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(54) CONTAINER FOR GAS GENERATOR

HÜLLE FÜR EINE GASPATRONE

CAPSULE POUR UNE CARTOUCHE DE GAZ

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(56) References cited:
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EP 4 046 513 B1

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Description

[0001] The present disclosure relates generally to the sector of providing protection by means of an airbag, so as to protect a user from impacts due to falling or sliding, when travelling on a means of transport, such as a vehicle, preferably a two-wheeled vehicle, or any other means of transport, such as a horse or other animal, sports equipment, such as a pair of skis or a bobsleigh, or similar means of transport, or to protect a user when performing any activity also without transport means.

[0002] More particularly, the present disclosure relates to a container for a gas generator, for example a container designed to be placed on the back or flank of a user, namely in a zone of a user's body.

[0003] The present disclosure also relates to an inflation device, including the aforementioned container or gas generator for inflating an inflatable element for protecting a user in the event of falls and/or impacts of various types. A personal protection device, a protective garment or a wearable article, each comprising the aforementioned inflation device, also form the subject of the present disclosure.

[0004] In the sector of user protection it is known to use protection devices including an inflatable element, namely airbag, which are inflated, in the event of an impact, by an inflation device in fluid communication with the airbag itself. Generally, this inflation device consists of a fluid source, such as a cylindrical compressed-gas canister, which is fixed to the back portion of a protection device or a garment or arranged inside a back protector. The positioning of an inflation device in the back zone of a user makes the protection device comprising the inflation device safer, preventing the gas canister from being able to interfere, in the event of a fall, with the vital organs which are situated in the front or side part of the user. More precisely, the known inflation devices comprise a support structure which is formed by plates or other rigid mechanical components generally arranged in the region of the user's spinal column. This support structure is designed to support the gas generator(s) and is generally connected to a protection garment comprising an inflatable element.

[0005] The document WO01/54523A1 discloses a container for a cylindrical compressed gas canister.

[0006] The present disclosure is based on a recognition by the inventor of the present disclosure that the inflation devices such as those made available hitherto by the prior art, while being advantageous from many points of view, have not always been sufficient to ensure satisfactory mobility and comfort during use by a user.

[0007] More specifically, the inflation devices have been hitherto designed and arranged on protective garments so as to prevent them from being dangerous for the user in the event of falls, but without paying too much attention to the question of ensuring the freedom of movement of the user and the comfort during use in general.

[0008] In addition, a further recognition on the part of

the inventor of the present disclosure is that the known inflation devices may not be easily removed from a protection garment by a user. This means that the user may not, autonomously, separate the inflation device from the protective garment in order to perform, for example, washing of the garment or replacement of the compressed-gas canister.

[0009] The starting point of the present disclosure is that of providing a wearable inflation device for an inflatable element, which is able to satisfy all the aforementioned requirements with reference to the prior art and/or achieve further advantages.

[0010] This is obtained by means of a wearable inflation device, a protection device and a wearable article or a protective garment according to the respective independent claims. Secondary characteristic features forming the subject of the present disclosure are defined in the corresponding dependent claims.

[0011] In particular, according to the present disclosure, in order to improve the comfort, it is proposed to improve the ergonomic form of the inflation device overall and to make it more suitable for the shape of the body.

[0012] For this purpose it is proposed to provide a container which includes a curved casing body. The curved casing body may be easily adapted to the curved shape of the body and may be placed so as to fit perfectly against the flank of a user or the user's back. The casing body includes a seat or channel having a form suitable for receiving the canister-shaped gas generator. The seat may be cylindrical or have another shape suitable for receiving the canister-shaped gas generator.

[0013] Basically, in order to adapt the canister-shaped gas generator to the shape of the body, the generator is inserted inside a casing which is curved and more suitable for the anatomy of the human body. Preferably, the casing body is a body made of a soft material which may be removed from the canister-shaped gas generator. The casing body is preferably a body able to ensure the cushioning of knocks or impacts.

[0014] Furthermore, the casing body and the canister-shaped gas generator may be handled together as a single body and removed from a personal protection device or a garment with which they are associated, for example for replacement of the gas generator.

[0015] Further characteristic features and modes of use forming the subject of the present disclosure will become clear from the following detailed description of embodiments thereof, provided by way of a non-limiting example.

[0016] It is any case evident that each embodiment of the subject of the present disclosure may have one or more of the advantages listed above; in any case it is not required that each embodiment should have simultaneously all the advantages listed.

[0017] Reference will be made to the figures of the attached drawings in which:

- Figure 1 shows a view of an inflation device accord-

- ing to the present disclosure;
- Figure 1a-1c show a corresponding number of views of the inflation device according to Figure 1;
 - Figure 2 shows a view of a container according to the present disclosure;
 - Figure 3 shows a view of a garment including an inflation device according to the present disclosure;
 - Figure 4 shows a view of an inflation device according to the present disclosure, during removal of the container from the canister-shaped gas generator;
 - Figure 5 shows a cross-sectional view along the line V-V of Figure 1c.

[0018] With reference to the attached figures, an embodiment of a container for a gas generator is denoted overall by the reference number 1. A gas generator is indicated by the reference number 2. The canister-shaped gas generator 2 may be a canister containing compressed cold gas, such as helium. The canister may be provided with a respective shut-off valve (not shown). Alternatively, the inflation fluid source may comprise gas generators preferably of the pyrotechnic or other hybrid type or other types known according to the state of the art.

[0019] The assembly including the gas generator 2 and the container 1 for the gas generator 1 is called an inflation device, denoted generally by the reference number 3. The inflation device 3 is connected by means of cables to a control unit (not shown in the drawings) which allows activation of the inflation to be controlled. The present disclosure also relates to an inflation device 3 comprising the container 1 and a canister-shaped gas generator 2.

[0020] A further subject of the present disclosure consists of a personal protection device 4 for the personal protection of a user. This personal protection device 4 is a device including, in addition to the inflation device 3, an inflatable element 5 or airbag, in fluid communication with this inflation device 3 and intended to protect at least partly the torso of a user. Preferably, the inflation device 3 is intended to be positioned in a flank region or lumbar region of the user's torso, inside the inflatable element 5, as can be seen in Figure 3.

[0021] Finally, the present disclosure also relates to a wearable article or protective garment, generally indicated by the number 6 in Figure 3 and comprising a personal protection device 4 as defined above. The personal protection devices 4 together with the airbags and the protective garments which include said airbags are personal protection devices which are known to the person skilled in the art and therefore are not further described in the present patent application. In particular, the inflation device 3 is in fluid communication with the inflatable element 5 so as to convey, once activated, inflation fluid into the inflatable element 5 and allow inflation thereof. The inflation device 3 is, as mentioned, connected to the control unit by means of which inflation may be activated. With regard to inflation, in order to perform inflation of the inflatable element 5, in the event of a fall and/or sliding and/or a sudden impact involving a user or a vehicle being

ridden/driven, the protection device 4 is adapted to cooperate with special activation means (normally consisting of the aforementioned control unit and sensors) which are for example operationally connected to the canister-shaped gas generator 2.

[0022] It should also be noted that the activation modes, although being an aspect of particular importance for effective operation of the device, will not be further described in greater detail since they are methods which are essentially already known to a person skilled in the art of protection of an individual from sudden impacts.

[0023] According to the present disclosure, the container 1 for a canister-shaped gas generator 2 comprises a casing body 10 having a curved profile. In other words, the casing body is curved, namely the casing body has an external surface 101 having a substantially tubular form which defines a curved profile thereof. In other words, the external surface 101 follows an at least partially curvilinear trajectory. Expressed yet differently again, the external surface 101 has a progression which is partly arched, curvilinear or curved. As a result, as already mentioned, the external profile of the casing body 10 is especially shaped so as to adapt to the anatomy of a user's torso, in particular the anatomy of a flank region or a lumbar region of a user's torso.

[0024] The casing body 10 therefore follows a curved trajectory, according to a given radius of curvature R. Preferably the radius of curvature R is chosen so as to correspond to the anatomical curved shape of the flank of a user's body or the lumbar region of a user's back. In this way, the container 1 may be rested and especially made so as to "fit" or "match" the anatomical curvature of a user's torso. Preferably, the entire casing body is therefore curved.

[0025] According to the present disclosure, the casing body 10 is a hollow body, namely it has a cavity for receiving the gas generator. In particular, the casing body 10 is provided with a cavity or channel 103 configured to house a conventional canister-shaped gas generator 2. The channel 103 therefore has a form and dimensions such as to be able to receive inside it a conventional canister-shaped gas generator 2. In fact, as described above, the known gas generators 2, which are used in the context of personal protection devices, generally comprise canisters which have an at least partially cylindrical form. Therefore, the channel 103 acts as a seat for housing a canister-shaped gas generator 2, which preferably has a cylindrical form.

[0026] Preferably, the channel 103 is formed at least partially inside the casing body 10. In other words, the channel 102 is an internal cavity of the casing body. In this way, the casing body 10 surrounds, at least partly, the canister-shaped gas generator 2 and acts as protective covering for the canister-shaped gas generator 2.

[0027] Consequently, as mentioned above, the container 1 is configured so as to protect the canister-shaped gas generator 2 and allow positioning of the latter in a

region, such as the flank or the lumbar region, occupying a minimum amount of space and hindering as little as possible the movements of the user, while at the same time housing the canister-shaped gas generator 2.

[0028] The container 1 therefore allows the gas generator to be positioned so as to occupy an anatomical hollow zone of a user's torso. As a result, the canister-shaped gas generator 2 may be positioned so as to minimize the overall volume presented to the user.

[0029] It can be understood that the casing body 10 has a longitudinal cross-section, along the main direction S, which has a substantially C-shaped form, with a first convex flank or side 10' on one side of the channel 103, and a second concave side or flank 10" on the other side of the channel 103.

[0030] It is to be understood therefore that the casing body 10 extends principally along a main direction S parallel to or coinciding with the development axis A of the channel 103. Namely the channel 103 is oriented in the main direction S along which the casing body 10 extends. Expressed in yet other words, the casing body 10 and the channel 103 extend mainly on the same direction. Consequently, the housing body 10 is a substantially tubular body.

[0031] In order to achieve the geometrical form defined above, the casing body 10 has, furthermore, an internal surface 102 opposite to the aforementioned external surface 101. The internal surface 102 delimits or surrounds the channel 103. According to a preferred aspect of the present disclosure, the channel 103 extends mainly along its own development axis A. The channel 103 therefore has a substantially elongated or oblong form, along this development axis A. In this way, a conventional canister-shaped gas generator 2, which has an elongated cylindrical form, may be received completely, or at least partly, over most of its length inside the channel 103.

[0032] According to a preferred aspect of the present disclosure, during use, the internal surface 102 is intended to be completely in contact with a canister-shaped gas generator 2. Expressed differently, the internal surface 102, during use, rests or lies on the canister-shaped gas generator 2. During use, that is, the internal surface 102 adheres to the canister-shaped gas generator 2. In this way no empty spaces, or play, is present between the internal surface 102 and the canister-shaped gas generator 2.

[0033] The casing body 10 is therefore configured to surround tightly the canister-shaped gas generator 2. In this way relative movements of the canister-shaped gas generator 2 with respect to the casing body 10 surrounding it are prevented. Consequently, therefore, during use, the canister-shaped gas generator 2 is firmly retained inside the channel 103.

[0034] According to a preferred aspect of the present disclosure, the casing body 10 is a single body, i.e. a monolithic body.

[0035] Even more preferably, in order to ensure the aforementioned adherence, the casing body 10 is made

of soft material, such as silicone or other material. In other words the container 1 is made of a flexible and/or elastically yielding material. Preferably, the container 1 is made of an elastomeric material; for example, the container 1 may be made of silicone, rubber or latex. In this way, the container 1 is made so as to be particularly flexible and able to cushion both the impacts which could affect the gas generator and the bruising which, in the event of a fall, the inflation device 3 may cause for the user.

[0036] The soft and flexible material also allows easy unsheathing of the casing body 10, as can be seen in Figure 4.

[0037] According to a preferred aspect of the present disclosure, the casing body 10 extends between a first end 103 and a second end 105. The first end 104 and the second end 105 are opposite to each other.

[0038] According to this preferred aspect, at least one of the first end 104 and the second end 105, for example the end 105 has or is provided with an opening 106. The opening 106 communicates with the channel 103 so as to allow access to the canister-shaped gas generator 2. The through-opening 106 may be in the form of a slot or through-hole. The channel 103 is therefore open towards the outside. In this way, the canister-shaped gas generator 2 may be inserted into or extracted from the channel 103 through the opening 106 during use. In addition, the canister-shaped gas generator 2 may be connected to the control unit through the opening 106.

[0039] According to a preferred aspect of the present disclosure, the other end 104 of the casing body 10 is dome or cap-shaped and defines a cavity opening out on one side with the channel 103 and communicating with an environment outside the channel 103. The gas output nozzle of the canister-shaped gas generator 2 is directed towards the cavity 111. In this way, said cavity 111 is configured to direct, orient or steer a gas flow exiting the canister-shaped gas generator 2 towards the airbag 5.

[0040] The casing body 10 may also include a central opening 112 which facilitates unsheathing, as shown in Figure 4.

[0041] The subject-matter of the present disclosure has been described hitherto with reference to embodiments thereof. It is to be understood that other embodiments relating to the same inventive idea may exist, all of these falling within the scope of protection of the claims which solely define the scope of the invention.

Claims

1. Container (1) for canister-shaped gas generator (2), wherein the container (1) comprises a casing body (10) which is curved or shaped according to a curved trajectory, and wherein the casing body (10) has a channel (103) configured to house the canister-shaped gas generator (2); the container being char-

- acterized in that** the casing body has a concave outer side (10") and a convex outer side (10').
2. Container (1) according to claim 1, wherein said channel (103) extends mainly along a straight or rec-
tilinear development axis (A).
 3. Container (1) according to claim 2, wherein, during use, said channel (103) is delimited by an inner sur-
face (102) and said inner surface (102) is intended to be completely in contact with the canister-shaped gas generator (2).
 4. Container (1) according to either one of claims 2 or 3, wherein said casing body (10) extends along a
main direction (S) parallel to, or coinciding with, the development axis (A) of said channel (103).
 5. Container (1) according to any one of the preceding claims 2 to 4, wherein the curved trajectory has a
curvature radius (R) and said curvature radius (R) is substantially perpendicular to said development axis (A).
 6. Container (1) according to any one of the preceding claims, wherein said channel (103) has a tubular or
cylindrical shape.
 7. Container (1) according to any one of the preceding claims, wherein said casing body (10) develops be-
tween a first end (104) and a second end (105), op-
posite to said first end (104), and wherein at least one of the first end (104) and the second end (105)
is provided with an opening (106) communicating with said channel (103) to allow the insertion and
extraction of the canister-shaped gas generator (2) into/from said channel (103) and to allow fluid com-
munication of the canister-shaped gas generator (2) with an environment external to said inner channel
(103).
 8. Container (1) according to claim 7, wherein the other end (104) has a cavity (111) communicating with said
inner channel (103) and open towards an environ-
ment external to said channel (103) and configured to direct a gas flow exiting the canister-shaped gas
generator (2) towards said external environment.
 9. Container (1) according to claim 8, wherein said oth-
er end (104) has a hemispherical or semi-dome
shape.
 10. Container (1) according to any one of the preceding claims, wherein the casing body (10) is made of soft
material, preferably an elastomeric material.
 11. Inflation device (3) comprising a container (1) ac-
cording to any one of the preceding claims and said

canister-shaped gas generator (2).

12. Personal protection device (4) for the personal pro-
tection of a user comprising an inflation device (3)
according to claim 11, an inflatable element (5) in
fluid communication with said inflation device (3) and
intended to protect at least one part of a user's body.
13. Personal protection device (4) according to claim 12,
wherein said inflation device (3) is intended to be
positioned in a region of the torso of said user.
14. A wearable article or garment (6) comprising a per-
sonal protection device (4) according to claim 12 or
13.

Patentansprüche

1. Behälter (1) für einen kanisterförmigen Gasgenera-
tor (2), wobei der Behälter (1) einen Gehäusekörper
(10), der gemäß einer gekrümmten Trajektorie gek-
rümmt oder geformt ist, umfasst und wobei der Ge-
häusekörper (10) einen Kanal (103) aufweist, der
konfiguriert ist, um den kanisterförmigen Gasgenera-
tor (2) unterzubringen; wobei der Behälter **da-
durch gekennzeichnet ist, dass** der Gehäusekör-
per eine konkave Außenseite (10") und eine konvexe
Außenseite (10') aufweist.
2. Behälter (1) nach Anspruch 1, wobei sich der Kanal
(103) hauptsächlich entlang einer geraden oder ge-
radlinigen Entwicklungsachse (A) erstreckt.
3. Behälter (1) nach Anspruch 2, wobei der Kanal (103),
in Verwendung, durch eine Innenoberfläche (102)
begrenzt ist und die Innenoberfläche (102) vorgese-
hen ist, um mit dem kanisterförmigen Gasgenerator
(2) vollständig in Berührung zu sein.
4. Behälter (1) nach einem der Ansprüche 2 oder 3,
wobei sich der Gehäusekörper (10) entlang einer
Haupttrichtung (S) parallel zu, oder zusammenfal-
lend mit, der Entwicklungsachse (A) des Kanals
(103) erstreckt.
5. Behälter (1) nach einem der vorstehenden Ansprü-
che 2 bis 4, wobei die gekrümmte Trajektorie einen
Krümmungsradius (R) aufweist und der Krüm-
mungsradius (R) im Wesentlichen senkrecht zu der
Entwicklungsachse (A) ist.
6. Behälter (1) nach einem der vorstehenden Ansprü-
che, wobei der Kanal (103) eine rohrförmige oder
zylindrische Form aufweist.
7. Behälter (1) nach einem der vorstehenden Ansprü-
che, wobei sich der Gehäusekörper (10) zwischen

einem ersten Ende (104) und einem zweiten Ende (105), gegenüber dem ersten Ende (104), entwickelt und wobei mindestens eines des ersten Endes (104) und des zweiten Endes (105) mit einer Öffnung (106) versehen ist, die mit dem Kanal (103) in Verbindung steht, um den Einsatz und die Entnahme des kanisterförmigen Gasgenerators (2) in den/von dem Kanal (103) zu ermöglichen und eine Fluidverbindung des kanisterförmigen Gasgenerators (2) mit einer Umgebung extern des Innenkanals (103) zu ermöglichen.

8. Behälter (1) nach Anspruch 7, wobei das andere Ende (104) einen Hohlraum (111) aufweist, der mit dem Innenkanal (103) in Verbindung steht und zu einer Umgebung extern des Kanals (103) hin offen und konfiguriert ist, um einen Gasstrom, der aus dem kanisterförmigen Gasgenerator (2) austritt, zu der externen Umgebung hin zu leiten.
9. Behälter (1) nach Anspruch 8, wobei das andere Ende (104) eine hemisphärische oder Halbkuppelform aufweist.
10. Behälter (1) nach einem der vorstehenden Ansprüche, wobei der Gehäusekörper (10) aus Weichstoffmaterial, vorzugsweise einem elastomeren Material, hergestellt ist.
11. Aufblasvorrichtung (3), umfassend einen Behälter (1) nach einem der vorstehenden Ansprüche und den kanisterförmigen Gasgenerator (2).
12. Personenschutzvorrichtung (4) für den persönlichen Schutz eines Benutzers, umfassend eine Aufblasvorrichtung (3) nach Anspruch 11, ein aufblasbares Element (5) in Fluidverbindung mit der Aufblasvorrichtung (3) und die vorgesehen ist, um mindestens einen Teil eines Körpers des Benutzers zu schützen.
13. Personenschutzvorrichtung (4) nach Anspruch 12, wobei die Aufblasvorrichtung (3) vorgesehen ist, um in einem Bereich des Rumpfes des Benutzers positioniert zu werden.
14. Tragbarer Artikel oder Kleidungsstück (6), umfassend eine Personenschutzvorrichtung (4) nach Anspruch 12 oder 13.

Revendications

1. Contenant (1) destiné à un générateur de gaz sous forme de cartouche (2), le contenant (1) comprenant un corps d'enveloppe (10) qui est incurvé ou profilé selon une trajectoire incurvée, et dans lequel le corps d'enveloppe (10) a un canal (103) conçu pour loger le générateur de gaz sous forme de cartouche (2) ;

le contenant étant **caractérisé en ce que** le corps d'enveloppe a un côté externe concave (10") et un côté externe convexe (10').

2. Contenant (1) selon la revendication 1, dans lequel ledit canal (103) s'étend principalement le long d'un axe de développement droit ou rectiligne (A).
3. Contenant (1) selon la revendication 2, dans lequel, pendant l'utilisation, ledit canal (103) est délimité par une surface interne (102) et ladite surface interne (102) est prévue pour être complètement en contact avec le générateur de gaz sous forme de cartouche (2).
4. Contenant (1) selon l'une quelconque des revendications 2 ou 3, dans lequel ledit corps d'enveloppe (10) s'étend le long d'une direction principale (S) parallèle à, ou coïncidant avec, l'axe de développement (A) dudit canal (103).
5. Contenant (1) selon l'une quelconque des revendications 2 à 4 précédentes, dans lequel la trajectoire incurvée a un rayon de courbure (R) et ledit rayon de courbure (R) est sensiblement perpendiculaire audit axe de développement (A).
6. Contenant (1) selon l'une quelconque des revendications précédentes, dans lequel ledit canal (103) a une forme tubulaire ou cylindrique.
7. Contenant (1) selon l'une quelconque des revendications précédentes, dans lequel ledit corps d'enveloppe (10) se développe entre une première extrémité (104) et une seconde extrémité (105), opposée à ladite première extrémité (104), et dans lequel au moins l'une de la première extrémité (104) et de la seconde extrémité (105) est pourvue d'une ouverture (106) communiquant avec ledit canal (103) pour permettre l'insertion et l'extraction du générateur de gaz sous forme de cartouche (2) dans ledit/dudit canal (103) et pour permettre une communication fluide du générateur de gaz sous forme de cartouche (2) avec un environnement externe audit canal interne (103).
8. Contenant (1) selon la revendication 7, dans lequel l'autre extrémité (104) a une cavité (111) communiquant avec ledit canal interne (103) et ouverte en direction d'un environnement externe audit canal (103) et conçu pour diriger un flux de gaz quittant le générateur de gaz sous forme de cartouche (2) en direction dudit environnement externe.
9. Contenant (1) selon la revendication 8, dans lequel ladite autre extrémité (104) a une forme hémisphérique ou de demi-dôme.

10. Contenant (1) selon l'une quelconque des revendications précédentes, dans lequel le corps d'enveloppe (10) est constitué d'un matériau souple, de préférence un matériau élastomère. 5
11. Dispositif de gonflage (3) comprenant un contenant (1) selon l'une quelconque des revendications précédentes et ledit générateur de gaz sous forme de cartouche (2). 10
12. Dispositif de protection individuelle (4) pour la protection individuelle d'un utilisateur comprenant un dispositif de gonflage (3) selon la revendication 11, un élément gonflable (5) en communication fluïdique avec ledit dispositif de gonflage (3) et prévu pour protéger au moins une partie du corps d'un utilisateur. 15
13. Dispositif de protection individuelle (4) selon la revendication 12, dans lequel ledit dispositif de gonflage (3) est prévu pour être positionné dans une région du torse dudit utilisateur. 20
14. Article ou vêtement à porter (6) comprenant un dispositif de protection individuelle (4) selon la revendication 12 ou 13. 25

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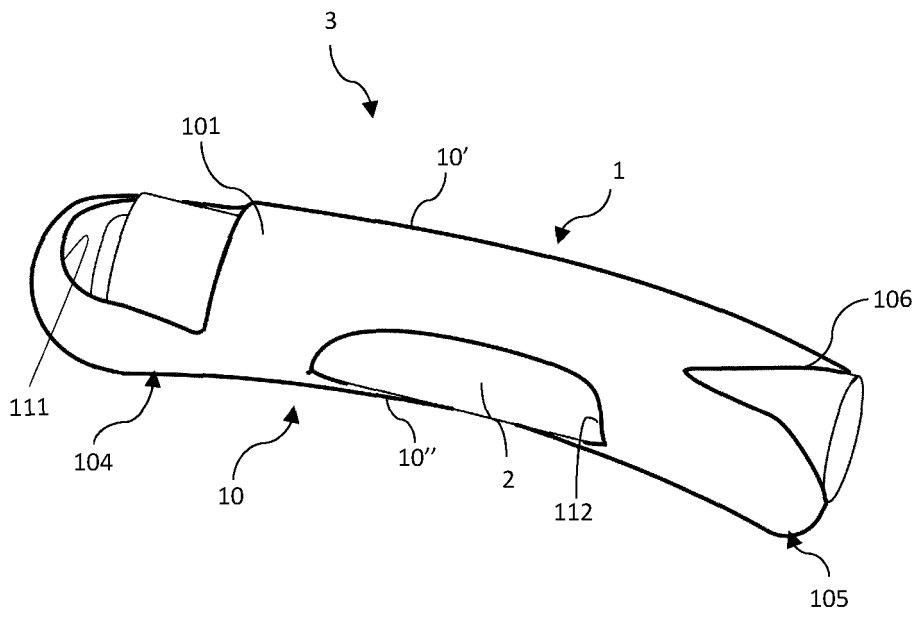


Fig. 1

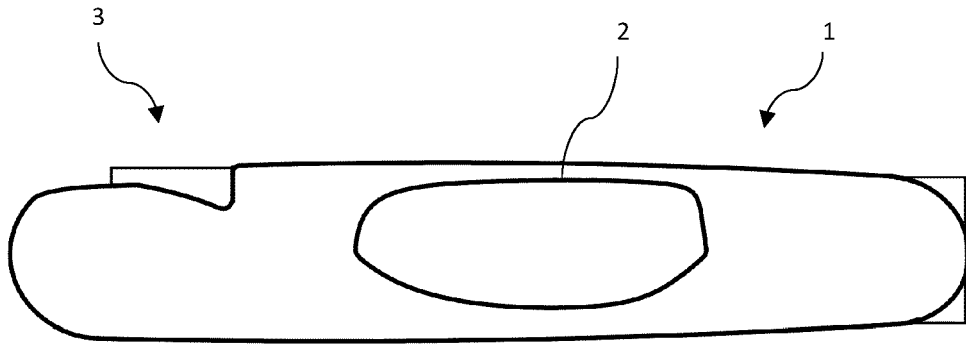


Fig. 1b

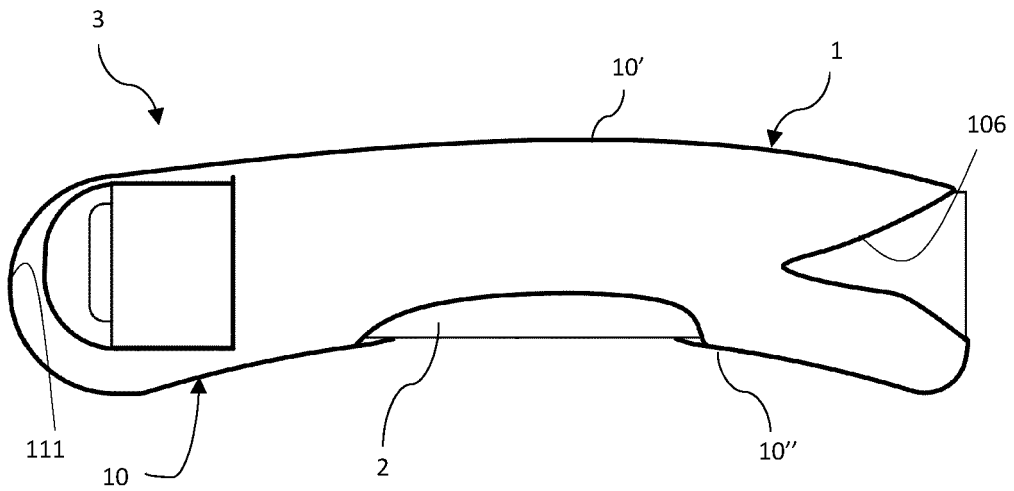


Fig. 1a

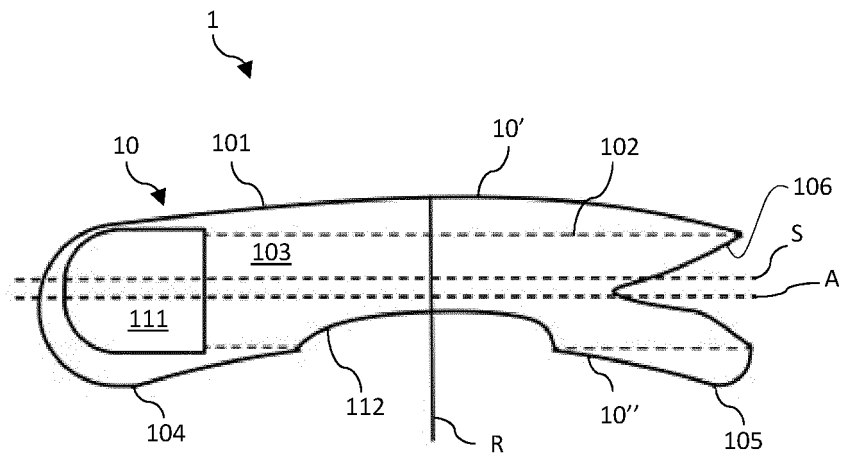


Fig. 2

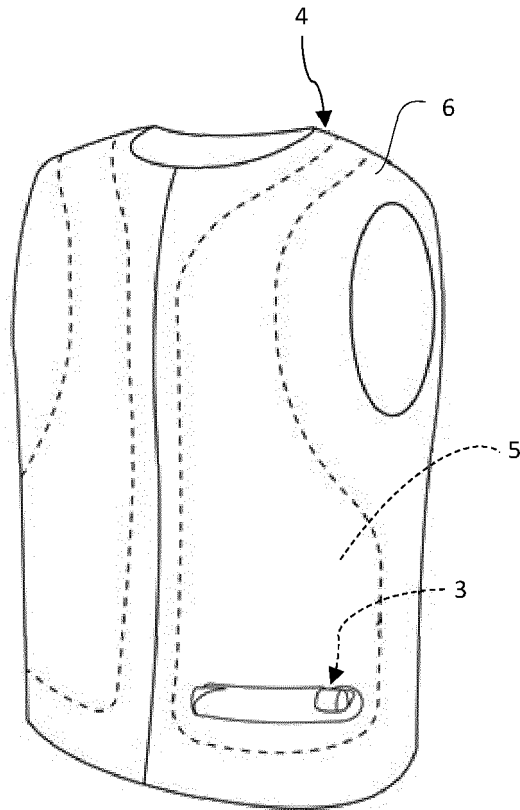


Fig. 3

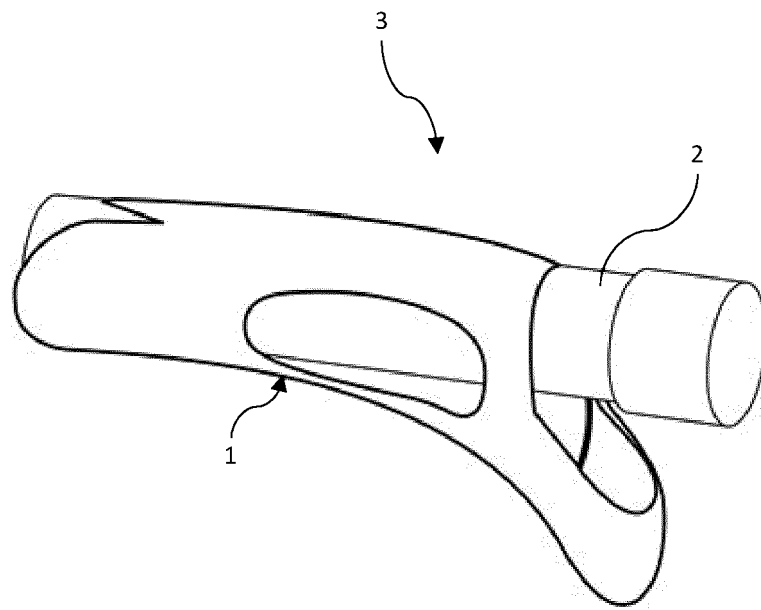


Fig. 4

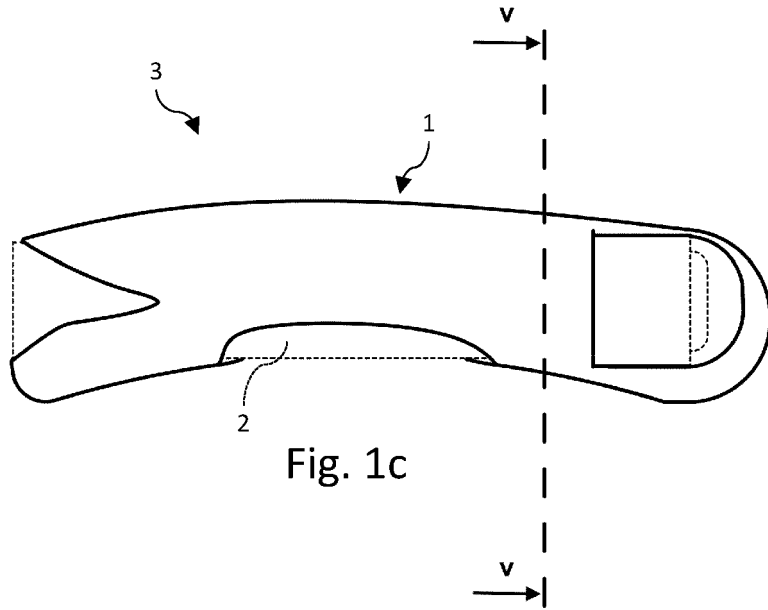


Fig. 1c

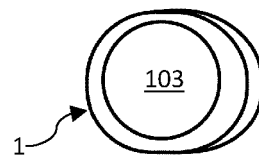


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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