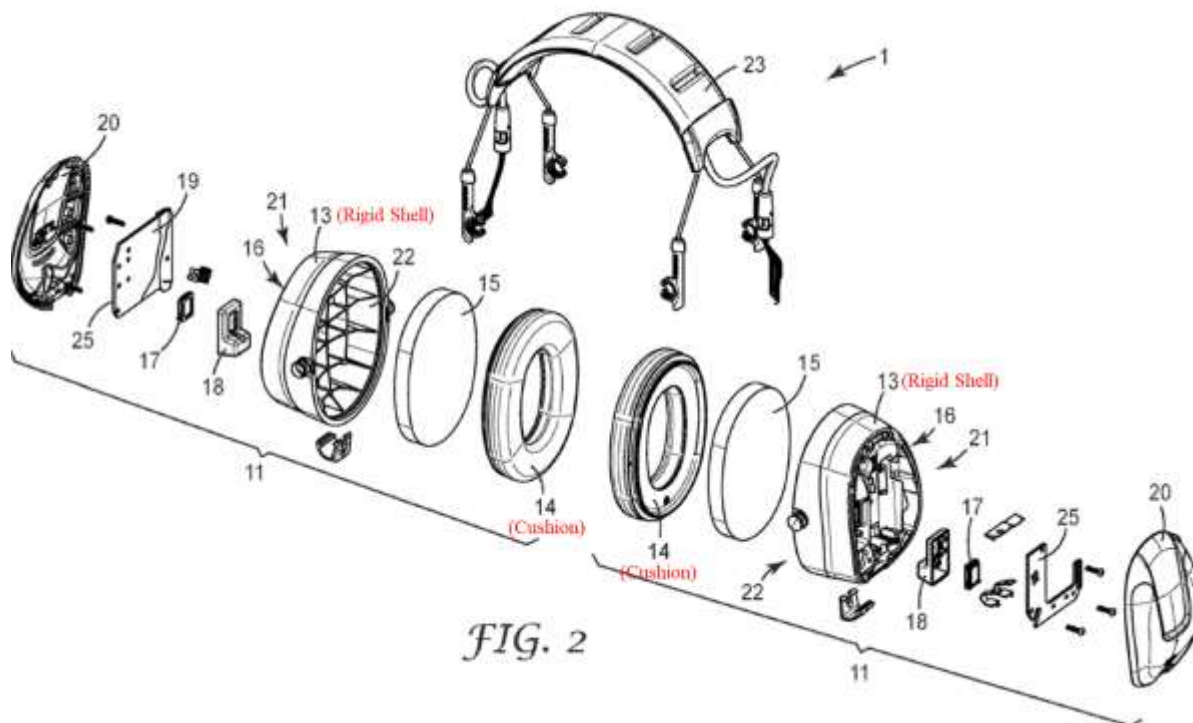
FIG. 9

Third, Figure 7 (partial, annotated below) shows that the green portion has a side profile characteristic of an earmuff cushion. The upper and lower corners of the green portion are rounded out (rather than sharp turns), which is a common characteristic of such sealing cushions. Ex. 1002 ¶229.



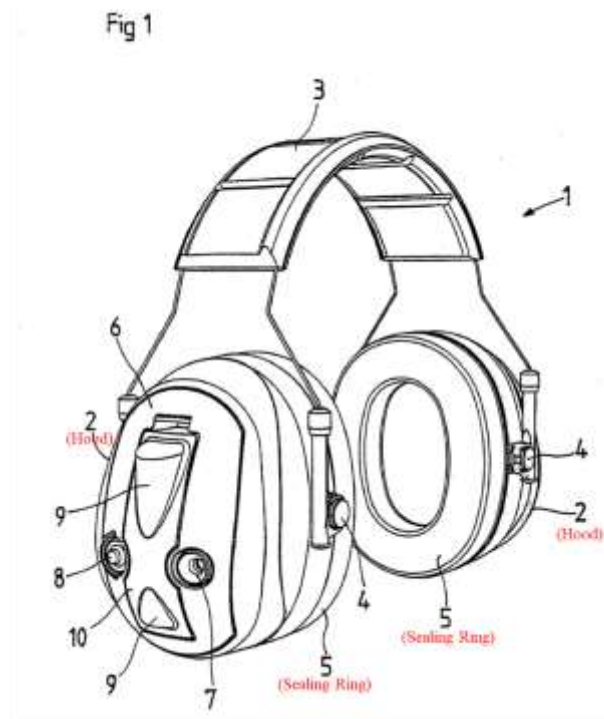
Even assuming Unger does not disclose the claimed *rigid housing* with the *flexible parts* arranged thereon, these features were obvious based on the general knowledge of a POSITA. *Id.* ¶230. These are common characteristics of earmuff hearing protection devices—there is nothing novel about using these features with hearing protection devices. *Id.* Each cup is typically formed of a hard shell (often a hard plastic) having interior sealing cushions to provide for sound isolation and improved ear comfort. *Id.* For example, Hakansson’s Figure 2 depicts earmuffs comprising a *housing* (“generally rigid” “shell 13” “made of a plastic material”) with a *flexible part* (“cushioning 14” formed of “preferably elastically deformable material” that “is configured to adapt to a wearer’s head in an area around the wearer’s ear, so as to form a preferably air-tight seal at this area”) mounted thereon, which was a very

common feature of hearing protection earmuffs:



Id. ¶231 (citing Ex. 1013, 4:67-5:37).

Similarly, U.S. Patent Application Publication No. 2005/0238181 (“Nilsson”) is directed toward a hearing protection device and explains that each cup is made from a “hard material” with seals around the wearer’s ears. Ex. 1012 [0003]. Consistent with this common design, Nilsson discloses in reference to Figure 1 (annotated below) hearing protection ear muffs comprising a *rigid housings* (“hoods 2 have hard outer shells”) and a *flexible part* (“sealing ring 5 for abutment against the head of the user around the user’s ear” and that “may be designed in any optional manner ... known in the art”):



Id. [0027]. Both Hakansson and Nilsson demonstrate that hearing protection earmuffs with a *rigid housing* (e.g., plastic shell) and attached *flexible part* (e.g., sealing cushion or ring) were within the general knowledge of a POSITA. Indeed, these were basic features that a POSITA would have been very surprised to not to find in hearing protection earmuffs. Ex. 1002 ¶¶232-33.

It was obvious based on a POSITA's general knowledge to use earmuffs comprising a *rigid housing* in Unger. For one, rigid housing is more resistant to physical damage and provides better protection to its enclosed components (e.g., the loudspeaker, audio input) than a non-rigid housing. *Id.* ¶234. A POSITA recognized that hearing protection devices are commonly used in environments involving heavy machinery and hazards (e.g., tripping hazards, helmet hazards), making durability

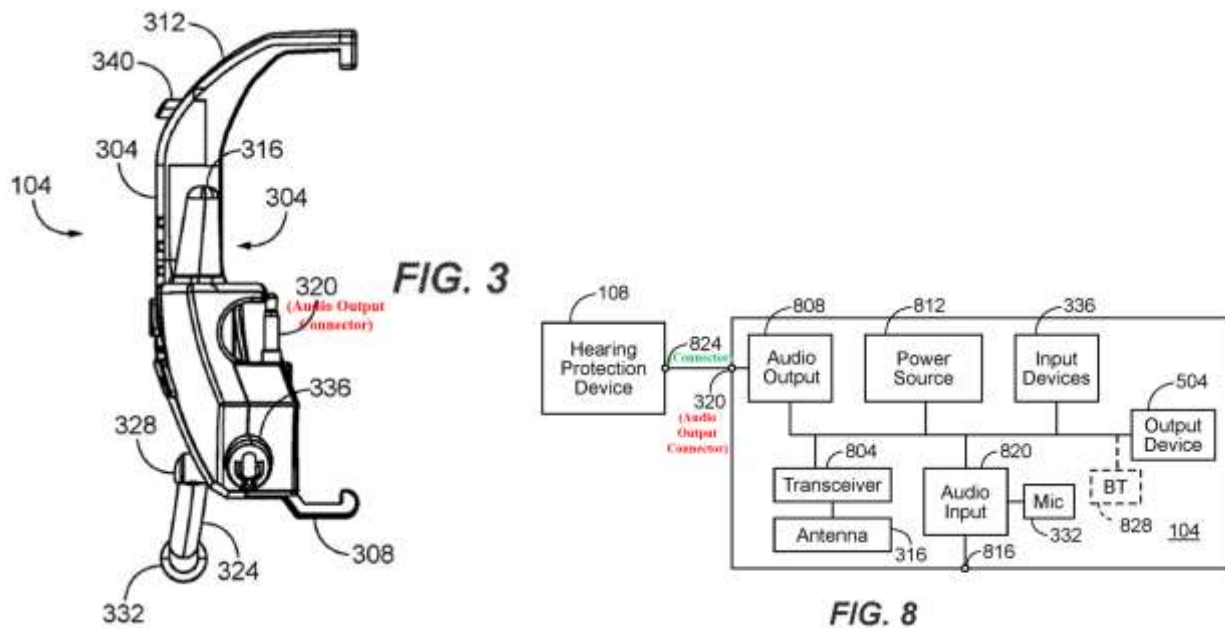
and resistance to physical damage even more important. *Id.* Additionally, it was generally easier to manufacture and assemble a rigid housing (e.g., formed of hard shells that are easily attached via screws and can snap or form-fit together) compared to a non-rigid material. *Id.*

It was also obvious based on a POSITA's general knowledge to use a *flexible part* arranged on the *rigid housing*. Hearing protection devices are intended to protect the wearer from loud external noises, which can cause substantial hearing damage if not adequately sealed from the wearer. *Id.* ¶235. A POSITA was thus strongly motivated to include a *flexible part* (e.g., sealing ring or sealing cushion) so that the cups 116 of Unger's earmuffs can adapt to the shape of the wearer's ear and effectively seal the wearer off from loud external noises in the environment. *Id.* A POSITA was also motivated to use a *flexible part* attached to the *rigid housing* to improve wearer comfort, which is very important for head worn devices. *Id.*

A POSITA had a reasonable expectation of success in modifying Unger's cups to have a *rigid housing* with attached *flexible parts*, as such features were well-known and common in hearing protection earmuffs. Incorporating these features into Unger's earmuffs involved only the application of basic mechanical design and fabrication principles, which were well-understood and widely applied as shown by the commonality of these features in the prior art, such as Hakansson and Nilsson. *Id.* ¶236.

Claim 19 The system according to claim 17, wherein the communication device further comprises an audio output member; and the hearing protection equipment further comprises an audio input member, connected with the audio output member.

As explained for claim 1[Preamble] and claim 1.6, Unger's communication device comprises an *audio output member* 320 and the hearing protection equipment comprises an *audio input member* 824 that receives that audio output member when the communication device is attached to the hearing protection device:



While none of Unger's other figures show audio input connector 824, a POSITA understood that connector 824 was necessarily a female-type connector that received the male-type audio output connector 320 when the hearing protection device 108 and communication device 104 were coupled together via the upper mount 312 and lower mount 308. Ex. 1002 ¶237 (citing Ex. 1004, 4:66-5:2).

VII. GROUND 2: CLAIM 18 IS OBVIOUS OVER UNGER AND SMITH, FURTHER IN VIEW OF HAKANSSON

To the extent the Board determines that the use of a *rigid housing* with *two fixing points* and a *flexible part* arranged on the housing was not obvious based on a POSITA's general knowledge, it was obvious based on the combination of Unger and Smith, further in view of Hakansson.

Unger and Hakansson are analogous, as both are from the same field of endeavor as the claimed invention—the design of hearing protection equipment and communication devices. *See, e.g.*, Ex. 1001, Claims 1, 17 (reciting structure of hearing protection equipment and communication device). Like the claimed invention, both are directed toward the design of hearing protection equipment (e.g., earmuffs), and Unger is also directed toward the design of communication devices (e.g., walkie-talkies). Ex. 1002 ¶113.

Unger and Hakansson are both reasonably pertinent to the problem faced by the inventor. Specifically, one problem recited in the '855 patent relates to more effectively attaching and detaching communication devices. *See* Ex. 1004., 1:32-35, 4:14-36. Unger focuses on more effectively attaching a communication device to hearing protection equipment using removable, flexible and/or resilient components (*see supra* Section VI.A.1), while Hakansson focuses on increasing the “technical reliability” and “wearing comfort” of earmuffs and the manufacturer thereof. *See, e.g.*, Ex. 1013, Abstract; *see also supra* Section VI.C. (claim 18). Therefore, a

POSITA would have looked toward Unger and Hakansson when considering the recited problem. Ex. 1002 ¶113.

GSM incorporates here its discussion for claim 18 in Section VI.C., which provides several rationales for modifying Unger’s earmuffs based on Hakansson. For example, it was obvious to use rigid cup housing to provide a stronger point of connection for the communication device mounting arms to attach and better protect the internal components. There was also a reasonable expectation of success and predictable results, as shown by the ubiquitous presence of rigid housing with flexible cushions or seals in the prior art. *See* Section VI.C. (Claim 18); Ex. 1002 ¶¶238-242.

VIII. GROUND 3: CLAIMS 3-6, 8-9 AND 16 ARE INDEFINITE

Under *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014), “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” While “absolute precision” is not required, it must still “provide[] **enough certainty** to one of skill in the art when read in the context of the invention.” *Sonix Tech. Co. v. Publications Int’l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017). The Board applies the same indefiniteness standard in post-grant proceedings. USPTO Memorandum, Approach to Indefiniteness Under 35 U.S.C. § 112 In AIA Post-Grant Proceedings (Jan. 6,

2021).

Under *Nautilus*, dependent claims 3-6, 8, 9 and 16 are indefinite.

Claim 3

Claim 3 depends from claim 1 and recites “wherein ***the*** at least one elastic body sleeves on the first connecting member.” Claim 1 does not recite an “elastic body,” and thus claim 3 lacks antecedent basis. While dependent claim 2 recites “at least one elastic body,” it is unclear whether claim 3 was intended to recite: “The communication device according to claim ~~1~~2...” or “The communication device according to claim 1, wherein ~~the~~—at least one elastic body sleeves on the first connecting member.”¹¹ Both interpretations are reasonable and consistent with the specification but result in vastly different claim scope. Ex. 1002 ¶244. Therefore, it is unclear which interpretation is appropriate.

While the Federal Circuit has held that the Board has authority to correct obvious errors in a claim, it only did so where the correction was not subject to “reasonable debate” because the patentee and petitioner had agreed as to the error and its correction. *See Fitbit, Inc. v. Valencell, Inc.*, 964 F.3d 1112, 1119-20 (Fed.

¹¹ Throughout Section VIII, GSM uses the same nomenclature for amendments made during examination—namely strikethrough to indicate deletion of claim text and underline to indicate the addition of claim text.

Cir. 2020). Here, in stark contrast, there are two equally reasonable interpretations that could plausibly be correct.

Because the nature of the error is not apparent on the face of the patent, it is inappropriate to resort to the prosecution history.¹² Even if appropriate, the prosecution history is unhelpful. Ex. 1002 ¶245. In the final amendment leading to allowance, the patentee incorporated then-pending dependent claim 2 into independent claim 1, and amended then-pending dependent claims 3-13 (now-issued dependent claims 2-12) to depend directly from claim 1, rather than from various intervening dependent claims. Ex. 1003, 33, 38, 114. The lack of antecedent basis demonstrates that a mistake was made, but it is unclear whether the underlying intent was to retain the previous claim-dependency structure of claim 3 (then-pending dependent claim 4) or have claim 3 establish the first instance of “at least one elastic body.” Given the existence of two equally likely, reasonable interpretations resulting in differing claim scope, claim 3 is indefinite. Ex. 1002 ¶246.

¹² Under the standard for judicial correction applied by district courts, the correction of an error must be evident on the face of the patent, and the prosecution history is only reviewed to determine whether it suggests a different interpretation than that correction. *Novos Indus., L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1354 (Fed. Cir. 2003).

Claim 4

Claim 4 depends from claim 1 and recites “wherein the first mounting member comprises: a receiving portion, **the** at least one butting part is received in the receiving portion.” However, claim 1 does not recite a “butting part” and thus claim 3 lacks antecedent basis.

While dependent claim 2 recites “at least one butting part,” it is unclear whether claim 4 was intended to recite: “The communication device according to claim 42...” or “The communication device according to claim 1, wherein the first mounting member comprises: a receiving portion, ~~the~~ at least one butting part is received in the receiving portion.” Both interpretations are reasonable and consistent with the specification but result in vastly different claim scope. *Id.* ¶247. Moreover, the prosecution history provides no guidance as to the appropriate interpretation. *Supra* Section VIII (Claim 3). The lack of antecedent basis demonstrates that a mistake was made, but it is unclear whether the intent was to retain the previous claim-dependency structure of claim 4 (then-pending dependent claim 5) or have claim 4 establish the first instance of “at least one butting part.” Given the two equally likely reasonable interpretations resulting in differing claim scope, claim 4 is indefinite. Ex. 1002 ¶248.

Claim 5

Claim 5 depends from claim 1 and recites “wherein **the** butting part comprises:

a straight section, connected with *the* elastic body.” However, claim 1 does not recite a “butting part” or “elastic body,” and thus claim 5 lacks antecedent basis for these terms.

While dependent claim 2 recites “at least one butting part” and “at least one elastic body,” it is unclear whether claim 5 was intended to recite “The communication device according to claim 1,” or “The communication device according to claim 1, wherein ~~the~~ butting part comprises: a straight section, connected with ~~an~~ the elastic body.” Moreover, the ambiguity here is further compounded because, as discussed above, dependent claims 3 and 4 could have been intended to depend on dependent claim 2, in which case claim 5 could have been intended to indirectly depend on claim 2 via one of those intervening claims. Each interpretation is reasonable and consistent with the specification but result in vastly different claim scope. *Id.* ¶250. Moreover, the prosecution history provides no guidance. *Supra* Section VIII (Claim 3). The lack of antecedent basis demonstrates that a mistake was made, but it is unclear whether the intent was to depend on a prior claim structure or have claim 5 establish the first instance of “at least one butting part” and “an elastic body.” Given the multiple possible reasonable interpretations resulting in differing claim scope, claim 5 is indefinite. Ex. 1002 ¶251.

Claim 6

Claim 6 depends from claim 1 and recites “at least one fixing part, connected

with **the** elastic body.” However, claim 1 does not recite an “elastic body” and thus claim 6 lacks antecedent basis.

While each of dependent claims 2, 3 and 5 recite “at least one elastic body” and/or “the elastic body,” it is unclear whether claim 6 was intended to recite “The communication device according to claim ~~1~~2,” “The communication device according to claim ~~1~~3,” “The communication device according to claim ~~1~~5,” or “The communication device according to claim 1 ... at least one fixing part, connected with ~~the~~an elastic body and fixed on the housing.” All four interpretations are reasonable and consistent with the specification but result in vastly different claim scope. *Id.* ¶253. Moreover, the prosecution history provides no guidance. *Supra* Section VIII (Claim 3). The lack of antecedent basis demonstrates that a mistake was made, but it is unclear whether the intent was to depend on another claim or have claim 6 establish the first instance of “an elastic body.” Given the multiple, equally likely reasonable interpretations resulting in differing claim scope, claim 6 is indefinite. Ex. 1002 ¶254.

Claim 8

Claim 8 depends from claim 1 and recites “two ends of the fixing part are connected with **the** two elastic bodies, respectively.” However, claim 1 does not recite an “elastic body” and thus claim 8 lacks antecedent basis.

While dependent claim 7 recites “two elastic bodies,” it is unclear whether

claim 8 was intended to recite “The communication device according to claim ~~1~~7,” or “The communication device according to claim 1 ... two ends of the fixing part are connected with ~~the~~ two elastic bodies, respectively.” Both interpretations are reasonable and consistent with the specification but result in vastly different claim scope. *Id.* ¶256. Moreover, the prosecution history provides no guidance. *Supra* Section VIII (Claim 3). The lack of antecedent basis demonstrates that a mistake was made, but it is unclear whether the intent was to depend on another claim or have claim 8 establish the first instance of “two elastic bodies.” Given the multiple, equally likely reasonable interpretations resulting in differing claim scope, claim 8 is indefinite. Ex. 1002 ¶257.

Claim 9

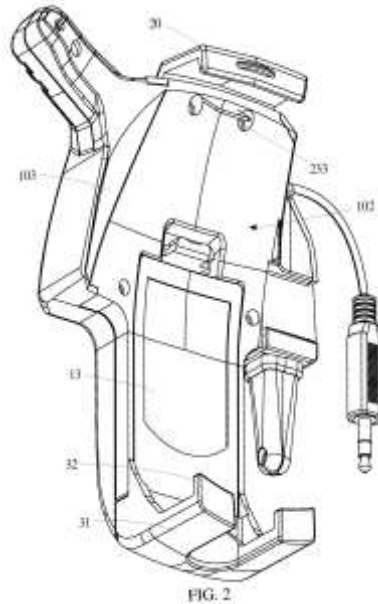
Claim 9 depends from claim 1 and recites “wherein **each** butting part comprises: a bending section, the two bending sections extend towards each other or extend in opposite directions.” However, claim 1 does not recite a “butting part” and thus claim 8 lacks antecedent basis for “each butting part.”

While dependent claim 2 recites “at least one butting part” and dependent claim 7 recites “two butting parts” and “each butting part,” it is unclear whether claim 9 was intended to depend on claim 2 or 7, or instead recite “The communication device according to claim 1, wherein the elastic member comprises two butting parts, each comprises...” Each interpretation is reasonable and

consistent with the specification but results in vastly different claim scope. *Id.* ¶259. The prosecution history provides no guidance. *Supra* Section VIII (Claim 3). The lack of antecedent basis demonstrates that a mistake was made, but it is unclear whether the intent was to depend on a prior claim or have claim 9 establish the first instance of “butting part.” Given the multiple, equally likely reasonable interpretations resulting in differing claim scope, claim 9 is indefinite. Ex. 1002 ¶260.

Claim 16

Claim 16 recites “wherein the housing is ***substantially*** arc-shaped.” However, the specification provides no guidance to determine or distinguish an arc-shaped housing from a *substantially* arc-shaped housing. *Id.* ¶261. The specification merely states that “[t]he housing 10 is *substantially* arc-shaped.” Ex. 1001, 3:20-21. While Figure 2 (reproduced below) depicts the inside surface of the housing 10 as being arc-shaped, nothing in the specification allows a POSITA to distinguish, even approximately, between a housing that is merely arc-shaped versus a housing that is *substantially* arc-shaped. Ex. 1002 ¶261.



The specification provides no guidance on what factors or characteristics can be used to measure the degree of “arc-ness” of a shape. Does *substantially* arc-shaped encompass designs where half of the inside surface of the housing is flat and the other half is arc-shaped? Or where the entire inside surface of the housing has a **shallow** concave shape? Or does this limitation require the entire inside of the housing to have a **deeper** concave shape? It is simply unclear to a POSITA which characteristic of the housing must be examined to determine the degree of “arc-ness” of a shape, making it impossible to determine or distinguish a *substantially* arc-shaped housing from a housing that is merely arc-shaped. *Id.* ¶262. Even if the relevant characteristic were ascertainable, the specification provides no way of *measuring* the degree of that characteristic to distinguish between a *substantially* and non-*substantially* arc shaped housing. *Id.*

While the Federal Circuit has cautioned that use of “substantially” does not automatically render a claim indefinite, it does so when the specification fails to provide a POSITA with sufficient guidance to determine the scope of the claim with **reasonable** certainty. *Sonix Tech. Co. v. Publishing Int’l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017). Here, the specification provides no guidance. Thus, one could not, with reasonable certainty, design a housing that is arc-shaped but not *substantially* arc-shaped. Ex. 1002 ¶262.

For these reasons, claim 16 is indefinite. *Substantially* arc-shaped is too nebulous to provide a POSITA with reasonable certainty as to the scope of the claim.

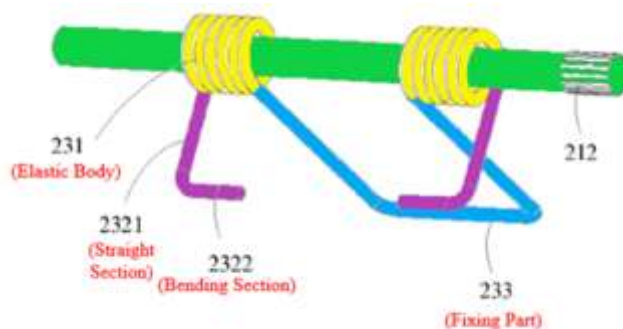
IX. GROUND 4: CLAIM 10 LACKS ENABLEMENT

Enablement is a legal determination of whether a patent enables one skilled in the art to make and use the claimed invention. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384 (Fed. Cir. 1986). To be enabling, a patent’s specification must “teach those skilled in the art how to make and use **the full scope** of the claimed invention without ‘undue experimentation.’” *ALZA Corp. v. Andrx Pharm., LLC*, 603 F.3d 935, 940 (Fed. Cir. 2010). However, a patent need not teach, and preferably omits, what is well-known in the art. *Streck, Inc. v. Research & Diagnostic Sys., Inc.*, 665 F.3d 1269, 1288 (Fed. Cir. 2012). Thus, an inventor need not explain every detail since he is speaking to those skilled in the art such that what amounts to conventional knowledge will be read into the disclosure. *In re Howarth*,

654 F.2d 103, 105 (CCPA 1981).

Claim 10 lacks enablement because the patent fails to enable ***the full scope*** of the claimed invention without undue experimentation. The lack of enablement stems from the requirement that the elastic member must have two butting parts that are “both *connected with* the elastic body” and both “butted against the first mounting member.” Ex. 1002 ¶264. That is, the two butting parts must be connected to **the same** elastic body and they must also both be butted against **the same** mounting member. *Id.*

The scope of the claim covering butting parts that are indirectly “connected with the elastic body” is embodied by the dual-body torsion spring of Figure 8 (partial, annotated below):



Specifically, left elastic body 231 (yellow) has a left butting part (purple) directly connected with it and a right butting part (purple) indirectly connected with it via the right elastic body (yellow) and fixing part 233 (blue). *Id.* ¶265. GSM does not contend that this claim scope lacks enablement, as it relies on a well-known dual-body torsion spring design. *Id.* (citing Ex. 1019, 12-13).

However, the full claim scope includes butting parts that are both directly “connected with the elastic body.” *Id.* ¶266. This is purportedly embodied by the single-body torsion spring of Figure 11 (annotated below):

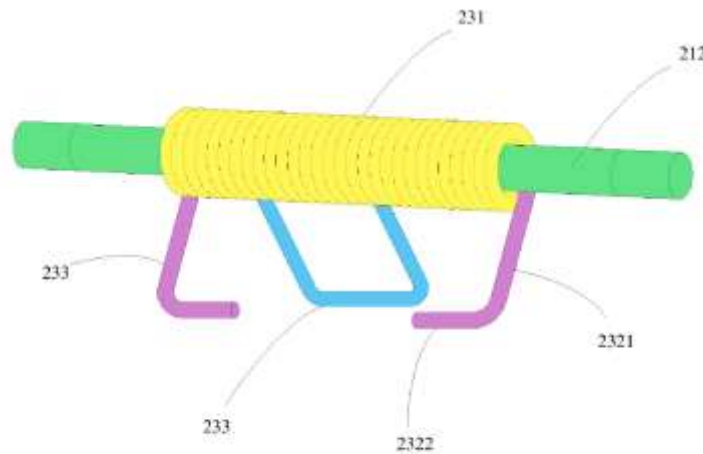


FIG. 11

It depicts two butting parts (purple) directly “connected with” the elastic body 231 (yellow) where both butting parts are “butted against the mounting member.” *Id.* (citing Ex. 1001, 6:29-44).¹³ A POSITA would not understand this embodiment to be enabled, which relies on a single-body torsion spring with a fixing part 233 (blue) that is mysteriously coming off of the back of the body. *Id.* This is not a conventional

¹³ There is an obvious error in Figure 11 based on the passage describing the figure. Specifically, the figure erroneously identifies the left butting part (purple) as element 233, even though the passage refers to element 233 as the “fixing part” and element 232 as the “butting parts.” A POSITA would understand based on the context of the passage that element 233 pointing to the left butting part should be labeled 232, and that element 233 is appropriately labeled the “fixing part.” Ex. 1002 ¶XX.

torsion spring design and a POSITA would be baffled as to how to manufacture or create the spring depicted in Figure 11. *Id.* Indeed, Figure 11 conceals the form of connection between the fixing part and body precisely because such a design is not feasible, as explained further below.

To understand why this design is not enabled, it is helpful to review conventional torsion spring designs. A single-body design is very common. *Id.* ¶267 (citing Ex. 1019, 12-13)). Figure 12 (annotated below) details such a conventional design:

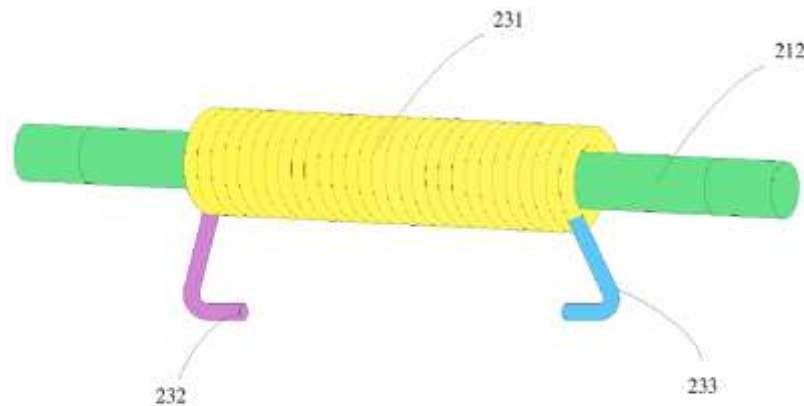


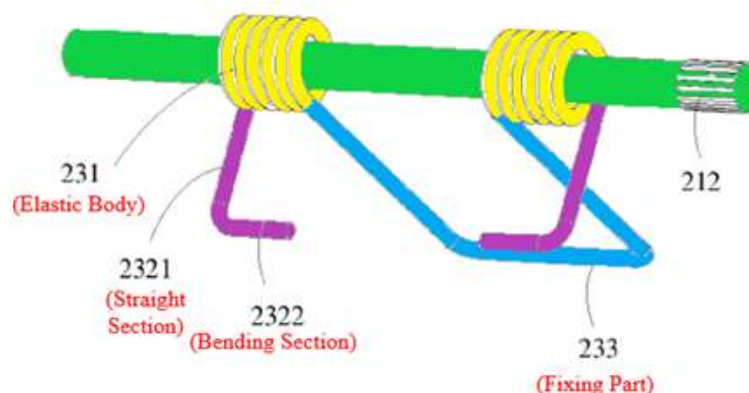
FIG. 12

It comprises an elastic member comprising a single-body 231 (yellow), butting part 232 (purple) that butts against the first mounting member and fixing part 233 (blue) fixed to the communication device housing. *Id.* Claim 10 cannot cover the Figure 12 embodiment because the claim requires two butting parts butted against the mounting member, while Figure 12 has only one “butting part” (232). *Id.* (citing Ex. 1001, 6:44-53). While element 233 (blue) looks identical to the “butting part” 232,

element 233 is the “fixing part” that is fixed to the communication device housing 10. *Id.*

As shown in Figure 12, a fundamental requirement for any torsion spring to function is that one portion of the spring (e.g., fixing part 233 in Fig. 11) is fixed relative to another portion (e.g., butting part 232 in Fig. 11) such that the spring is prevented from freely rotating about the pivot pin. *Id.* ¶268. Indeed, if both elements 232 and 233 of Figure 12 were butted against the mounting member, rotation of the mounting member would cause the **entire** spring to rotate about the pivot pin, as the spring would not be fixed to the housing to prevent this free rotation. *Id.* This means the spring would simply not function—it would not and could not provide a resilient or biasing force and the mounting member would simply “dangle” from the communication device housing without applying any clamping force. *Id.*

Another common torsion spring design is the dual-body design (also called “double torsion”). *Id.* ¶269 (citing Ex. 1019, 12-13). This design is embodied by the torsion spring of Figures 6-8 (annotated below):



The dual-body design also meets the fundamental requirement that the torsion spring be fixed, as it relies on two spaced apart spring bodies (left and right yellow windings) each directly connected to a butting part (purple) that butts against the mounting member, and directly connected with a fixing part (blue) that is fixed to the communication device housing. *Id.* Because the fixing part fixes the torsion spring to the housing, when force is applied to the mounting member the torsion spring does not freely rotate. *Id.*

The Figure 11 embodiment (annotated below), which is encompassed by claim 10, lacks enablement because the patent fails to convey to a POSITA how to make and use that embodiment. *Id.* ¶270. More specifically, the lack of enablement stems from the fact that the fixing part (blue) is mysteriously attached to the single-spring body (yellow):

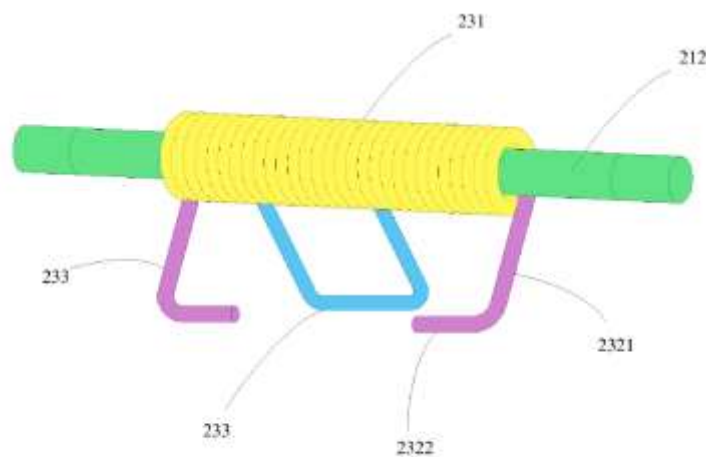


FIG. 11

Because of the perspective of the figure, the way the fixing part is somehow formed

from or connected to the spring is hidden. *Id.* The specification only vaguely teaches that the mounting assembly includes “a fixing part 233” that “can be located between the two butting parts 232.” Ex. 1001, 6:29-44. Thus, the patent fails to provide any guidance whatsoever as to how the spring shown in Figure 11 can be made or used. Ex. 1002 ¶270.

This is particularly problematic because a POSITA understood that torsion springs were formed of wire, which is formed into the desired spring design. *Id.* ¶271 (citing Ex. 1021, 1022, 1023). In practice, this is performed by machines that are continuously fed wire and quickly and efficiently form the wire into a particular design. *Id.* A POSITA understood that in both the conventional designs (the Figure 12 single-body design and the Figures 6-8 dual-body designs), the torsion spring necessarily begins as an unformed wire, and is then formed into the designs shown in those figures. This was and still is the well-understood way that springs are created, and a POSITA would readily understand that those two designs would easily be created this way. *Id.*

While a POSITA understood how to form the conventional designs from a single (strand of) wire, they would be baffled as to how to accomplish this with the single-body design of Figure 11. *Id.* ¶272. For example, the fixing part of Figures 6-8 is possible *because* there are two spaced apart bodies (yellow), and so the wire connecting those two bodies can be used to form the fixing part (blue). *Id.* In stark

contrast, there is only a single body in the Figure 11 design, and so it would be impossible to form the fixing part (blue) this conventional way. Indeed, if there was any space between windings in the body of Figure 11, there would be *two* spaced apart bodies rather than a single-body design and there would not be two butting parts directly connected with the same elastic body. *Id.*

A POSITA also understood that attaching a fixing part to the side of an elastic body as shown in Figure 11 would meaningfully alter the functionality of the spring. *Id.* ¶273. While there are many well-known and understood formulas and factors to consider when designing a torsion spring, there is no known formula or factor for designing a spring with a fixing part coming directly off of the spring body. *Id.* The specification of the '855 Patent does not provide any formulas, factors, or guidance to account for the fact that the fixing part would be applying a force directly to the side of the spring body, which would mean the spring could not be reliably designed based on conventional formulas and technical considerations. *Id.* Simply put, if the patentee wanted to enable its mysterious dual-body torsion spring design where *both* butting parts are connected to the mounting member and *both* butting parts are directly *connected with* the elastic body, it was required to provide enabling detail such as an illustration of the attachment of the fixing part to the single-body and written description explaining these technical considerations. Because it did not do so, for the reasons above, a POSITA would not understand the full scope of claim

10 to be enabled. *Id.*

X. GROUND 5: CLAIM 10 LACKS WRITTEN DESCRIPTION SUPPORT

The test for written description support is “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date” based on an “objective inquiry into the four corners of the specification.” *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). The written description requirement is satisfied when the specification “set[s] forth enough detail to allow a person of ordinary skill in the art to understand what is claimed and to recognize that the inventor invented what is claimed.” *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 928 (Fed. Cir. 2004). “[T]he level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology.” *Ariad Pharms.*, 598 F.3d at 1351. Factors used to evaluate the sufficiency of a disclosure include: 1) “the existing knowledge in the particular field”; 2) “the extent and content of the prior art”; 3) “the maturity of the science or technology”; and 4) “the predictability of the aspect at issue.” *Id.* “[T]he written description must lead a person of ordinary skill in the art to understand that the inventors possessed ***the entire scope*** of the claimed invention.” *Juno Therapeutics, Inc. v. Kite Pharma, Inc.*, 10 F.4th 1330 (Fed. Cir. 2021).

Claim 10 lacks written description because a POSITA would not understand the inventor to have possessed or invented the dual-body torsion spring embodiment of Figure 11. Ex. 1002 ¶274. As discussed for Ground 4, claim 10 plainly encompasses the embodiment depicted in Figure 11, but that embodiment is not enabled. See Section IX. While Figure 11 purports to depict the invention of claim 10, it conceals or hides the form of connection of the fixing part to the single-body. Given the lack of enablement and the fact that the form of connection is concealed, a POSITA would not have understood the inventor to have possessed the full scope of the claimed invention—including the embodiment of Figure 12. Ex. 1002 ¶274. Instead, a POSITA would instead conclude that the patentee simply added the fixing part to the Figure 11 single-body design to make it appear as if the fixing part was attached to the single-body in a functional and enabled way, even though the patentee did not actually possess or know how to create such an embodiment. *Id.*

XI. CONCLUSION

For the foregoing reasons, GSM requests that trial be instituted and that claims 1-19 of the '855 Patent be cancelled.

Dated: May 21, 2024

Respectfully submitted,

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Registration No. 67,272

CERTIFICATE OF SERVICE

I hereby certify that on this 15th day of May 2024, a copy of this Petition for Post Grant Review and GSM's Exhibits 1001–1024 were served pursuant to Federal Express on the following correspondence address of record for Patent Owner:

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Stephen D. Zinda

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24 *et seq.*, the undersigned certifies that this document complies with the type-volume limitations. This document, excluding the table of contents, mandatory notices, and certificates of service and compliance, contains 18,644 words as calculated by the word processing program used in creating it.

/Stephen D. Zinda/
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