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(72) Inventors:
 • **MØLLER, Mathias Rask**
DK-2765 Smørum (DK)
 • **SPORK, Emil Gram**
DK-2765 Smørum (DK)

(74) Representative: **William Demant**
Oticon A/S
Kongebakken 9
2765 Smørum (DK)

(71) Applicant: **Oticon A/S**
2765 Smørum (DK)

(54) **FILTER HANDLING TOOL**

(57) A filter handling tool configured to remove a filter from a receiver of a hearing aid and/or insert a new filter into the receiver, wherein the filter handling tool comprises a central portion provided with a receiving portion configured to receive and hold the receiver in a fixed position. The filter handling tool comprises a first lateral portion provided with an attachment structure for receiving the filter from the receiver or to contain a new filter to be inserted into the receiver. The first lateral portion is rotatably attached to the central portion. The central portion of attachment structure is configured to be brought into contact with the central portion of the receiving portion upon rotating the first lateral portion with respect to an axis of rotation.

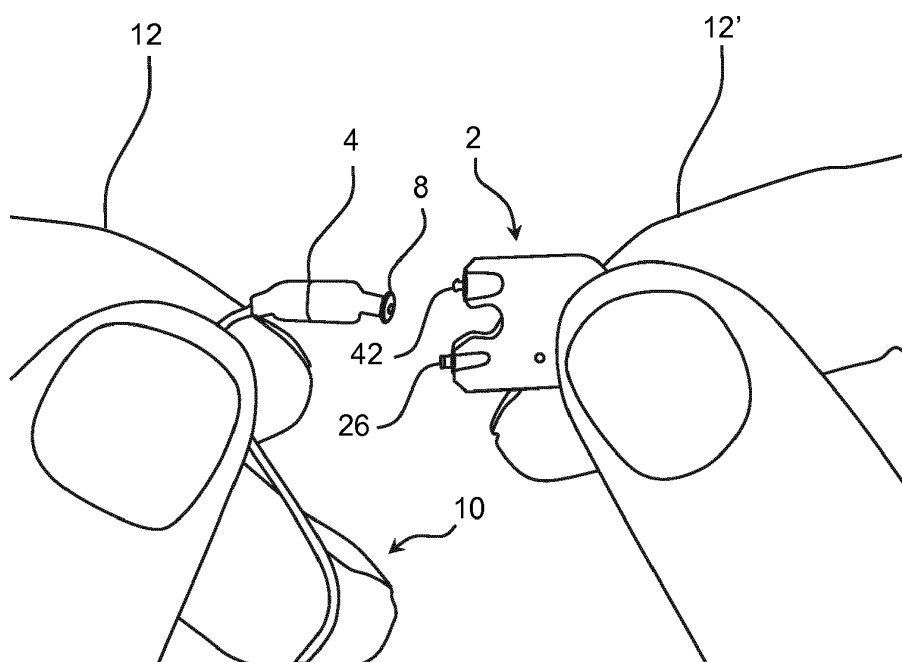


Fig.1A

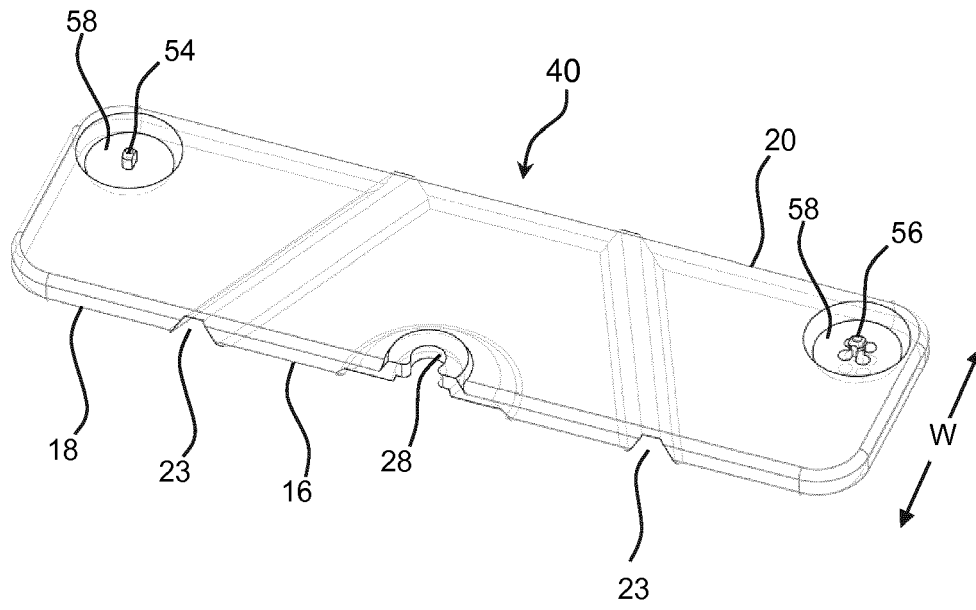


Fig.1B

Description

FIELD

[0001] The present disclosure relates to a filter handling tool configured to remove a filter (wax filter) from a receiver of a hearing aid and inserting a new filter into the receiver.

BACKGROUND

[0002] High precision, steady hands and good eyesight of the user is required when filters are changed by using prior art filter handling tools. This is challenging for the elderly users.

[0003] Therefore, it would be desirable to be able to provide an alternative filter handling tool that is less demanding with respect to user's eyesight and capability of providing high precision hand motions.

[0004] Accordingly, it is an object of the disclosure to provide a filter handling tool being less demanding with respect to user's eyesight and capability of providing high precision hand motions.

SUMMARY

[0005] According to an aspect of the disclosure, the filter handling tool is configured to be used by a hearing aid user and or a hearing care professional to remove a filter from a receiver of a hearing aid and/or insert a new filter into the receiver, wherein the filter handling tool comprises a central portion provided with a receiving portion configured to receive and hold the receiver in a fixed position, wherein the filter handling tool comprises a first lateral portion provided with an attachment structure for receiving the filter from the receiver or to contain a new filter to be inserted into the receiver, wherein the first lateral portion is rotatably attached to the central portion, wherein the central portion of the attachment structure is configured to be brought into contact with the central portion of the receiving portion upon rotating the first lateral portion with respect to an axis of rotation.

[0006] Hereby, it is possible to provide a filter handling tool being less demanding with respect to user's eyesight and capability of providing high precision hand motions. Thus, the filter handling tool solves the problem that high precision, steady hands and good eye-sight of the user is required when filters are changed by using prior art filter handling tools.

[0007] The use of predefined relative position between the attachment structure and the receiving portion eliminates the need for manual high-precision attachment.

[0008] According to another embodiment, the filter handling tool comprises a second lateral portion provided with an attachment structure for receiving the filter from the receiver or to contain a new filter to be inserted into the receiver, wherein the second lateral portion is rotatably attached to the central portion, wherein the central

portion of attachment structure is configured to be brought into contact with the central portion of the receiving portion upon rotating the second lateral portion with respect to an axis of rotation.

[0009] Hereby, it is possible to provide a filter handling tool that can be used both to remove a used filter and to insert a new filter, wherein the filter handling tool is less demanding with respect to user's eyesight and capability of providing high precision hand motions than the prior art filter handling tools.

[0010] According to a further embodiment, the first lateral portion is configured to be rotated about the axis of rotation extending along a bending zone constituting a hinge joint extending between the central portion and the first lateral portion and/or the second lateral portion is configured to be rotated about the axis of rotation extending along a bending zone constituting a hinge joint extending between the central portion and the second lateral portion.

[0011] Application of a bending zone provides a reliable and high-precision rotation of the lateral portion relative to the central portion.

[0012] According to an even further embodiment, the first lateral portion is configured for receiving the filter and the second lateral portion is configured for holding a new filter, wherein the first lateral portion and the second lateral portion are hinged at opposing sides of the central portion.

[0013] Hereby, it is possible to provide a filter handling tool that is easy to use. The old filter can be removed by using the first lateral portion, whereas the new filter can be inserted by using the second lateral portion.

[0014] According to an even further aspect, the first lateral portion is configured for receiving the filter and the second lateral portion is configured for holding a new filter, wherein the first lateral portion and the second lateral portion are hinged at adjacent sides of the central portion.

[0015] Hereby, it is possible to provide a filter handling tool that is user-friendly, wherein the old filter can be removed by using the first lateral portion, whereas the new filter can be inserted by using the second lateral portion.

[0016] According to another aspect, the axes of the bending zones extend parallel to each other. Hereby, it is possible to provide a filter handling tool that can be used on both sides.

[0017] According to a further aspect, the axes of the bending zones are angled relative to each other. Hereby, it is possible to arrange the attachment structures in the corner region of the lateral portions and the receiving portion near the edge of the central portion of the filter handling tool.

[0018] It may be an advantage that the angle between the axes of the bending zones are within the range of 20-90 degrees, preferably between 25-55 degrees such as approximately 40 degrees.

[0019] According to a further embodiment, the distance from the central portion of the attachment structure

in the first lateral portion to the axis of rotation of the bending zone corresponds to the distance from the central portion of the receiving portion to the axis of rotation (the longitudinal axis of the bending zone) and/or the distance from the central portion of the attachment structure in the second lateral portion to the axis of rotation (the longitudinal axis) of the bending zone corresponds to the distance from the central portion of the receiving portion to the axis of rotation (longitudinal axis) of the bending zone. Hereby, it is possible to position the attachment structures in an accurate manner relative to the central portion of the receiving portion when the lateral portions are rotated with respect to the bending zones.

[0020] According to another embodiment, the distance from the central portion of the attachment structure in the first lateral portion to the axis of rotation (longitudinal axis) of the bending zone corresponds to the distance from the central portion of the attachment structure in the second lateral portion to the axis of rotation (longitudinal axis) of the bending zone. This embodiment can be produced in a manner in which the filter handling tool is symmetric.

[0021] According to a further embodiment, the bending zone has a smaller thickness than the adjacent structures of the central portion and lateral portion. Hereby, it is possible to provide a simple and reliable joint about which it is possible to rotate the lateral portion(s) relative to the central portion.

[0022] According to an even further embodiment, the attachment structure is a protruding structure. Hereby, it is possible to attach a new filter and an old filter (to be replaced) by using the attachment structure.

[0023] According to another embodiment, the protruding structure is surrounded by a recessed structure. Hereby, it is possible to keep track of the filter when removing it from the attachment structure. The recessed portion will prevent the filter from rolling off the lateral portion. According to an even further aspect, the thickness of the bending zone(s) is 0.1-0.3 mm, such as approximately 0.2 mm.

[0024] According to another embodiment, the width (W) of the bending zone(s) is 0.2-1.8 mm, preferably 0.8-1.4 mm such as approximately 1.0 mm. Hereby, it is possible to provide a bending zone that is strong enough to be used to rotate the lateral portion relative to the central portion and at the same time allows for carrying out the rotation in an easy and smooth manner.

[0025] According to an even further embodiment, the filter handling tool is a one-piece body. Hereby, it is possible to ease the production of the filter handling tool and keep the production price low.

[0026] According to another embodiment, the receiving structure comprises a circular arched portion having a radius of 0.6-1.4 mm, preferably 0.8-1.2 mm such as approximately 1.0 mm. Hereby, it is possible to provide a filter handling tool that fits the filter to be replaced.

[0027] The system according to the disclosure is a system comprising a filter handling tool according to the disclosure and a hearing aid.

BRIEF DESCRIPTION OF DRAWINGS

[0028] The embodiments of the disclosure may be best understood from the following detailed description taken in conjunction with the accompanying figures. The figures are schematic and simplified for clarity, and they just show details to improve the understanding of the claims, while other details are left out. Throughout, the same reference numerals are used for identical or corresponding parts. The individual features of each aspect may each be combined with any or all features of the other aspects. These and other aspects, features and/or technical effect will be apparent from and elucidated with reference to the illustrations described hereinafter in which:

Fig. 1A shows a prior art filter handling tool configured to remove a filter from a receiver of a hearing aid. It can be seen that high precision, steady hands and good eye-sight of the user is required when filters are changed by using prior art filter handling tools;

Fig. 1B shows a perspective view of a filter handling tool according to an embodiment of the disclosure;

Fig. 2A shows a perspective view of a filter handling tool according to an embodiment of the disclosure in a first configuration;

Fig. 2B shows a perspective view of the filter handling tool shown in Fig. 2A, in a second configuration;

Fig. 2B shows a perspective view of the filter handling tool shown in Fig. 2A, in a second configuration;

Fig. 2C shows a perspective view of the filter handling tool shown in Fig. 2A, in a third configuration;

Fig. 2D shows a perspective view of the filter handling tool shown in Fig. 2A, in a fourth configuration;

Fig. 2E shows a perspective view of the filter handling tool shown in Fig. 2A, in a fifth configuration;

Fig. 2F shows a perspective view of the filter handling tool shown in Fig. 2A, in a sixth configuration;

Fig. 3A shows a perspective view of the filter handling tool shown in Fig. 2A, in a seventh configuration;

Fig. 3B shows a perspective view of the filter handling tool shown in Fig. 2A, in an eighth configuration;

Fig. 3C shows a perspective view of the filter handling tool shown in Fig. 2A, in a ninth configuration;

Fig. 3D shows a perspective view of the filter handling tool shown in Fig. 2A, in a tenth configuration;

Fig. 3E shows a perspective view of a filter handling tool according to an embodiment of the disclosure;

Fig. 4A shows a close-up view of a demounting pin of the filter handling tool shown in Fig. 1B;

Fig. 4B shows another view of the demounting pin shown in Fig. 4A;

- Fig. 4C shows a close-up view of a mounting pin of the filter handling tool shown in Fig. 1B;
 Fig. 4D shows another view of the mounting pin shown in Fig. 4C;
 Fig. 5A shows a perspective view of a filter handling tool according to an embodiment of the disclosure;
 Fig. 5B shows a close-up view of a portion of the filter handling tool shown in Fig. 5A and
 Fig. 5C shows a perspective view of the filter handling tool shown in Fig. 5A in another configuration.

DETAILED DESCRIPTION

[0029] The detailed description set forth below in connection with the appended drawings is intended as a description of various configurations. The detailed description includes specific details for the purpose of providing a thorough understanding of various concepts. However, it will be apparent to those skilled in the art that these concepts may be practised without these specific details.

[0030] A hearing device may include a hearing aid that is adapted to improve or augment the hearing capability of a user by receiving an acoustic signal from a user's surroundings, generating a corresponding audio signal, possibly modifying the audio signal and providing the possibly modified audio signal as an audible signal to at least one of the user's ears. The "hearing device" may further refer to a device such as an earphone or a headset adapted to receive an audio signal electronically, possibly modifying the audio signal and providing the possibly modified audio signals as an audible signal to at least one of the user's ears. Such audible signals may be provided in the form of an acoustic signal radiated into the user's outer ear, or an acoustic signal transferred as mechanical vibrations to the user's inner ears through bone structure of the user's head and/or through parts of middle ear of the user or electric signals transferred directly or indirectly to cochlear nerve and/or to auditory cortex of the user.

[0031] The hearing device is adapted to be worn in any known way. This may include i) arranging a unit of the hearing device behind the ear with a tube leading airborne acoustic signals into the ear canal or with a receiver/loudspeaker arranged close to or in the ear canal such as in a Behind-the-Ear type hearing aid, and/ or ii) arranging the hearing device entirely or partly in the pinna and/ or in the ear canal of the user such as in an In-the-Ear type hearing aid.

[0032] In general, a hearing device includes i) an input unit such as a microphone for receiving an acoustic signal from a user's surroundings and providing a corresponding input audio signal, and/or ii) a receiving unit for electronically receiving an input audio signal. The hearing device further includes a signal processing unit for processing the input audio signal and an output unit for providing an audible signal to the user in dependence on the processed audio signal.

[0033] The input unit may include multiple input microphones, e.g. for providing direction-dependent audio signal processing. Such directional microphone system is adapted to enhance a target acoustic source among a multitude of acoustic sources in the user's environment. In one aspect, the directional system is adapted to detect (such as adaptively detect) from which direction a particular part of the microphone signal originates. This may be achieved by using conventionally known methods. The signal processing unit may include amplifier that is adapted to apply a frequency dependent gain to the input audio signal. The signal processing unit may further be adapted to provide other relevant functionality such as compression, noise reduction, etc. The output unit may include an output transducer such as a loudspeaker/ receiver for providing an air-borne acoustic signal transcutaneously.

[0034] Now referring to Fig. 1A, which illustrates a prior art filter handling tool 2 configured to remove a filter 26 from a receiver 4 of a hearing aid. When applying the current (prior art) method of changing filters 26, one uses the small prior art filter handling tool 2 shown in Fig. 1A after having pulled it out of its packaging (not shown). The prior art filter handling tool 2 comprises two protrusions 42, a first protrusion 42 for removing the filter that needs to be replaced and one for mounting the new filter 26, wherein a new filter 26 is already attached to the second protrusion.

[0035] The receiver (speaker unit) 4 is held by the fingers 12 of one hand and the art filter handling tool 2 is held by the fingers 12' of the other hand. The user now has to insert the protrusion 42 into the centre of the filter to be replaced and being arranged in the receiver 4. This action takes a +/- 0.3 mm precision. When the protrusion 42 has been successfully inserted into the centre of the filter to be replaced, the filter to be replaced is fixed to the filter handling tool 2 that hereafter can be pulled out of the receiver 4 in order to remove the filter to be replaced.

[0036] Now the user has to position the new filter 26 into the centre of the receiver 4 by using the filter handling tool 2. This requires a +/- 0.2 mm precision. Moreover, the filter handling tool 2 is sensitive to the angle (relative to the longitudinal axis of the filter 26) at which the filter handling tool 2 is withdrawn/pulled back when the new filter 26 has been attached to the receiver 4. If the filter handling tool 2 is pulled back at an angle to longitudinal axis of the filter 26, the filter 26 will remain fixed to the filter handling tool 2 and not be attached to the receiver 4 as intended.

[0037] Thus, high precision, steady hands and good eye-sight of the user is required when a filter 26 needs to be changed by using prior art filter handling tool 2. Accordingly, changing the filter 26 is especially hard for the elderly hearing aid users. Therefore, the disclosure aims for providing an alternative that reduces or even eliminates these drawbacks of the prior art.

[0038] Fig. 1B illustrates a perspective view of a filter

handling tool 40 according to an embodiment of the disclosure. The filter handling tool 40 comprises a plate-shaped central portion 16 and a first lateral portion 18 and a second lateral portion 20 rotatably attached thereto by means of hinge structures provided by means of indentations 23 extending along the width W of the central portion 16. The hinge structures are angled relative to each other. In one embodiment according to the disclosure, the angle between the hinge structures is 30-50 degrees, preferably approximately 40 degrees. In one embodiment, the hinge structures are symmetrically arranged with respect to the central portion 16.

[0039] The first lateral portion 18 is provided with a hole 58, in which a mounting pin 54 for holding a new filter to be attached to a receiver of hearing aid is centrally arranged. The second lateral portion 20 is provided with a hole 58, in which a demounting pin 56 for attaching a filter to be replaced is centrally arranged.

[0040] In one embodiment the hole 58 is a Ø2 mm hole. It may be an advantage that the holes 58 are placed near the edges of the first lateral portion 18 and the second lateral portion 20, respectively, to provide easy access.

[0041] Fig. 2A illustrates a perspective view of a filter handling tool 40 according to an embodiment of the disclosure in a first configuration. Fig. 2B illustrates a perspective view of the filter handling tool 40 shown in Fig. 2A, in a second configuration. Fig. 2C illustrates a perspective view of the filter handling tool 40 shown in Fig. 2A, in a third configuration. Fig. 2D illustrates a perspective view of the filter handling tool 40 shown in Fig. 2A, in a fourth configuration. Fig. 2E illustrates a perspective view of the filter handling tool 40 shown in Fig. 2A, in a fifth configuration. Fig. 2F illustrates a perspective view of the filter handling tool 40 shown in Fig. 2A, in a sixth configuration. Fig. 3A shows a perspective view of the filter handling tool shown in Fig. 2A, in a seventh configuration. Fig. 3B illustrates a perspective view of the filter handling tool 40 shown in Fig. 2A, in an eighth configuration. Fig. 3C illustrates a perspective view of the filter handling tool 40 shown in Fig. 2A, in a ninth configuration and Fig. 3D illustrates a perspective view of the filter handling tool 40 shown in Fig. 2A, in a tenth configuration.

[0042] The filter handling tool 40 comprises a plate-shaped central portion 16, a plate-shaped first lateral portion 18 and a second plate-shaped lateral portion 20. The first lateral portion 18 and the second lateral portion 20 are rotatably attached to the central portion 16 by means of hinge structures provided as bending zones extending along the width of the central portion 16. The hinge structures extend parallel to each other. In a preferred embodiment, the first lateral portion 18 and the second lateral portion 20 are symmetrically arranged relative to the central portion 16.

[0043] The first lateral portion 18 is provided with an attachment structure 24 configured to receive a filter to be replaced by a new one. The second lateral portion 20 is provided with a new filter (a wax-filter) 24 attached to a holding structure (e.g. a mounting pin) provided on the

second lateral portion 20.

[0044] The user holds the filter handling tool 40 in his hands by the fingers 12 of the first hand and the fingers 12' of the second hand. The central portion 16 is provided with a notch 22 comprising a receiving portion 28 allowing a receiver 4 to be inserted therein, for detaching the filter of the receiver 4 in order to replace the filter with the new filter 26. A tube 10 is attached to the receiver 4 for coupling the receiver 4 to a hearing aid (not shown).

[0045] The filter handling tool 40 may be constructed as a one-piece body. The filter handling tool 40 may be made in a plastic material e.g. through injection moulding.

[0046] As it will be explained with reference to the figures Fig. 2A-Fig. 3D, the filter handling tool 40 is configured to be used for mounting and demounting a filter in a manner that necessitates only few requirements to the user's ability to see or precisely operate miniature devices. The workflow goes as follows:

In Fig. 2A, the receiver 4 is being inserted into the centrally arranged receiving portion 28 of the filter handling tool 40. In Fig. 2B, the receiver 4 has been inserted into the receiving portion 28 of the filter handling tool 40.

[0047] In Fig. 2C and Fig. 2D, the first lateral portion 18 is rotated towards the central portion 16 in order to insert the attachment structure 24 (see Fig. 2A and Fig. 2B) into the receiving portion 28 of the filter handling tool 40 to attach the filter to be replaced to the attachment structure 24 of the filter handling tool 40. In a preferred embodiment, a clicks sound is generated when the attachment structure 24 is inserted into the receiving portion 28 of the filter handling tool 40. Hereby, the user can hear, when the attachment process has been accomplished.

[0048] In Fig. 2E and Fig. 2F the filter handling tool 40 is being opened and unfolded. As it can be seen in Fig. 2F, the old filter 8 has been removed is now attached to the attachment structure 24 of the first lateral portion 18 of the filter handling tool 40. At the second lateral portion 20 a new filter 26 is attached to a centrally arranged attachment structure of the second lateral portion 20.

[0049] In Fig. 3A and Fig. 3B the second lateral portion 20 is rotated and pressed towards the central portion of the filter handling tool 40 in order to attach the new filter 26 to the receiver 4.

[0050] In Fig. 3C and Fig. 3D, the new filter 26 has been attached to the receiver 4 and the attachment structure 44 of the second lateral portion 20 to which the filter 26 was attached, is visible. In a preferred embodiment, the filter handling tool 40 is disposable. Accordingly, the entire filter handling tool 40 including the contaminated filter 24 can be disposed.

[0051] The workflow of changing filters using the filter handling tool 40 according to the disclosure is easier to use. This is especially an advantage for elderly because the filter handling tool has lower requirements with respect to eyesight, dexterity and precision of the user.

[0052] Fig. 3E illustrates a perspective view of a filter handling tool 40 according to an embodiment of the dis-

closure. The filter handling tool 40 comprises a plate-shaped central portion 16. A first lateral portion 18 is rotatably attached to a first edge (end portion) of the central portion 16. A second lateral portion 20 is rotatably attached to a second edge (end portion) of the central portion 16. The second edge is positioned adjacent to the first edge to which the first lateral portion 18 is attached of the central portion 16.

[0053] The central portion 16 is provided with a U-shaped notch 22 that is provided with a receiving portion 28 arranged and configured to receive a filter to be replaced. The first lateral portion 18 is provided with an attachment structure 24 arranged and configured to be inserted into the central portion of the receiving portion 28 when the first lateral portion 18 is rotated as indicated with the dotted arrow. The second lateral portion 20 is provided with a centrally arranged attachment structure 30 configured and arranged to be inserted into the central portion of the receiving portion 28 when the second lateral portion 20 is rotated as indicated with the dotted arrow.

[0054] Fig. 4A illustrates a close-up view of a demounting pin 56 of the filter handling tool shown in Fig. 1B and Fig. 4B illustrates another view of the demounting pin in Fig. 4A. The demounting pin 56 has four prongs 70 evenly distributed along the circumference of the demounting pin 56. A recess 63 is provided between each adjacent set of prongs 70. The demounting pin 56 comprises a flat top portion 62. Four parallel bores 60 are provided next to and in extension of the body portion of the demounting pin 56. The demounting pin 56 is centrally arranged in a hole 58 and has an arched surface 66 provided next to the top portion 62.

[0055] In one embodiment, the demounting pin 56 protrudes on both sides of the second lateral portion (see Fig. 1B) and thus extends through the entire thickness of the second lateral portion. Hereby, it is possible to provide a two-sided filter handling tool.

[0056] In one embodiment, the diameter of the demounting pin 56 is 0.5-1.5 mm such as approximately 1.0 mm e.g. 1.02 mm. In one embodiment, the height of the demounting pin 56 is 0.5-1.5, such as approximately 1.0 mm.

[0057] Fig. 4C illustrates a close-up view of a mounting pin 54 of the filter handling tool shown in Fig. 1B and Fig. 4D illustrates another view of the mounting pin 54 shown in Fig. 4C. The mounting pin 54 does not have prongs but comprises two parallel planar surfaces (sides cuts) 64 and two arched side structures 68 extending therebetween. The mounting pin 54 comprises a flat top portion 62 and an arched surface 66 provided next to the top portion 62.

[0058] In one embodiment, the diameter (the thickest width) of the mounting pin 54 is 0.5-1.5 mm, preferably approximately 0.94 mm. The two parallel planar surfaces (sides cuts) 64 facilitates slippage of a filter. Hereby, it is possible to ensure that filter detaches from the filter-handling tool and mounts to the receiver.

[0059] Fig. 5A illustrates a perspective view of a filter

handling tool 40 according to an embodiment of the disclosure. Fig. 5B illustrates a close-up view of a portion of the filter handling tool 40 shown in Fig. 5A and Fig. 5C illustrates a perspective view of the filter handling tool 40 shown in Fig. 5A in a configuration, in which the lateral portions 18, 20 of the filter handling tool 40 have been rotated towards the central portion 16 of the filter handling tool 40.

[0060] The filter handling tool 40 comprises a central plate-shaped portion 16, a first lateral portion 18 rotatably attached to a first edge (end portion) of the central portion 16 and a second lateral portion 20 is rotatably attached to a second edge (end portion) of the central portion 16 by means of bending zones 32, 34 provided next to indentations 23 extending along the width of the central portion 16 of the filter handling tool 40.

[0061] The bending zone 34 of the first lateral portion 18 extends along a longitudinal axis Y. Likewise, the bending zone 32 of the second lateral portion 20 extends along a longitudinal axis X. The longitudinal axes X, Y extend parallel to each other.

[0062] The second edge is positioned in the opposite end of the central portion 16 than the first edge to which the first lateral portion 18 is attached of the central portion 16. The

[0063] An attachment structure 24 is provided near the end portion of the first lateral portion 18 in a distance L_4 from the longitudinal axis Y of the bending zone 34, by which the first lateral portion 18 is rotatably attached to the central portion 16. Likewise, another attachment structure 30 is provided near the end portion of the second lateral portion 20 in a distance L_5 from the longitudinal axis X of the bending zone 32, by which the second lateral portion 20 is rotatably attached to the central portion 16.

[0064] A U-shaped notch 22 is provided in the central portion 16. A receiving portion 28 is arranged in the proximal end of the U-shaped notch 22. It can be seen that the distance L_2 from the central portion of the receiving portion 28 to the longitudinal axis Y of the bending zone 34 equals the distance L_3 from the central portion of the receiving portion 28 to the longitudinal axis X of the bending zone 32. Moreover, in order to ensure that the attachment structure 24 is inserted into the central portion of the receiving portion 28, the distance L_4 corresponds to the distance L_2 . Likewise, in order to ensure that the attachment structure 30 is inserted into the central portion of the receiving portion 28, the distance L_3 corresponds to the distance L_5 .

[0065] In Fig. 5B it can be seen that the radius R_1 of motion of the attachment structure 24 corresponds to the distance L_4 and the distance L_2 . Likewise, it can be seen that the radius R_2 of motion of the attachment structure 30 corresponds to the distance L_3 and the distance L_5 .

[0066] Fig. 5C illustrates that the bending zone 32 extends between a first non-bending zone 36 and a second non-bending zone 38. The thickness T_2 of the non-bend-

nig zones 36, 38 is larger than the thickness T_1 of the bending zone 32 due to the depth of the indentation 23 provided in the filter handling tool 40. The filter handling tool 40 may be moulded in plastic e.g. by using a two-sided moulding tool.

[0067] It should be noted that the embodiment described herein in relation to the filter handling tool, could be integrated into e.g. a packaging kit, where the filter handling tool could be provided as a part of the packaging kit. That is new filters could be provided with the handling tool in a packaging, such that an easy removal tool is provided together with the new filters.

[0068] Furthermore, it should be noted that the filter handling tool is intended to be used for changing more than just one filter. That is, when the handling tool is in a first state, a new filter is arranged in the first lateral portion. Upon attaching this new filter to the receiver, the handling tool may be configured such that a second new filter can be reloaded into the first lateral portion, whereby a second new filter can be attached to a hearing aid.

List of reference numerals

[0069]

2	Prior art filter handling tool
4	Receiver (speaker unit)
6	Protrusion
8	Filter
10	Tube
12, 12'	Finger
14	Filter (to be replaced)
16	Central portion
18	First lateral portion
20	Second lateral portion
22	Notch
23	Indentation
24	Attachment structure
26	Filter
28	Receiving portion
30	Attachment structure
32	Bending zone
34	Bending zone
36	Non-bendnig zone
38	Non-bendnig zone
40	Filter handling tool
42	Protrusion
44	Recessed portion
46	Hole
48	Concave surface
50	Top surface
52	Barbed portion
54	Mounting pin
56	Demounting pin
58	Hole
60	Bore
62	Top portion
63	Recess

64	Planar surface
66	Arched surface
68	Arched side structure
70	Prong
5 W	Width
X	Longitudinal axis
Y	Longitudinal axis
L_1	Width
L_2, L_3, L_4, L_5	Distance/length
10 T_1, T_2	Thickness

Claims

1. A filter handling tool configured to remove a filter from a receiver of a hearing aid and/or insert a new filter into the receiver, wherein the filter handling tool comprises a central portion provided with a receiving portion configured to receive and hold the receiver in a fixed position, wherein the filter handling tool comprises a first lateral portion provided with an attachment structure for receiving the filter from the receiver or to contain a new filter to be inserted into the receiver, wherein the first lateral portion is rotatably attached to the central portion, wherein the central portion of attachment structure is configured to be brought into contact with the central portion of the receiving portion upon rotating the first lateral portion with respect to an axis of rotation.
2. A filter handling tool according to claim 1, wherein the filter handling tool comprises a second lateral portion provided with an attachment structure for receiving the filter from the receiver or to contain a new filter to be inserted into the receiver, wherein the second lateral portion is rotatably attached to the central portion, wherein the central portion of attachment structure is configured to be brought into contact with the central portion of the receiving portion upon rotating the second lateral portion with respect to an axis of rotation.
3. A filter handling tool according to claim 1 or 2, wherein the first lateral portion is configured to be rotated about the axis of rotation extending along a bending zone constituting a hinge joint extending between the central portion and the first lateral portion and/or the second lateral portion is configured to be rotated about the axis of rotation extending along a bending zone constituting a hinge joint extending between the central portion and the second lateral portion.
4. A filter handling tool according to claim 3, wherein the first lateral portion is configured for receiving the filter and the second lateral portion is configured for holding a new filter, wherein the first lateral portion and the second lateral portion are hinged at opposing sides of the central portion.

5. A filter handling tool according to one of the preceding claims 3-4, wherein the axis of the bending zones extend parallel to each other.
6. A filter handling tool according to one of the preceding claims 3-4, wherein the axes of the bending zones are angled relative to each other. 5
7. A filter handling tool according to one of the preceding claims 3-6, wherein the distance from the central portion of the attachment structure in the first lateral portion to the axis of rotation of the bending zone corresponds to the distance from the central portion of the receiving portion to the axis of rotation and/or the distance from the central portion of the attachment structure in the second lateral portion to the axis of rotation of the bending zone corresponds to the distance from the central portion of the receiving portion to the axis of rotation of the bending zone. 10
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8. A filter handling tool according to claim 6, wherein the distance from the central portion of the attachment structure in the first lateral portion to the axis of rotation of the bending zone corresponds to the distance from the central portion of the attachment structure in the second lateral portion to the axis of rotation of the bending zone. 25
9. A filter handling tool according to one of the preceding claims 3-5, wherein the bending zone has a smaller thickness than the adjacent structures of the central portion and lateral portion. 30
10. A filter handling tool according to one of the preceding claims, wherein the attachment structure is a protruding structure. 35
11. A filter handling tool according to claim 10, wherein the protruding structure is surrounded by a recessed structure. 40
12. A filter handling tool according to one of the preceding claims 9-10, wherein the thickness of the bending zone(s) is 0.1-0.3 mm, such as approximately 0.2 mm. 45
13. A filter handling tool according to claim 12, wherein the width of the bending zone(s) is 0.6-1.8 mm, preferably 0.8-1.4 mm such as approximately 1.0 mm. 50
14. A filter handling tool according to one of the preceding claims, wherein the receiving structure comprises a circular arched portion having a radius of 0.6-1.4 mm, preferably 0.8-1.2 mm such as approximately 1.0 mm. 55
15. A system comprising a filter handling tool according to one of the preceding claims and a hearing aid.

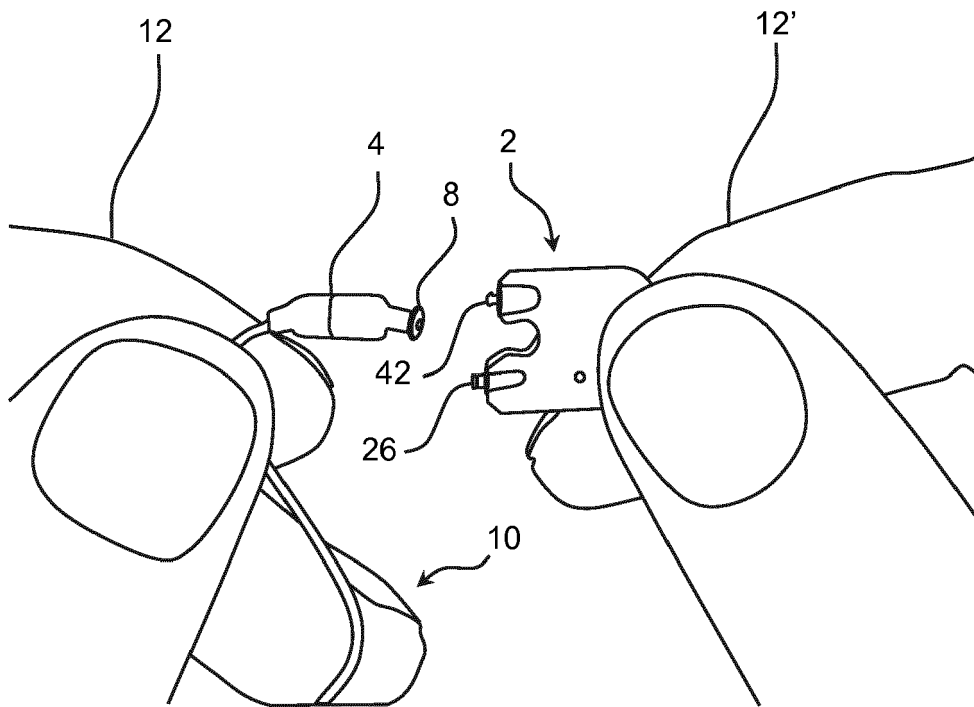


Fig.1A

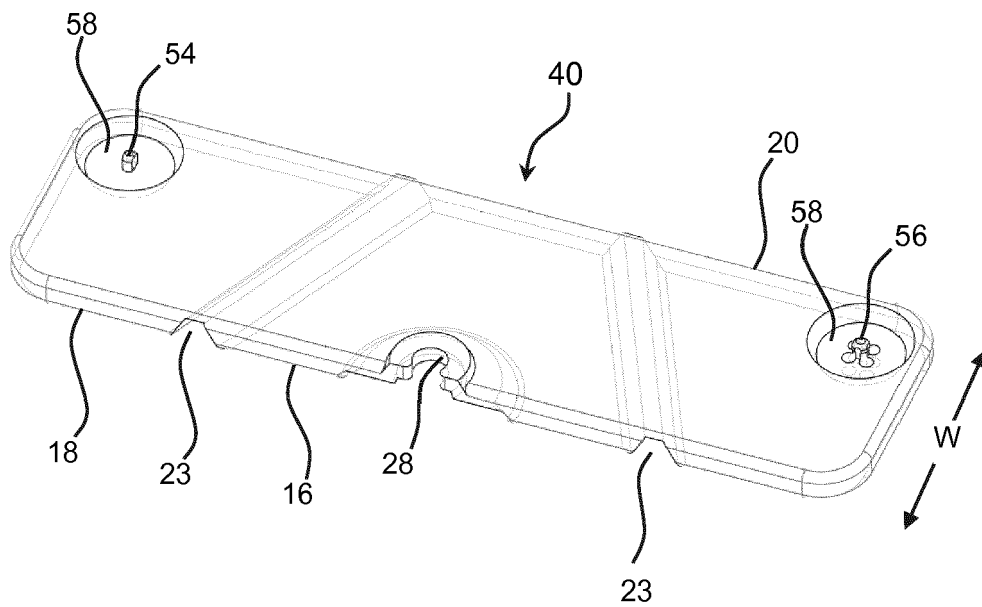


Fig.1B

Fig. 2A

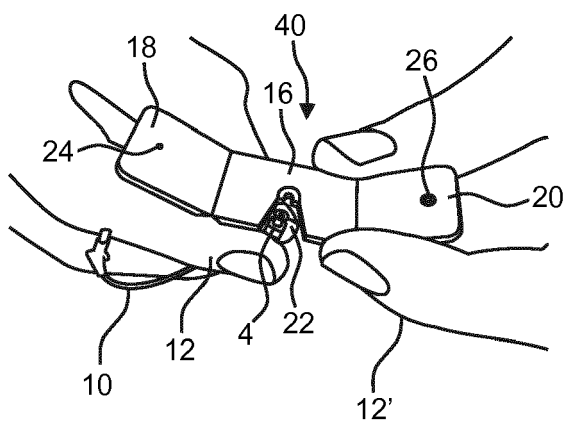


Fig. 2B

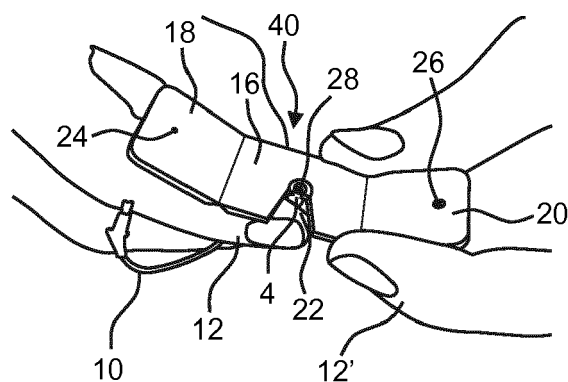


Fig. 2C

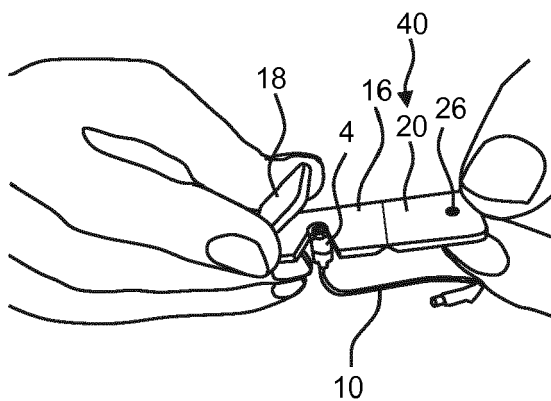


Fig. 2D

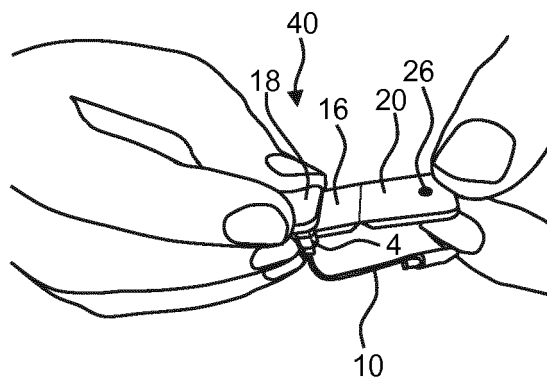


Fig. 2E

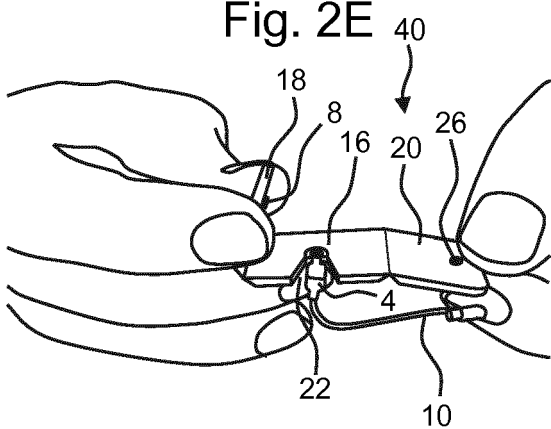


Fig. 2F

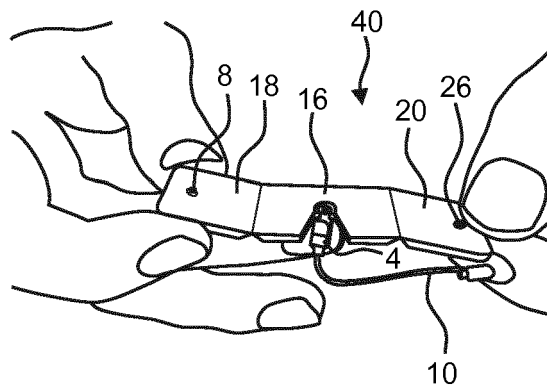


Fig. 3A

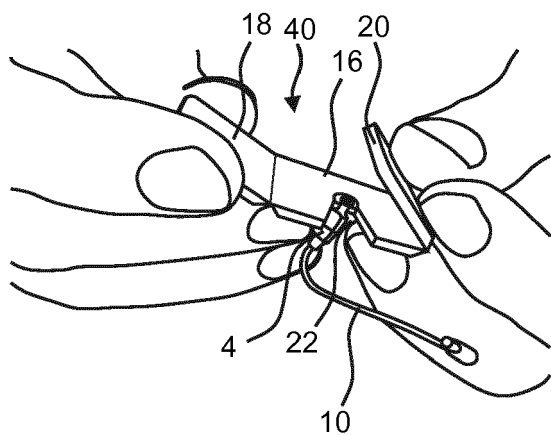


Fig. 3B

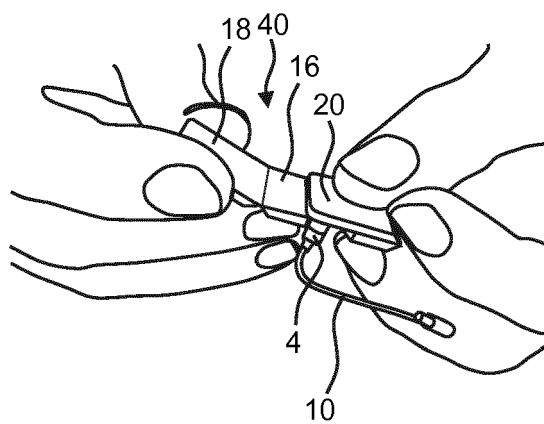


Fig. 3C

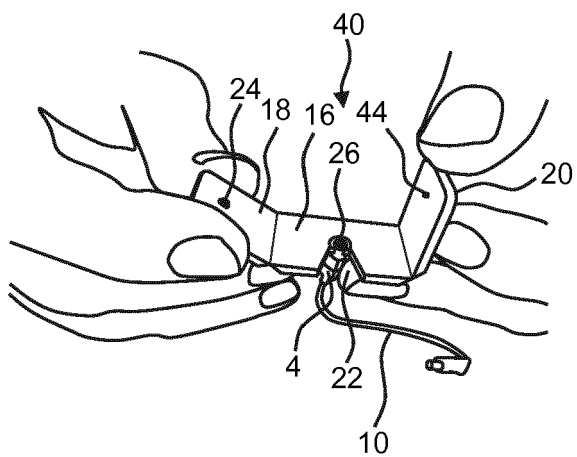


Fig. 3D

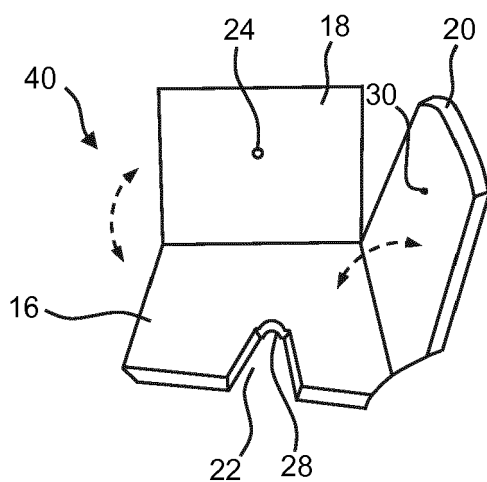
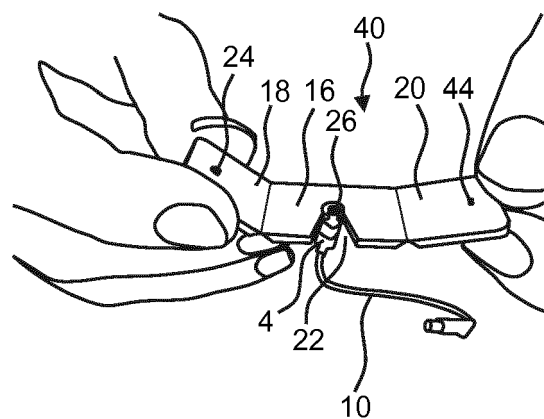
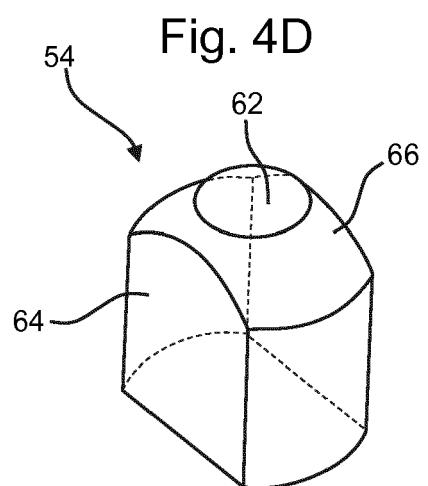
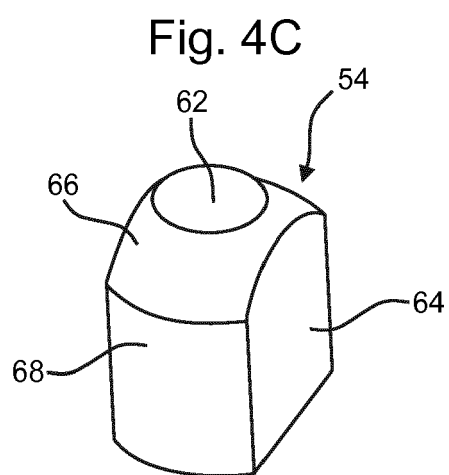
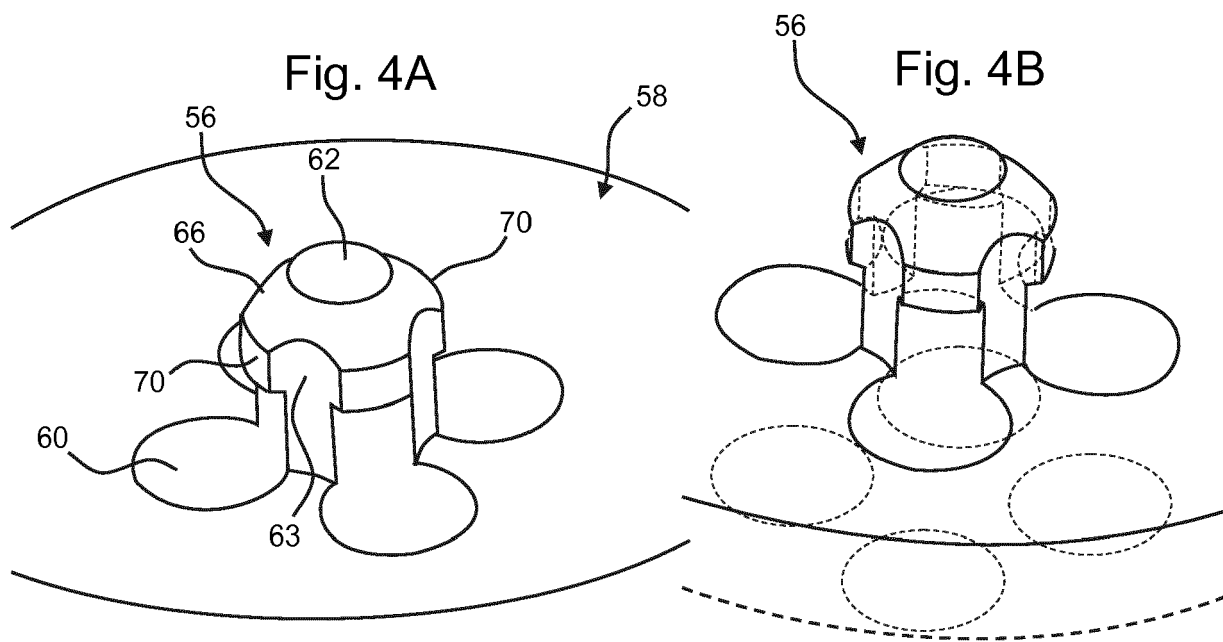


Fig. 3E



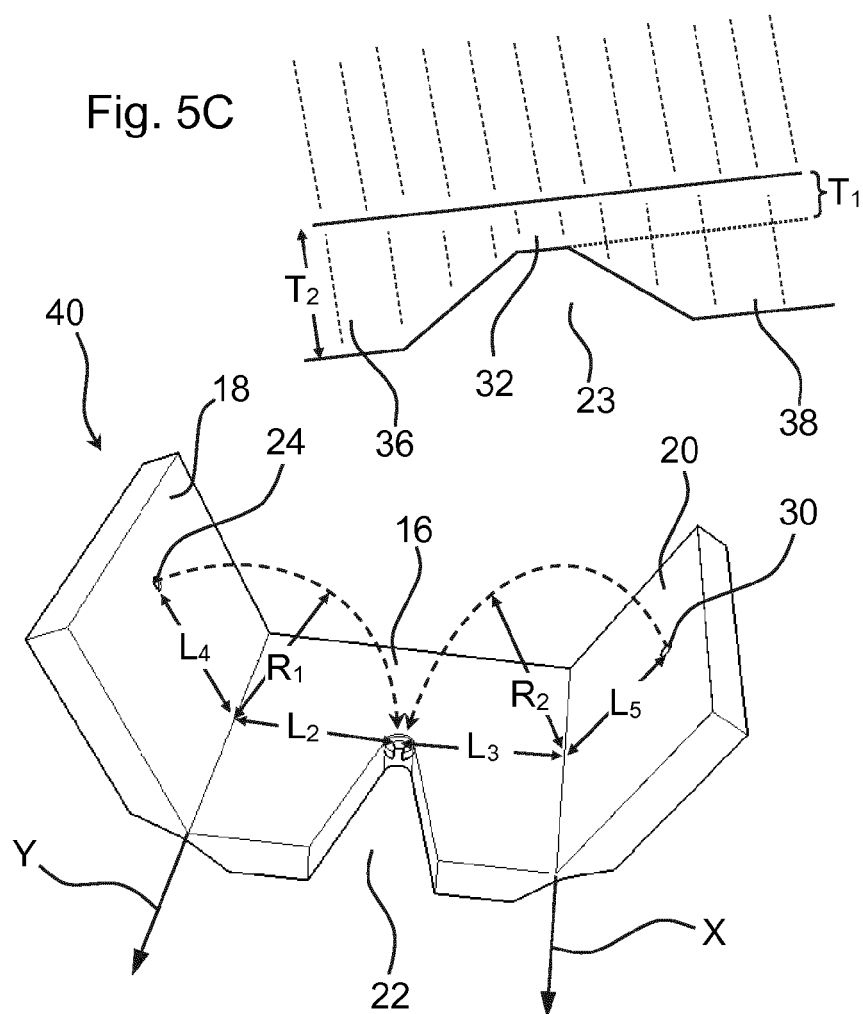
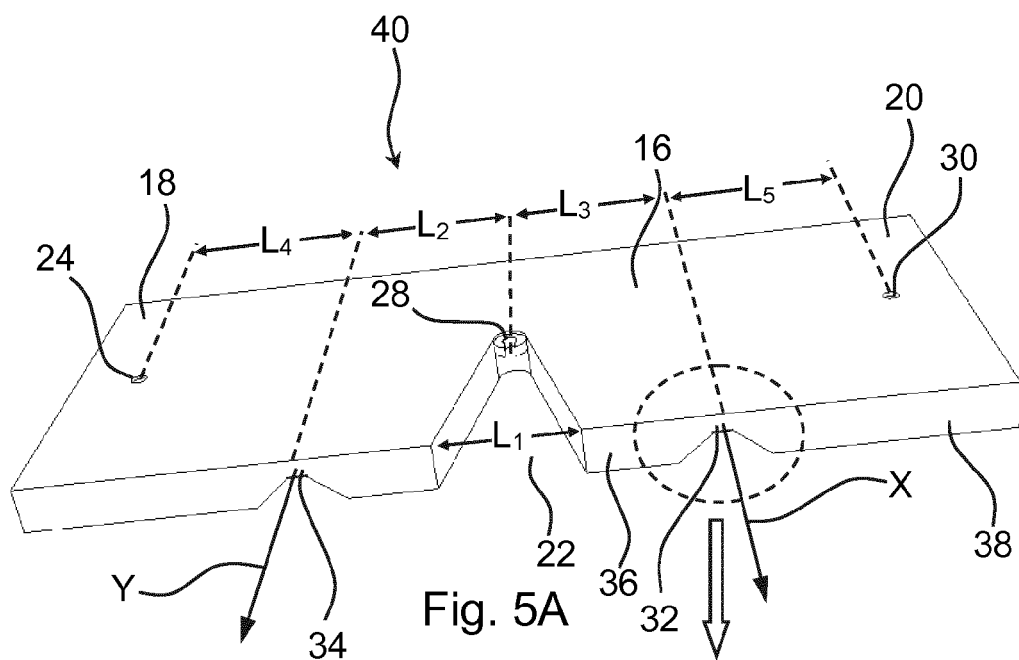
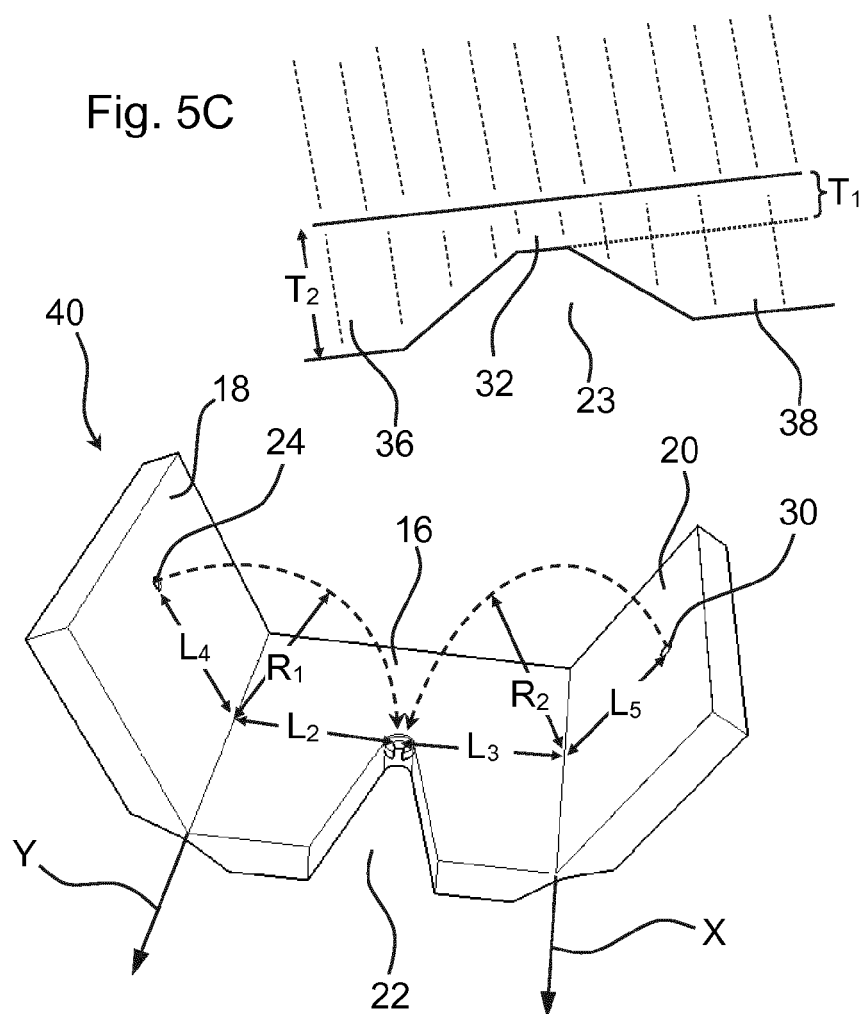


Fig. 5C





EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 September 2018	Examiner Fülöp, István
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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