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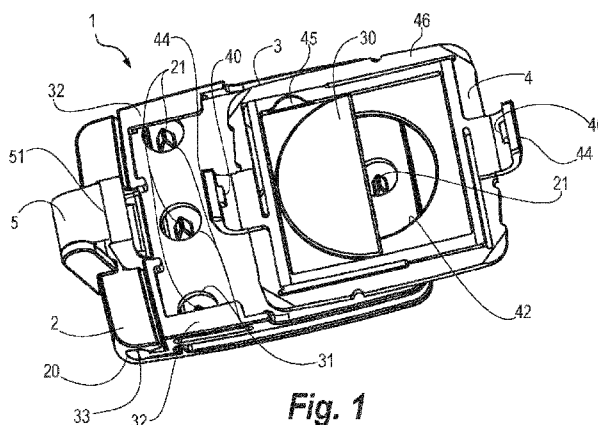


Fig. 1

(57) Abstract: An attachment means (1) for a hearing aid accessory (6) comprises an attaching part (4) for holding the hearing aid accessory (6). The attaching part (4) may slide between a rotating position and a fixed position relative to a front part (3), where the attaching part (4) may rotate 360° about a pivot axis in the rotating position, where the attaching part (4) may be placed in the fixed position in one of four angular orientations relative to the front part (3). A clip pivot (20, 33, 35) allows the front part (3) to rotate with respect to a back part (2), thus forming a lockable clip. The back part (2) has a plurality of protrusions (21) for engaging a corresponding plurality of holes (31) in the front part (3), the clip being lockable in a closed position by a locking part (5) pivotally attached to the back part (2). The attachment means (1) enables fixing a hearing aid accessory (6) to a piece of clothing during use in a controlled orientation with respect to one or two hearing aids optimizing wireless communication between the hearing aid accessory (6) and the hearing aids.



DEVICE FOR ATTACHING A HEARING AID ACCESSORY TO A CLOTHING ITEM

This invention relates to accessories for hearing aids. More specifically it relates to means for attaching and fixing a wireless hearing aid accessory to a piece of clothing.

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In this context, a hearing aid is to be understood as a tiny device configured to be worn on or in the ear of a person suffering from a hearing impairment. The hearing aid comprises one or more microphones for picking up acoustic signals from the surroundings and converting them into electrical signals, a means for amplifying the electrical signals from the microphones according to the users' prescription, and an output transducer for converting the amplified electrical signals back into acoustical signals for the purpose of reproduction to the hearing-impaired person. The means for amplifying the electrical signals from the microphones is preferably embodied as a digital signal processor due to the high flexibility, small size and modest power requirements that digital signal processors have over comparable analog circuitry. Apart from the microphones, a hearing aid may also comprise means for picking up various electromagnetic signals, e.g. signals from a telecoil loop antenna, a remote control or the like.

Contemporary hearing aids may comprise means for communicating wirelessly with external accessories present in close proximity to the hearing aids, i.e. wireless receivers, transmitters and antennas. A receiver in such a hearing aid may be configured for receiving signals from an external accessory such as a remote control or from another hearing aid worn on or in the other ear of the user. A transmitter in such a hearing aid is preferably used for communicating information to another hearing aid worn on or in the other ear of the user with due consideration of transmitter power limitations dictated by the capacity and proposed life expectancy of the battery. The antennas in hearing aids of this type are preferably directional antennas embodied as tiny coils invisibly encased within the hearing aids. External hearing aid devices, hereinafter denoted external hearing aid accessories, are provided in a variety of configurations for different purposes.

A wireless hearing aid accessory incorporates transmitters and antenna coils for wireless communication and may further include various capabilities, e.g. a remote

control for allowing the hearing aid user to conveniently operate the hearing aids, an input means for an audio reproduction device such as an MP3-player for the purpose of transmitting an audio signal from the audio reproduction device to the hearing aids, or an FM receiver for picking up an FM signal, e.g. from an external microphone unit
5 comprising a microphone for picking up speech and other sounds from a distance of a few meters from the hearing aids, and an FM transmitter for transmitting the microphone signals as an FM signal to the FM receiver for retransmission to the hearing aids. It may also comprise a relaying transceiver configured for picking up wireless signals transmitted from a piece of equipment using a dedicated transmitter
10 operating according to one wireless transmission scheme and retransmitting the signals to the hearing aids according to another wireless transmission scheme.

A relaying transceiver may, for instance, be configured for picking up wireless signals from a mobile telephone using the Bluetooth® transmission protocol and
15 retransmitting the signals to the hearing aids utilizing a wireless hearing aid transmission protocol, in effect transforming the hearing aids into a mobile telephone headset. It may also be configured for picking up a wireless signal transmitted from a dedicated transmitter connected to e.g. a home entertainment system such as a television set. This transmitter may have an effective transmission range of e.g. ten
20 meters but may be incapable of communicating with the hearing aids directly, necessitating the presence of a relaying transceiver within close proximity of the hearing aids and capable of retransmitting a wireless signal from the dedicated transmitter connected to the television set and to the hearing aids during use.

25 In this context, “close proximity” means a distance of between 5 centimeters and one meter. In order to secure proper and error-free communication between the hearing aids and an external hearing aid accessory, the maximum distance of one meter is not to be exceeded during use. Due to the configuration of the antenna coils in the hearing aids transmission to the hearing aids is also substantially directional and thus highly
30 sensitive to the spatial orientation of the hearing aid accessory in relation to the hearing aids. If, for instance, the hearing aid accessory is placed in a shirt pocket during use, its orientation may change considerably as the user moves around, thus deteriorating the signal strength and compromising the quality of the received signals.

Through the increased use of wireless hearing aid accessories together with hearing aids a need has arisen for means for holding the hearing aid accessory in a fixed distance and orientation with respect to the hearing aids during use. One solution is to provide the hearing aid accessory with a lead or lanyard going round the neck of the hearing aid user, the hearing aid accessory thus hanging in the lanyard and being worn like a necklace during use. This solution has several disadvantages, e.g. the lanyard of the hearing aid accessory being prone to entanglement or the hearing aid accessory dangling excessively in the lanyard with detrimental effect to the wireless signal quality. For safety reasons, such a lanyard is also unsuitable for use with e.g. hearing-impaired children.

A more suitable way of holding the hearing aid accessory in a fixed distance and orientation with respect to the hearing aids would be some kind of attachment means for attaching the hearing aid accessory to a piece of garment, e.g. a button lining, a shirt pocket or a collar worn during use. Such an attachment means should be easy to use without any previous training and should be capable of being fixed securely to the piece of garment it is attached to without destroying the fabric. Ideally, it should be possible to alter the configuration of the attachment means in order to change the orientation of the hearing aid accessory as needed in a controllable manner. Some form of locking mechanism should preferably be integrated into the attachment means in order to prevent unintended changes in the orientation of the hearing aid accessory during use. Preferably, the attachment means should be capable of attaching to any garment material ranging from heavy fabric like fleece or wool to lighter materials such as silk or synthetic fabric without leaving any permanent marks or deteriorations in the garment.

US2616985 discloses a body-worn hearing instrument intended to be carried in a pocket during use. The hearing instrument comprises a microphone concealed as a button suitable for being worn protruding e.g. through a buttonhole in a lapel or a pocket of a jacket or similar piece of garment. Although this configuration may prevent the hearing instrument from moving around in the pocket it does not counteract e.g. rotation about the axis of the exposed microphone. Such a configuration would therefore not be suited for the attachment of a transmitter due to the directionality problem discussed in the foregoing.

WO-A2-2011/091797 discloses a body-worn hearing aid device embodied as an elongated object resembling a pen. The elongated hearing aid housing comprises a clip, such as a pen clip, for attachment to the rim of a pocket or a similar part of a
5 suitable piece of garment. This configuration is disadvantageous for use with a wireless hearing aid accessory for two reasons. Firstly, the configuration is unsuitable for a horizontal fitting, i.e. the clip is only capable of holding the hearing aid securely in place if positioned vertically. Secondly, the configuration is rather inflexible with respect to interchangeability, say, between a first external unit capable of
10 communicating with a mobile telephone and a second unit capable of receiving and relaying signals from a television set.

US4084299 discloses a garment clip for use as a laundry clip or fixed to one end of a suspender or the like. The clip is preferably manufactured from a synthetic material
15 such as polypropylene, ABS, polycarbonate or similar material. The clip comprises an upper part and a lower part rotationally connected by a pivot, a locking device rotationally connected to the lower part by the same pivot and a spring for keeping the clip open when the locking device is opened. The garment clip does not have means for altering the orientation of the clip, e.g. about an axis perpendicular to the pivot.

20 Men's shirts and jackets are usually buttoned left side over right while women's shirts and jackets are usually buttoned right side over left, at least in the Western culture. The inventor has realized that this difference has a significant influence on the configuration of a wireless hearing aid accessory mounted in an attachment means
25 intended for fixing on a piece of garment such as a shirt. During use, the external device must have a particular orientation with respect to the hearing aids. In other words, if e.g. an external device is mounted in an attachment means having its clip opening to the left for fixing to a man's shirt, it would be positioned in an upside-down orientation if it were to be fixed to a woman's blouse, which is buttoned to the
30 opposite side, consequently compromising the signal quality.

One might imagine two different types of attachment means to be manufactured, one for men's shirts and one for women's shirts. Due to the logistic complications of stocking such mirrored attachment means and the reduced flexibility of placing the

attachment means to various parts of different pieces of clothing while maintaining correct orientation of the external device with respect to the hearing aids, this solution is not favored. If, on the other hand, the attachment means were to have means for altering the orientation of the external device while mounted in the attachment means, such a solution would be preferred.

According to the invention an attachment means for fixing a hearing aid accessory to a piece of garment is devised, said attachment means comprising a back part, a front part, an attaching part and a locking part, wherein the back part has means for pivotally engaging corresponding means embodied in the front part, the back part and the front part together embodying a clip, the locking part having means for securing the clip by fixing the front part in a closed position with respect to the back part, the attaching part having means for holding a hearing aid accessory, means for connecting to the front part in such a way that the attaching part may be rotated with respect to the orientation of the front part, and means for fixing the attaching part in one of a plurality of different orientations with respect to the orientation of the front part. This provides a hearing aid user with a convenient way of fastening a wireless hearing aid accessory to e.g. a clothing item such as a shirt or a blouse or the like in a way which enables easy operation of the hearing aid accessory while maintaining proper orientation and a sufficiently short distance from the hearing aids worn by the hearing aid user.

Further features and advantages of the attachment means according to the invention are apparent from the dependent claims.

In a preferred embodiment, the attachment means according to the invention comprises an attaching part for attaching the attachment means to a hearing aid accessory, a front part connected to the attaching part in such a way that the attaching part may perform a sliding motion between a fixed position in alignment with the attaching part and a rotating position displacing the center of the attaching part approximately one third of its length away from the fixed position. When the attaching part is in its rotating position, the attaching part may be rotated 360° around an attaching pivot in 90° steps with respect to the front part. A back part is connected to the front part on a clip pivot placed at one edge of the front part and the back part,

and the front part may swing about said clip pivot with respect to the back part from an angle of 0° in a first, closed position to an angle of approximately 15° in a second, open position. The front part and the back part of the attachment means thus embody a clip for fixing the attachment means to a piece of garment. An L-shaped locking part
5 is mounted on a locking pivot on the edge of the back part and may swing from an unlocked position to a locked position with respect to the back part. In the locked position, a portion of the locking part acts as a resilient lever, engaging in a locking action with a portion of the front part, thus preventing the front part from moving with respect to the back part when the locking part is in the locked position. The locking
10 part thus constitutes a means for locking the clip during use.

The attaching part of the attachment means has at least two protruding locking members for engaging corresponding recesses in the enclosure of an accessory for a hearing aid. The front part comprises a plurality of equidistantly spaced holes or
15 recesses for engaging a corresponding plurality of protrusions embodied in the back part whenever the front part is in its closed position, the front part and the back part of the attachment means thus forming the upper and the lower part of a clip for fixing the attachment means to a piece of garment. The protrusions in the back part preferably have a rounded shape suitable for engaging the corresponding holes through the fabric
20 of the garment without marring or destroying the fabric during use, and may, in a preferred embodiment, be arranged in rows where each row has a length inversely proportional to the distance of that particular clip row from the clip pivot. Apart from said plurality of protrusions, the front part comprises an accessory holder stop for having a recess for engaging one of the protruding locking members of the attaching
25 part and a member substantially perpendicular to the plane of the front part for engaging the portion of the locking part that is parallel to the front part whenever the locking part is in its locked position.

When the attaching part is in the fixed position, the attaching part is prevented from
30 rotating about the attaching pivot. Only when the attaching part is slid to the rotating position, it may rotate around the attaching pivot with respect to the front part in steps of 90° to attain one of four unique positions, 0° , 90° , 180° or 270° , respectively. The attaching part may then be locked in one of these four positions by sliding the attaching part back into the fixed position in the front part. When placed in the

attachment means, the hearing aid accessory may then be oriented in one of four different orientations with respect to the orientation of the attachment means.

The invention will now be described in more detail with reference to the drawings,
5 where

fig. 1 is a perspective view of an embodiment of an attachment means for a hearing aid accessory according to the invention;

fig. 2 is an exploded perspective view of the individual parts embodying the attachment means shown in fig. 1;

10 fig. 3 is a side view of the attachment means shown with the clip in a closed position;

fig. 4 is a side view of the attachment means shown with the clip in an open position;

fig. 5 is a perspective back view of a hearing aid accessory mounted in the attachment means;

15 fig. 6 is a perspective front view of a hearing aid accessory mounted in the attachment means; and

fig. 7 is a schematic front view of a hearing aid accessory mounted in the attachment means and fixed to a blouse.

Fig. 1 shows an embodiment of an attachment means 1 for a hearing aid accessory
20 (not shown in fig. 1) according to the invention. The attachment means 1 comprises a back part 2 and a front part 3, the back part 2 and the front part 3 together constituting a clip for attaching the attachment means 1 to a piece of garment or the like, an attaching part 4, and a locking part 5. The individual parts of the attachment means 1 are preferably made from a durable type of thermoplastic material such as
25 polyoxymethylene (POM) due to the high resistance against abrasion and long-term creep which this material possesses. The attaching part 4 comprises two oppositely disposed accessory holders 44, each having an accessory holder locking protrusion 40 for engaging corresponding recesses in a hearing aid accessory (not shown) and an attaching pivot hole 42. The front part 3 comprises an attaching pivot 30 for engaging
30 the attaching pivot hole 42 in the attaching part 4, a pair of sliding pockets 32, and a plurality of clip holes 31. The back part 2 comprises a clip pivot hole 20 and a plurality of clip protrusions 21 for engaging the corresponding plurality of clip holes 31 of the front part 3 of the attachment means 1 when the front part 3 is rotated about the axis of the clip pivot hole 20.

The attaching part 4 is capable of rotating about the axis of the attaching pivot pin 30 and may slide along said attaching pivot 30 into a fixed position in the pair of sliding pockets 32. When the attaching part 4 slides into the fixed position, the edges of a sliding frame 46 engages the pair of sliding pockets 32 in the front part 3, securing the attaching part 4 against rotational movement in the fixed position.

When the attaching part 4 is slid fully into a fixed position in the pair of sliding pockets 32, said pair of sliding pockets 32 prevents the attaching part 4 from rotating about the axis of the attaching pivot 30. The back part 2 and the front part 3 constitutes a clip lockable in a closed position by turning the locking part 5 about a locking part pivot (not shown in fig. 1). When the clip is in the closed position, a locking edge 51 of the locking part 5 may engage an accessory holder stop 34 of the front part 3 in a resilient manner by turning the locking part 5 from an unlocked position to a locked position, thus preventing the front part 3 of the attachment means 1 from moving with respect to the back part 2. When the clip is locked in this manner, the plurality of clip protrusions 21 of the back part 2 engages the corresponding plurality of clip holes 31 in the front part 3 providing a clip capable of applying a firm grip onto a wide range of different types of fabric, thus allowing the attachment means 1 to be conveniently and securely fastened and worn on many different pieces of garment while holding a hearing aid accessory. The attachment means 1 makes it possible for hearing aid users to carry wireless hearing aid accessories with them at all times while keeping the hearing aid accessories within a sufficiently short distance and correctly oriented with respect to the hearing aids.

When the locking part 5 is turned from the locked position to the unlocked position, the clip of the attachment means 1 may be opened by turning the back part 2 away from the front part 3 about the axis of a clip pivot comprised of a clip pivot end 33 embedded in the clip pivot hole 20.

Fig. 2 is an exploded view of the attachment means 1 shown in fig. 1 showing the individual parts including the back part 2, the front part 3, the attaching part 4 and the locking part 5. The back part 2 comprises a locking pivot pin 22 protruding from a locking pivot flange 23 of the back part 2 for forming a locking pivot joint with a

locking pivot hole 50 in the locking part 5. The front part 3 comprises the clip pivot end 33 and a clip pivot pin 35 for engaging the clip pivot hole 20 in the back part 2 for forming a clip pivot joint enabling the back part 2 and the front part 3 to operate as a clip for attachment to a piece of garment or the like. The front part 3 also comprises
5 the attaching pivot 30 for engaging the attaching pivot hole 42 in the attaching part 4 for forming an attaching pivot joint enabling both a rotational and a sliding movement of the attaching part 4 with respect to the front part 3.

The attaching pivot 30 of the front part 3 has a short stem (not shown) holding the
10 visible part of the attaching pivot 30 at a distance from the remaining part of the front part 3, said distance being sufficient to allow the attaching part 4 to slide freely under the visible part of the attaching pivot 30. The attaching part 4 has a sliding frame 46 for engaging the two sliding pockets 32 in the front part 3. The visible part of the attaching pivot 30 preferably has a substantially semicircular shape having a diameter
15 somewhat larger than the diameter of the attaching pivot hole 42 in the attaching part 4 in order to secure the attaching part 4 to the front part 3 while allowing both rotational and sliding movement of the attaching part 4 with respect to the front part 3. In order to ease placement of the attaching part 4 on the attaching pivot 30 of the front part 3 during assembly of the attachment means 1, a small mounting recess 45 is
20 preferably disposed at the inner edge of the attaching pivot hole 42 of the attaching part 4. During assembly, the attaching part 4 is oriented in such a way that a first corner of the semicircular attaching pivot 30 fits into the mounting recess 45. A second, opposite corner of the semicircular attaching pivot 30 may now pass through the attaching pivot hole 42 of the attaching part 4, and when the first corner of the
25 semicircular attaching pivot 30 is pulled out of the mounting recess 42, the attaching part 4 is now held in place on the front part 3 by the attaching pivot 30 in a way that allows for both a sliding movement and a swiveling of the attaching part 4 with respect to the front part 3, the attaching part 4 and the front part 3 moving along parallel planes.

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The attaching part 4 may swivel or rotate 360° about the attaching pivot 30 with respect to the front part 3. In four rotational orientations of the attaching part 4, i.e. 0°, 90°, 180° and 270°, respectively, the attaching part 4 may slide from a rotating position into a fixed position in the front part 3 by engaging the edges of the sliding

frame 46 of the attaching part 4 and the two sliding pockets 32 of the front part 3. In the orientations of 0° and 180°, respectively, one of the two accessory holders 44 of the attaching part 4 engages the accessory holder stop 34 at the edge of the front part 3 when the sliding frame 46 of the attachment part 4 is slid into the two sliding pockets 32 of the front part 3. In the orientations of 90° and 270°, respectively, the two accessory holders 44 of the attaching part 4 merely protrudes from the sides of the attachment means 1 when the sliding frame 46 of the attachment part 4 is slid into the locked position in the two sliding pockets 32 of the front part 3.

10 When assembling the back part 2 and the front part 3 of the attachment means 1, the clip pivot pin 35 of the front part 3 is slid behind a clip pivot guide 26 of the back part 2 and into the clip pivot hole 20 guided by the clip pivot end 33. When the back part 2 is in place, a pivot guiding recess 25 in the back part 2 engages the back part of the accessory holder stop 34 of the front part 3, thus preventing the front part 3 from sliding out of the back part 2. In this position, the front part 3 may rotate about 15° in the clip pivot, enabling opening and closing of the clip of the attachment means 1.

The back part 2 and the front part 3 embody a clip intended for attaching the attachment means 1 to a piece of clothing. When the clip is in the closed position, the plurality of clip protrusions 21 of the back part 2 engages the corresponding plurality of clip holes 31 in the front part 3 in a way which ensures a secure grip on the piece of clothing the attachment means 1 is attached to without running the risk of deforming or ripping up the fabric of the clothing, e.g. if the attachment means 1 is accidentally pulled off while it is fixed to the garment. This is a direct result of the configuration of the clip protrusions 21, which have substantially rounded tips extending into the clip holes 31 when the clip is in the closed position.

The locking part 5 is mounted on the locking pivot pin 22 on the locking pivot flange 23 of the back part 2 through the locking pivot hole 50 of the locking part 5, the locking pivot pin 22 and the locking pivot hole 50 forming a locking pivot for locking the clip of the attachment means 1. When the locking part 5 is rotated clockwise about the locking pivot (as seen from the general viewing angle in fig. 2) by turning a locking handle 52 of the locking part 5 towards the back part 2, i.e. into the locked position, the locking edge 51 of the locking part 5 operates as a lever engaging the

back of the accessory holder stop 34 of the front part 3 in a resilient manner. This prevents the front part 3 from rotating about the clip pivot for as long as the locking part 5 stays in the locked position. If the locking handle 52 is turned counterclockwise (as seen from the general viewing angle in fig. 2), i.e. into the unlocked position, the locking edge 51 of the locking part 5 is released from its engagement to the accessory holder stop 34, thus enabling the front part 3 to rotate freely about the clip pivot again for as long as the locking part 5 is in the unlocked position.

The clip of the attachment means 1 allows fixing the attachment means 1 to a piece of clothing when the locking part 5 is placed in the locked position. The sliding frame 46 of the attaching part 4 is allowed to slide free of the two sliding pockets 32 into the rotating position while the clip is fixed to a piece of clothing. In the rotating position, the attaching part 4 may rotate 360° about the attaching pivot 30 while the clip is fixed to a piece of clothing. When the attaching part 4 is slid into the fixed position in the sliding pockets 32, the attaching part 4 cannot rotate with respect to the front part 3 of the attachment means 1.

Fig. 3 is a side view of the embodiment of the attachment means 1 for a hearing aid accessory shown in fig. 1 and fig. 2 with the clip in the closed position, the attaching part in the rotating position and the locking part 5 in the locked position. In this position, the attachment part 4 of the attachment means 1 may rotate about the axis of the attaching pivot 30 and the clip may hold firmly onto a piece of garment. The back part 2 shows some of the plurality of clip protrusions 21 extending partly into the corresponding clip holes 31 (not shown) of the front part 3. The attaching part 4 is shown in the extended position and rotated 0° about the attaching pivot 30 of the front part 3. The two accessory holders 44 of the attaching part 4 expose the accessory holder locking protrusions 40 for holding a hearing aid accessory (not shown). In the locked position, the locking edge 51 of the locking part 5 is engaging the accessory holder stop 34 of the front part 3. In the locked position, the locking part 5 prevents the front part 3 from rotating about the axis of the clip pivot pin 35 with respect to the back part 2, i.e. it prevents the clip from opening.

As may be learned from figs. 1, 2 and 3, the relative thickness of the attachment means 1 when the clip is in the closed position is approximately one third of the width

and one quarter of the length of the attachment means 1. This relationship of one to three to four results in a relatively large contact surface between the back side of the back part 2 and the piece of garment the attachment means 1 is fixed onto, and thus improves resistance to e.g. torsional movement of the attachment means 1.

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Fig. 4 is a side view of the embodiment of the attachment means 1 for a hearing aid accessory shown in fig. 1 and fig. 2 with the clip in the open position, the attaching part 4 in the fixed position and the locking part 5 in the unlocked position. In this position, the attaching part 4 is slid completely into the two sliding pockets 32 of the front part 3, and the back part 2 is rotated approximately 15° about the clip pivot axis exposing three rows of clip protrusions hereinafter denoted 21a, 21b and 21c, respectively, in fig. 4. As may be learned from fig. 4, the outer row of clip protrusions 21a is shorter than the middle row of clip protrusions 21b, which is shorter still than the inner row of clip protrusions 21c. This feature provides the clip of the attachment means 1 with a secure grip, especially in heavier types of garment, while minimizing the risk of stressing the material of the back part 2 by excessive flexing when fixed to a thick collar of e.g. a dressing gown or the like.). In the unlocked position, the locking edge 51 moves downwards when the locking part 5 is rotated counterclockwise (as seen from the general viewing angle in fig. 4), i.e. by pulling the locking handle 52 upwards, releasing the locking edge of the locking part 5 from the accessory holder stop 34 of the front part 3. In the unlocked position, the locking part 5 allows the front part 3 to rotate freely by approximately 15° about the axis of the clip pivot pin 35 with respect to the back part 2, i.e. the clip may be opened.

Fig. 5 is a perspective back view of the attachment means 1 having a hearing aid accessory 6 mounted in the two accessory holders 44 (only one shown in fig. 5) of the attaching part 4 of the attachment means 1. A volume control 60 is exposed on the side of the hearing aid accessory 6 for easy access to controlling the volume of the hearing aids when the hearing aid accessory 6 is placed on a piece of garment. In fig. 5, the clip is shown in its open position, the attaching part 4 is orientated in such a way that the clip opening is to the right-hand side and the hearing aid accessory 6 is thus correctly orientated for inserting the back part 2 of the attachment means 1 from the left-hand side in e. g. the button lining of a woman's blouse. When the back part 2 is in place in e.g. a blouse, the clip may be closed by the turning the front part 3

towards the back part 2, sandwiching the fabric of the blouse between the back part 2 and the front part 3 in the process. Thanks to the plurality of clip protrusions arranged in the rows 21a, 21b and 21c of the back part 2 engaging the corresponding plurality of clip holes 31 in the front part 3, the clip attains a firm grip on the fabric, and the
5 attachment means 1 may now be secured to the blouse by turning the locking part 5 (not shown in fig. 5) to the locked position.

When the hearing aid accessory 6 is placed in the accessory holders 44 of the attachment means 1 and fixed to a piece of garment as described in the foregoing, the
10 hearing aid accessory 6 may be easily operated by its wearer. As stated in the foregoing, the hearing aid accessory 6 comprises means for communicating wirelessly with one or two hearing aids over a distance less than approximately one meter. As long as the attachment means 1 holding the hearing aid accessory 6 is fixed to the piece of garment in a substantially vertical orientation and within a maximal distance
15 of about 0.5 to 0.8 meter from the hearing aids, the hearing aid accessory 6 is capable of communicating wirelessly with the hearing aids.

Fig. 6 is a perspective front view of the hearing aid accessory 6 shown in fig 5 mounted in attachment means 1. The attachment means 1 is shown with the clip in its
20 closed position and the locking means 5 in its locked position. In fig. 6, the hearing aid accessory 6 exposes a power switch 61, a program change button 62, a plurality of LED indicators 63, an FM activation switch 64, a direct audio input (DAI) connector 65 and a charge/programming connector 66. Since the hearing aid accessory 6 is intended to be worn in a predetermined orientation this is reflected in the layout of the
25 user-oriented features of the hearing aid accessory 6. When the hearing aid accessory 6 is worn and in use, the FM activation switch 64, the DAI connector 65 and the charge/programming connector 66 are intended to point substantially downwards, the program change button 62, disposed on the upper half of the front of the hearing aid accessory 6, is intended to point substantially forwards, and the power switch 61 is
30 intended to point substantially to the left side of the user. Likewise, the volume control 60 (not shown in fig. 6) is thus intended to point substantially to the right side.

In fig. 6, the attachment means 1 exposes the back part 2, the front part 3 and the locking part 5. The locking edge 51 of the locking part 5 is engaging the accessory

holder stop 34 of the front part 3 of the attachment means 1, preventing the clip from opening by restricting rotational movement of the front part 3 with respect to the back part 2 about the clip pivot axis. The attaching part 4 (not shown in fig. 6) is slid all the way into the sliding pockets 32 of the front part 3, and one of the accessory holders 44
5 (not shown in fig. 6) is abutting the inside of the recess of the accessory holder stop 34 and the attaching part 4 is therefore in its fixed position. The hearing aid accessory 6 is thus prevented from turning about the axis of the attaching pivot 30 (not shown in fig. 6).

- 10 Fig. 7 shows a front view of the hearing aid accessory 6 mounted in an attachment means 1 and fixed to a blouse 7 worn by a hearing aid user (not shown). In this position, the hearing aid accessory 6 may be easily accessed and operated by the hearing aid user wearing one or two hearing aids (not shown) having capability for receiving wireless signals from the hearing aid accessory 6. The hearing aid accessory
15 6 is mounted in the two accessory holders 44 (only one accessory holder 44 shown in fig. 7), the attaching part 4 (not shown in fig. 7) is rotated to the desired orientation and pushed into the fixed position in the attachment means 1 as described in the foregoing. When in use, the back part 2 (not shown in fig. 7) of the attachment means 1 is positioned behind the button-hole lining of the blouse 7 and then the clip is closed
20 and locked by moving the locking part 5 into the locked position. Now the plurality of protrusions 21 (not shown in fig. 7) engages the corresponding plurality of holes 31 (not shown in fig. 7) from the back side of the fabric of the blouse 7, forming a clip gripping the fabric of the blouse 7 sufficiently firmly so as to easily carry the combined weight of the hearing aid accessory 6 and the attachment means 1, but not
25 so firmly as to deform or penetrate the fabric of the blouse 7.

- When the hearing aid accessory 6 is placed in the position shown in fig. 7, the hearing aid user may easily and conveniently perform a plurality of wireless control functions with the hearing aid accessory 6 for controlling the hearing aids. The hearing aid
30 accessory 6 may be switched on or off using the power switch 61, the volume of the hearing aids may be adjusted up or down using the volume control 60, one of a plurality of listening programs stored in the hearing aids may be selected by the program change button 62, and an external audio source may be connected through the DAI connector 65.

A hearing aid fitter may provide the hearing aid accessory 6 with e.g. an internally disposed FM receiver (not shown) enabling the hearing aid accessory 6 to receive a wireless FM-modulated signal from e.g. a wireless FM microphone and retransmit the received FM signal to the hearing aids. The internal FM receiver may be turned on or off by the hearing aid user by pressing the FM activation switch 64. In a preferred embodiment of the hearing aid accessory 6, a telecoil (not shown in fig. 7) is disposed internally in the hearing aid accessory 6 for the purpose of receiving a telecoil signal from a telecoil system and retransmit the telecoil signal to the hearing aids. This may be useful in situations where a pair of in-the-ear (ITE) or completely-in-canal (CIC) hearing aids are used, since hearing aids of these types seldom comprises their own telecoils due to space restrictions. Thanks to this functionality of the hearing aid accessory 6 and the fact that a receiver configured for receiving wireless signals from the hearing aid accessory 6 takes up less space in the hearing aids than a telecoil, hearing aids of the ITE and CIC types without telecoil capability – but with a built-in receiver for receiving signals from the hearing aid accessory 6 – may thus reproduce telecoil signals to a hearing aid user.

The embodiment of the attachment means 1 shown in the figures and described in the foregoing is only intended as an exemplary mode of providing an attachment means for a hearing aid accessory, and may be modified in various ways without departing from the scope and spirit of the invention as defined in the accompanying claims.

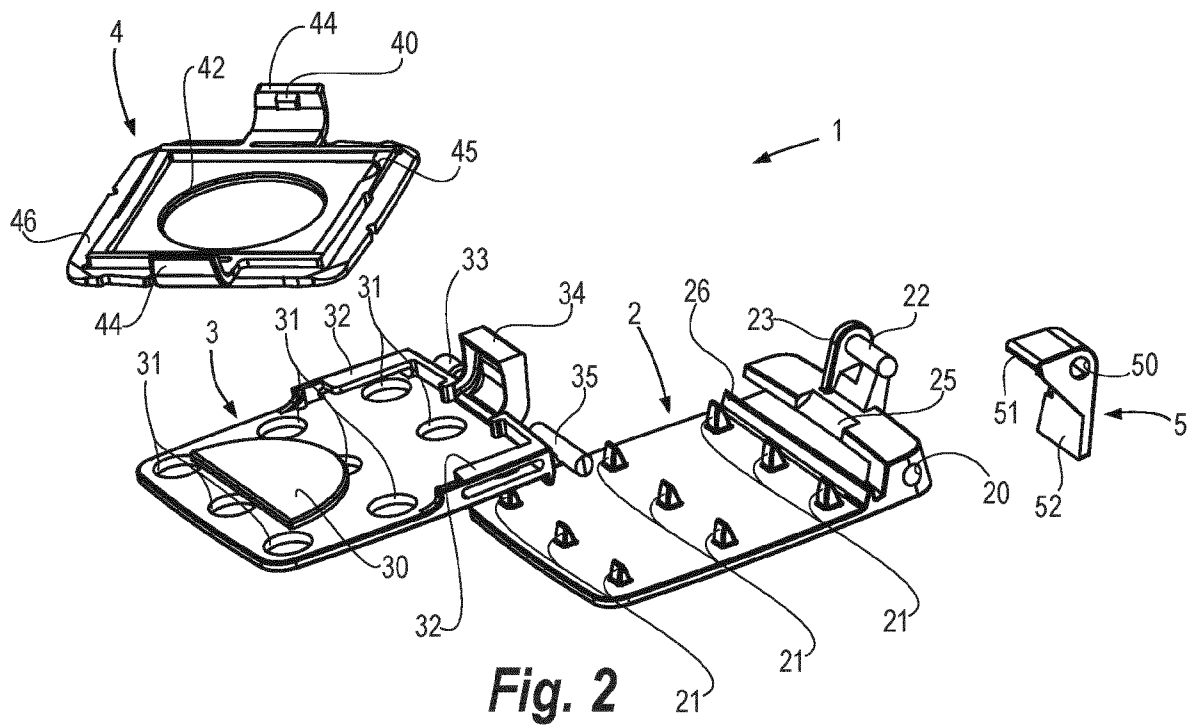
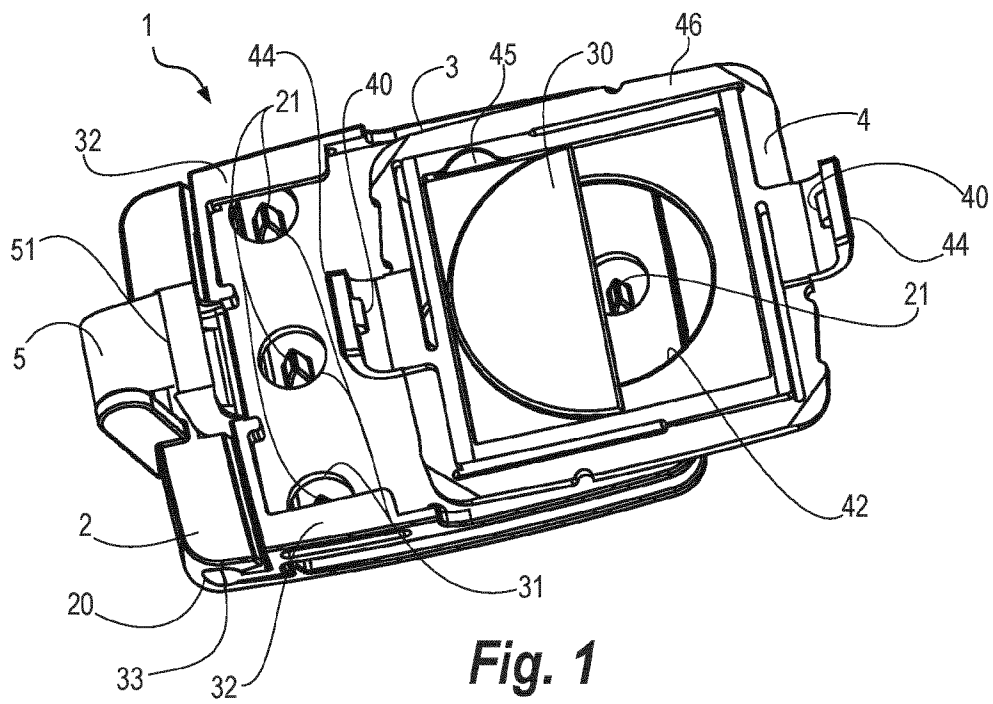
CLAIMS:

1. An attachment means (1) for fixing a hearing aid accessory (6) to a piece of garment, said attachment means (1) comprising a back part (2), a front part (3), an attaching part (4) and a locking part (5), wherein the back part (2) has means (33, 35) for pivotally engaging corresponding means (20, 26) embodied in the front part (3), the back part (2) and the front part (3) together embodying a clip, the locking part (5) having means (50, 51, 52) for securing the clip by fixing the front part (3) in a closed position with respect to the back part (2), the attaching part (4) having means (40, 44) for holding a hearing aid accessory (6), means for connecting to the front part (3) in such a way that the attaching part (4) may be rotated with respect to the orientation of the front part (3), and means for fixing the attaching part (4) in one of a plurality of different orientations with respect to the orientation of the front part (3).
2. The attachment means according to claim 1, wherein the means for connecting the attaching part (4) to the front part (3) comprises an attaching pivot pin (30) embodied in the front part (3) and a corresponding attachment pivot hole (42) embodied in the attaching part (4).
3. The attachment means according to claim 1, wherein the means for fixing the attaching part (4) in one of a plurality of different orientations with respect to the front part (3) comprises a substantially square sliding frame (46) embodied in the attachment means (4) and a pair of corresponding sliding pockets (32) embodied in the front part (3).
4. The attachment means according to claim 1, wherein the means for fixing the attaching part (4) in one of a plurality of different orientations with respect to the front part (3) comprises a set of cogs embodied in the front part (3) configured to engage a toothed rim embodied in the attaching part (4).
5. The attachment means according to claim 1, wherein the back part (2) comprises a plurality of protrusions (21a, 21b, 21c) arranged in such a way so as to engage a corresponding plurality of holes (31) embodied in the front part (3) when the clip is in a closed position.
6. The attachment means according to claim 1, wherein the attaching pivot pin (30) of the front part (3) has a substantially semicircular shape configured to

engage a mounting recess (45) embodied in the attaching part (4) during assembly of the attachment means (1).

- 5 7. The attachment means according to claim 1, wherein the locking part (5) comprises a locking pivot hole (50) configured for engaging a locking pivot pin (22) on a locking pivot flange (23) embodied in the back part (2), a locking edge (51) for engaging an accessory holder stop (34) of the front part (3) when the clip is in a locked position, and a locking handle (52) for rotating the locking part about the locking pivot (22, 50) between the locked position and an unlocked position.
- 10 8. The attachment means according to claim 5, wherein a first portion (21a) of the plurality of protrusions (21) furthest away from the clip pivot (20, 26, 33, 35) has a shorter length than a second portion (21b) of the plurality of protrusions (21), said second portion (21b) of the plurality of protrusions (21) having a shorter length than a third portion (21c) of the plurality of protrusions
- 15 (21), the third portion (21c) of the plurality of protrusions (21) being closest to the clip pivot (20, 26, 33, 35).

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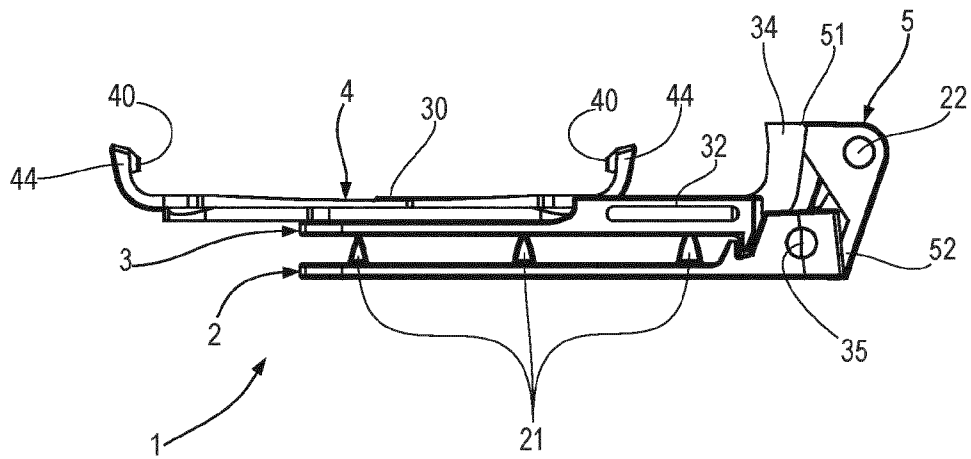


Fig. 3

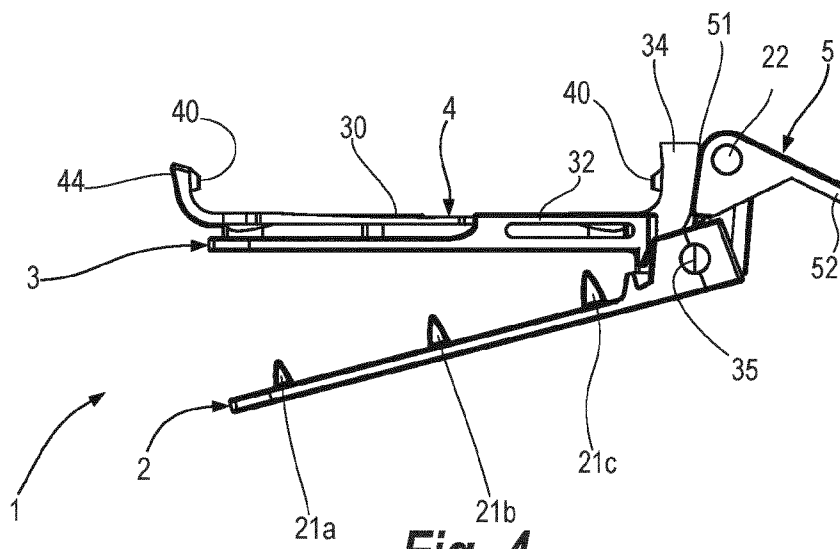
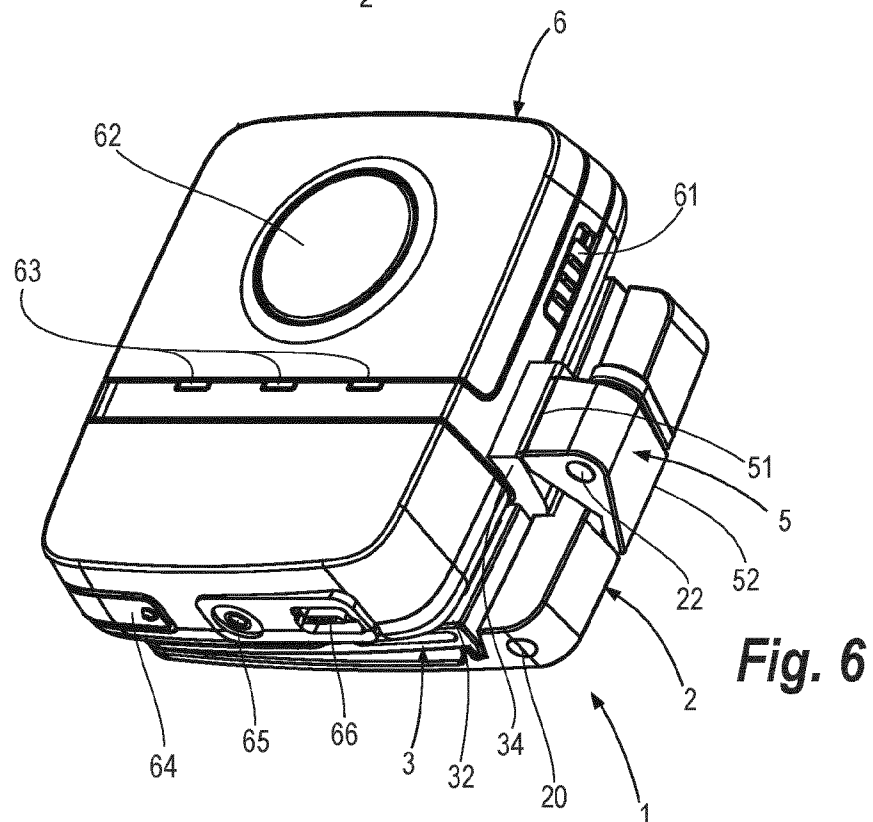
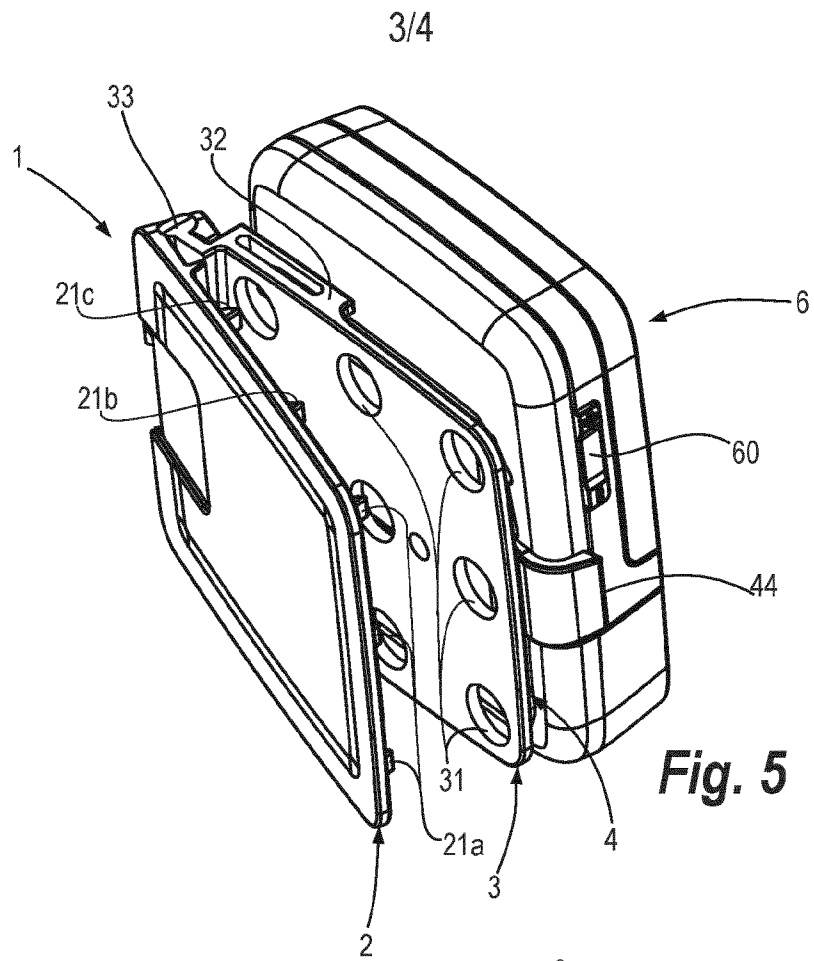


Fig. 4



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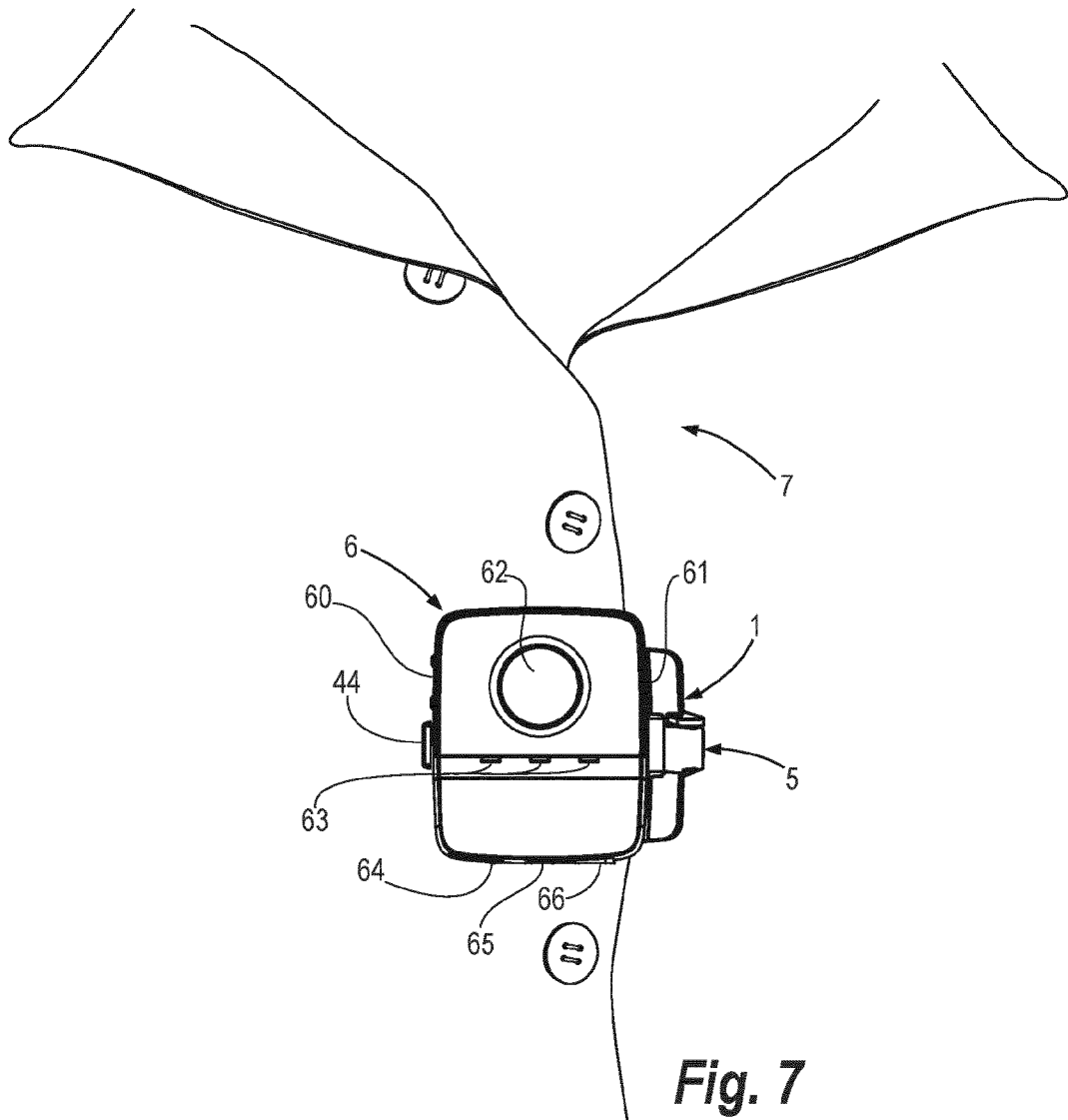


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/055280

A. CLASSIFICATION OF SUBJECT MATTER
INV. A45F5/02 A41F1/00
ADD. H04R25/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04R A41F D06F A45F G04G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010/200628 A1 (TAGES FERNANDO J [US]) 12 August 2010 (2010-08-12) paragraph [0008] - paragraph [0036]; figures 1-8	1-8
X	US 2003/106917 A1 (SHETLER LANCE [US] ET AL) 12 June 2003 (2003-06-12) paragraph [0010] - paragraph [0030]; figures 1-13	1-8
X	US 2003/000976 A1 (MALHOTRA RON [US]) 2 January 2003 (2003-01-02) paragraph [0007] - paragraph [0035]; figures 1-9	1-8
	----- -/-	



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

19 April 2013

Date of mailing of the international search report

29/04/2013

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/055280

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/162510 A1 (KIM DONG JOO [KR]) 28 August 2003 (2003-08-28) paragraph [0021] - paragraph [0042]; figures 6-18 -----	1-8
A	WO 2008/148266 A1 (LAU WONG [CN]) 11 December 2008 (2008-12-11) figures 2,3,5 -----	5,8
A	US 2011/253872 A1 (SPEAR TUCKER [US] ET AL) 20 October 2011 (2011-10-20) figures 2,4 -----	8
A	US 2008/078792 A1 (TAGES FERNANDO [US]) 3 April 2008 (2008-04-03) figures 3a, 3b -----	6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2012/055280

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