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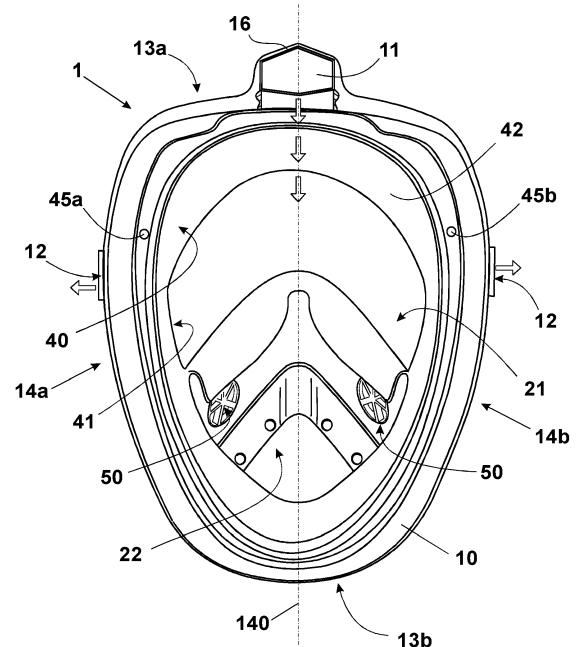
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(54) **FULL FACE DIVING MASK**

(57) A mask (1) comprising a frame (10) provided with an inlet mouth (11) for the introduction of a flow of air, or other gas, during an inspiration phase of a user, and at least an outlet mouth (12) for the exit of a flow of air, or other gas, during an expiration phase. The mask (1) comprises, furthermore, a visor (20) made of a transparent material and engaged to the frame (10). A face member (40) is, furthermore, provided made of a flexible material configured to be engaged inside the frame (10) and provided with a partition member (43) to divide the volume between the visor (20) and the face member (40) in an upper chamber (21) pneumatically connected with the inlet mouth (11), and a lower chamber (22) pneumatically connected with the outlet mouth (12). A one-way valve (50) pneumatically connects the upper chamber (21) with the lower chamber (22). The face member (40) provides a first and a second passageways (45a, 45b) configured to be crossed, in use, respectively by a first arm (105a) and a second arm (105b) of a pair of glasses (100) in such a way to engage the same to the face member (40) [Fig. 1]

Fig. 1



Description

Field of the invention

[0001] The present invention relates to the field of the equipment normally used for performing sport and recreational activities of different types, generally carried out in aquatic environment at both amateur and professional level, but also for filtering air, or a mix of oxygen and air, in particular in the hospitals, but also in other environments, where bacteria, viruses, or microorganisms of different kind that can be potentially toxic, or harmful, for a human being, can be present.

Description of the prior art

[0002] As it is known, a known kind of mask that is widely used for performing underwater activities is the diving mask, which allows the user who wears it to see clearly in the surrounding aquatic environment.

[0003] Normally, a diving mask of the kind used for performing activities in aquatic environment like swimming, snorkelling, breath-held diving, scuba diving, also in the depth, as well as scuba diving with aqualung, provides a more, or less, rigid frame, normally made of rubber, or silicone, but also rigid plastic, to which a transparent member made of glass, or transparent plastic material, is fixed and that is able to annul the refraction phenomenon thus allowing the user to see in the aquatic environment.

[0004] Among the other diving masks are known, in particular, the full face masks, that are so called because they cover the whole face of the user comprising the mouth.

[0005] Normally, the known full face masks provides a rigid frame having an oblong shape to which a visor made of transparent material is fixed. A flexible face member is, furthermore, provided at which, in use, the user puts his face. The face member provides a partition member that is positioned, in use, on the user's nose, and that divides the volume between the visor and the face member in an upper chamber, at which, in use, the user's eyes are arranged, and a lower chamber, at which the nose and the mouth of the user are arranged. communicates each other through one-way valves that are mounted on the partition member and that allow the inhaled air to pass from the upper chamber to the lower chamber, but not in the opposite direction. A snorkel is, furthermore, provided comprising one or more openings for the introduction of air within an inlet channel from where the inhaled air of the user moves within the upper chamber through an inlet mouth provided in the frame. One or more outlet mouths are, furthermore, provided for discharging in the surrounding environment the air that is breathed out by the user. More in detail, the, or each outlet mouth, communicates with the lower chamber by a discharge duct provided at the frame. The mask can, furthermore, provide a purge valve to allow the water

introduced, in case, in the mask during its use, to be discharged.

[0006] Examples of full face masks for snorkelling are, for example, described in WO2015/170013 and WO2019053577.

[0007] However, the known full face masks have some drawbacks.

[0008] Firstly, if the user has a vision disability for which he/she needs to wear glasses he/she will need to wear contact lenses in order to correctly see the surrounding environment, in particular the underwater landscape, when he/she uses the full face mask. However, in case water infiltration within the diving mask, it can penetrate between the contact lenses and the user's eyes thus causing a lot of problems first of all impeding the user from correctly seeing the surrounding environment, but also causing the contact lenses to be removed from the eyes thus unavoidably lose the same. Graduated diving masks also exist i.e. provided with corrective lenses in such a way that who wear the mask can benefit of the same corrective action provided by the glasses that he/she wears in the everyday life. However, even though the range of corrective lenses for diving masks is large, in practice it is not possible to have exactly the corrective action needed by the user. This can cause troubles to the user when he/she wears the diving mask such as an excessive lacrimation and, therefore, can cause the impossibility of wearing the mask for a long time.

[0009] In addition to the above, normally, the graduated diving masks have high costs and need to be periodically replaced, especially in case of young people whose vision disability quickly changes over time.

[0010] Diving masks also exist that foresee the possibility for the user to wear the glasses under the mask. Examples of these kinds of masks are described in GB1258710, US2993209 and US7494218.

[0011] However, the solutions described in these documents do not allow, from the one hand, to guarantee the user to keep the glasses in the correct position of use and, on the other hand, to guarantee the necessary sealing conditions of the mask in order to avoid that the water can enter the mask. This situation would need to discharge the water from the mask with a great loss of time for the user, also because it is necessary to completely remove from the lenses of the glasses the drops of water which unavoidably adhere on their surface and which unavoidably impede the user from correctly seeing, operation that is not always possible to carry out when he/she is in the water.

Summary of the invention

[0012] It is, therefore, an object of the present invention to provide a mask, in particular a diving mask, known as "full face mask" that is able to overcome the aforementioned drawbacks of similar prior art products.

[0013] It is, in particular, an object of the present invention to provide a mask that allows a user to wear

his/her glasses during the use of the mask and, therefore, to guarantee a to correctly see during the use of the mask by people with a vision disability.

[0014] It is another object of the present invention to provide a mask that is able to guarantee the user to be able to breath, in particular to be able to breath in and to breath out, in a completely natural way during the use of the mask.

[0015] It is another object of the present invention to provide a mask which allows a user with a vision disability to correctly see the surrounding environment and that has a cost less than other similar prior art products.

[0016] It is also an object of the present invention to provide a mask for filtering air before feeding the air to a user having the aforementioned advantages.

[0017] It is a particular an object of the present invention to provide a system for the respiration of a user having the aforementioned advantages.

[0018] These and other objects are achieved by the mask, in particular a full face mask, according to the invention, comprising:

- a frame provided with an inlet mouth for the introduction of a flow of air, or other gas, during an inspiration phase and with at least an outlet mouth for the exit of a flow of air, or other gas, during an expiration phase;
- a visor made of a transparent material, said visor being arranged to engage said frame;
- a face member made of a flexible material configured to be engaged inside of said frame, said face member having a front surface facing towards said visor, a rear surface configured to be arranged, in use, in contact with the user's face, and being provided with a partition member configured to divide the volume between said visor and said face member into an upper chamber pneumatically connected with said inlet mouth, and a lower chamber arranged to house, in use, the nose and the mouth of the user and pneumatically connected with the, or each, outlet mouth;
- at least a one-way valve arranged to pneumatically connect the aforementioned upper chamber with the aforementioned lower chamber and configured to allow the air, or other gas, that is inspired through the aforementioned upper chamber to flow into the aforementioned lower chamber during the inspiration phase, and to impede, instead, to flow in the opposite direction, i.e. from the aforementioned lower chamber to the aforementioned upper chamber during the expiration phase;

whose main characteristic is that the aforementioned face member is provided with a first and a second passageways which extend between the front surface and the rear surface and, advantageously, made at opposite sides with respect to a longitudinal plane of the face member and that the aforementioned first and second passageways are configured to be crossed, in use, respec-

tively by a first and a second arm of a pair of glasses, in such a way to engage the same to the face member.

[0019] Other features and related embodiments of the present invention are set out in the dependent claims.

[0020] In particular, the first and the second passageways can be delimited, respectively, by a first lateral wall and a second lateral wall made at the face member. More in particular, the first and second lateral walls can be substantially conical-shaped, in particular the shape of a frustum of cone, the transverse cross section of which decreases going from the front surface to the rear surface.

[0021] Advantageously, the face member can be made of a material arranged to be elastically deformed in order to sealingly engage the first and the second arms of the aforementioned glasses when these are positioned, respectively, in the first and in the second passageway.

[0022] Advantageously, the first and the second passageways can be associated to at least a respective sealing element arranged to hydraulically isolate the front surface of the face member from the rear surface, when a respective arm of the glasses is positioned within the same.

[0023] In particular, the visor can comprise a base portion and at least a removable portion configured to removably sealingly engage with each other. More in particular, the aforementioned removable portion can be arranged to move between an assembled configuration where is sealingly engaged to the base portion, and a disassembled configuration, where it is possible to reach the front surface of the face member to position the first and the second arms of the glasses, respectively, at the first passageway and at the second passageway.

[0024] Advantageously, at least a portion of the visor, in particular the upper portion, can be made of an anti-reflective material, in particular that is able to filter the sun's rays and to avoid reflexes.

[0025] Preferably, the, or each, removable portion of the visor can be made of an anti-reflective material, i.e. able to filter the sun's rays and to avoid reflexes.

[0026] In particular, the, or each, removable portion of the visor can be made at the aforementioned upper chamber of the visor.

[0027] Advantageously, the, or each, inlet mouth is made at an upper portion of the frame.

[0028] In particular, the face member can be provided with at least an outlet channel configured to pneumatically connect the lower chamber of the visor with the, or each, outlet mouth.

[0029] According to another aspect of the invention, a system for the respiration of a user comprising:

- a mask provided with:
 - a frame having at least an inlet mouth for the introduction of air, or other gas, during an inspiration phase, and at least an outlet mouth for the exit of air, or other gas, breathed out by the

- user during an expiration phase;
- a visor made of a transparent material and engaged to said frame;
- a face member made of a flexible material configured to be engaged inside of said frame and having a rear surface configured to be positioned, in use, in contact with the user's face, said face member being provided with a partition member configured to divide the volume between said visor and said face member into an upper chamber pneumatically connected with said, or each, inlet mouth, and a lower chamber arranged to house, in use, the nose and the mouth of the user, said lower chamber being pneumatically connected with said, or each, outlet mouth;
- at least a one-way valve arranged to pneumatically connect said upper chamber with said lower chamber and configured to allow the flow of air, or other gas, to move from said upper chamber to said lower chamber during the inspiration phase, and, instead, to impede the same to move in the opposite direction, i.e. from said lower chamber to said upper chamber during the expiration phase;
- a pair of glasses;

said system being characterized in that said face member of said mask is provided with a first and a second passageway configured to be crossed, in use, respectively by a first and a second arm of glasses in such a way to engage the same to said face member.

Brief description of the drawings

[0030] The invention will now be shown with the following description of its exemplary embodiments, exemplifying but not limitative, with reference to the attached drawings in which:

- Fig. 1 diagrammatically shows a plan view from the rear of a mask according to the invention;
- Fig. 2 shows the mask of figure 1 a plan view from the rear provided with a pair of glasses positioned inside of the mask;
- Fig. 3A shows a portion of a possible embodiment of a mask, according to the invention, in order to highlight some structural aspects;
- Fig. 3B diagrammatically shows a transverse cross section of a detail of figure 3A;
- Fig. 4A shows a portion of an alternative embodiment of the mask of figure 3A;
- Fig. 4B diagrammatically shows a transverse cross section of a detail of figure 4A in order to highlight some structural aspects;
- Fig. 5A shows a portion of another alternative embodiment of the mask of figure 3A;

- Fig. 5B diagrammatically shows a transverse cross section of a detail of figure 5A in order to highlight some structural aspects;
- Figures from 6 to 10 show some possible alternative embodiments of the mask according to the invention.

Detailed description of some exemplary embodiments of the invention

[0031] In figure 1, a mask 1 according to the invention is diagrammatically shown. In particular, the mask 1 can be a diving mask, in particular of the type that is commonly called "full face mask", but can also be a protective mask for a user, of the type that is used in the medical field, for example in the hospitals, or more in general in environments that can be potentially contaminated by toxic substances, or, anyway, injurious to the health, and provided with a filtering device for filtering air, or other gas, present in the surrounding environment, for example given to the user by a feeding device in particular comprising a device for pumping air, or a mix of air and oxygen, or pure oxygen, when the user wears the mask 1.

[0032] According to a first embodiment, the mask 1 comprises a substantially oval frame 10, for example made of a rigid material, such as plastic material, for example polyethylene (PE), or Polyvinyl chloride (PVC), or other plastic material. The frame 10 has, in particular, an upper portion 13a and a lower portion 13b linked to each other by a first and a second lateral portion 14a and 14b. The mask 1 provides, furthermore, a visor 20 made of a transparent material, for example glass, or a plastic material, engaged to the frame 10. In particular, the visor 20 can be configured in such a way to protrude, in use, beyond a front edge 14c of the frame 10.

[0033] The frame 10 comprises at least an inlet mouth 11 for the introduction of air, or oxygen, or a mix of these, into the frame 10 same during an inspiration phase of the user, and at least an outlet mouth 12, for example a first and a second outlet mouth 12, for the exit of a flow of air, or other gas, or mix of gases, breathed out by the user, from the volume delimited by the frame 10, during an expiration phase. More in particular, the, or each outlet mouth 12, can be positioned at a lateral portion of the frame 10, as diagrammatically shown in figure 2, or at an upper portion of the same, as for example described in WO2019/053577 in the name of the same Applicant, or, even, laterally to the inlet mouth 11.

[0034] A face member 40 is engaged within the frame 10 that is made of a soft and flexible material, for example silicone. More in detail, the face member 40 has a front surface 41 facing towards the aforementioned visor 20, and a rear surface 42 configured to be positioned, in use, in contact with the face of the user who is wearing the mask 1. The face member 40 comprises, in particular, a partition member 43 configured to divide the volume between the visor 20 and the face member 40, into an upper chamber 21 pneumatically connected with the inlet mouth 11, and a lower chamber 22 arranged to house,

in use, the nose and the mouth of the user and pneumatically communicating with the, or each, outlet mouth 12.

[0035] In particular, the snorkel 30 has at least an inlet opening 31, at a first end portion 32 through which air, or other gas, enters into a longitudinal cavity 35 and from here reaches an exit opening 33, diagrammatically shown in figure 6 con broken line, at a second end portion 34 opposite to the first end portion 32. More in particular, the second end portion 34 of the snorkel 30 can be arranged to engage, in use, into an engagement portion 16 of the rigid frame 10, in particular at the inlet mouth 11, in such a way that the flow of air, or other gas, or mix of gas, breathed out by the user passes from the aforementioned longitudinal cavity 35 of the snorkel 30 to the upper chamber 21 of the visor 20 through the aforementioned outlet opening 33. The upper chamber 21 and the lower chamber 22 are pneumatically connected with each other by at least a one-way valve 50, for example 2 one-way valves 50. More precisely, the, or each, one-way valve 50 is configured to allow the flow of air, or other gas, or mix of gases, to pass from the upper chamber 21 to the lower chamber 22, during the inspiration phase, and to impede, instead, to pass in the opposite direction, i.e. from the lower chamber 22 to the upper chamber 21 during the expiration phase. In particular, as diagrammatically shown for example in figure 6, the, or each, one-way valve 50 can provide a deformable membrane 51 configured to move from closed configuration of the valve 50 to an open configuration of the same in order to allow the outflow of air, or other gas, from the upper chamber 21 to the lower chamber 22 during an inspiration phase, and to impede, instead, the flow of air, or other gas, to pass in the opposite direction, i.e. from the lower chamber 22 to the upper chamber 21, during an expiration phase.

[0036] According to the invention and diagrammatically shown in figure 1, furthermore, the face member 40 is provided with a first and a second passageway 45a and 45b which extend between the front surface 41 and the rear surface 42 of the face member 40 same. In particular, the first and the second passageways 45a and 45b are made at opposite sides with respect to a longitudinal plane 140 of the face member 40. More in particular, the first and the second passageways 45a and 45b are configured to be crossed, in use, respectively by a first and a second arm 105a and 105b of a pair of glasses 100 in such a way to engage the same to the face member 40 (figure 2).

[0037] Advantageously, the mask 1 comprises, furthermore, at least an outlet channel 60 configured, in particular, to pneumatically connect the aforementioned lower chamber 22 with the, or each, outlet mouth 12. According to a preferred embodiment of the invention, the outlet channel 60 can be made at the visor 20 and can be in pneumatic communication with the lower chamber 22 by at least an aperture not shown in the figures for simplicity. In particular, a first and a second outlet channel 60a and 60b can be provided made in the visor

20 at opposite sides of the mask 1. This can comprise, furthermore, a purge valve 85, for example at lower portion, to allow the outflow of the water in case it enters in the mask 1 during the use of the same. The frame 10 is, furthermore, advantageously provided with holes 17 to engage a strap, not shown in the figures for simplicity reasons, used for fastening the mask 1 to the head of the user who wears the same during operating conditions.

[0038] As diagrammatically shown in figures 3A and 3B, the first and the second passageways 45a and 45b are delimited respectively by a first and a second lateral wall 46a and 46b made at the face member 40. In particular, the first and the second lateral walls 46a and 46b can have a substantially conical shape. More in particular, the substantially conical shape of the first and of the second lateral wall 46a and 46b, the transverse cross section of which can decrease going from the front surface 41 to the rear surface 42. Advantageously, the material of the face member 40 can be arranged to elastically deform in such a way to sealingly engage the first and the second arms 105a and 105b of the glasses 100 when they are introduced, respectively, in the first and in the second passageway 45a, and 45b. According to the embodiment that is diagrammatically shown in the figures 4A and 4B, the lateral walls 46a and 46b of the first and of the second passageway 45a and 45b have a portion 47a and 47b which protrudes from the surface of the face member 40. Advantageously, each protruding portion 47a, or 47b, can be configured to provide a highly effective hydraulic seal when a respective arm 105a and 105b is introduced into the respective passageway 45a and 45b. In particular, the protruding portions 47a and 47b can have a thickness such that is possible to accurately and precisely control the capability to deform elastically, in particular to widen in order to fit with the size of the arms 105a and 105b and then to tighten thus assuring to provide the necessary hydraulic seal conditions.

[0039] According to the alternative embodiment that is diagrammatically shown in the figures 5A and 5B, the first and the second passageways 45a and 45b can be associated to at least a respective sealing element, for example two sealing elements 48a and 48b arranged to hydraulically isolate the front surface 41 from the rear surface 42 when the first and the second arms 105a and 105b of the aforementioned glasses 100 are positioned within them. It is opportune to note that even though in figure 5B, for simplicity reasons, a passageway having a cylindrical shape is shown, the possibility is, however, foreseen to use sealing elements also in case that the passageways 45 have substantially the shape of a frustum of cone.

[0040] In the figures from 6 to 10 further alternative embodiments of mask 1 according to the present invention are diagrammatically shown.

[0041] More in detail, as diagrammatically shown in figure 6, in case that mask 1 is a snorkelling diving mask or, anyway, a mask used for performing sport and rec-

reational activities in aquatic environment, an inspiration duct, or snorkel, 30 can be, furthermore, provided that have a tubular shape and is integral, in use, to the upper portion 13a of the rigid frame 10. In particular, the snorkel 30 can be arranged to removably engage the frame 10 at an engagement portion 16 of which is provided with, preferably at the upper portion 13a. The snorkel 30 will be provided with one or more apertures 31, which are arranged to allow, during the inspiration phase, the air, or other gas, to enter into the longitudinal cavity of the same and, therefore, through the inlet mouth 11, into the frame 10 from where it passes, at first, in the upper chamber 21 and, then, in the lower chamber 22 through the, or each, one-way valve 50. During the expiration phase, instead, the flow of air, or other gas, breathed out by the user is discharged from the mask 1 through, the, or each, outlet mouth 12, in particular after being crossed the, or each, outlet channel 60.

[0042] In the example that is diagrammatically shown in figure 7, instead, the mask 1 is of the type that is used for protecting a user from potentially injurious substances that are present in the surrounding environment. More precisely, in this case, the mask 1 is not provided with the aforementioned snorkel 30, but with a filtering device 55 arranged upstream of the inlet mouth 11, and able to destroy bacteria, or microorganisms, that can be present in the flow of air, or other gas, fed into the mask 1. Advantageously, the filtering device 55 can be configured to engage the frame 10 of the mask 1 upstream of the inlet mouth 11. In particular, the filtering device 55 can comprise a container body 52 having a tubular shape, for example a substantially cylindrical shape. More in particular, the container body 52 can comprise a base body 53 arranged to engage the frame 10, advantageously at the engagement portion 16, and a closure, or plug 54, arranged to removably engage with the base body 53. For example, the closure 54 can provide at least an aperture, for example a series of apertures, or slits 56 through which the flow of air, or other gas, enters into the base body 53, within which a filtering member 57, which is diagrammatically shown in figure 7 with a broken line, is, preferably, provided, in particular able to mechanically filter the dangerous particles that are present in the flow of air, or other gas, breathed in by the user and to holds microorganisms, bacteria, dusts, viruses, or other potentially dangerous polluting particles. In particular, the filtering member 57 can be of removable type in order to be replaced with a new filtering member. For example, the filtering member 57 can comprise one or more layers of a predetermined material such as nonwoven fabric, preferably formed by fibres of polypropylene, polyester, or other kind of synthetic fibres.

[0043] According to a further alternative embodiment of the invention, not shown for simplicity, also the, or each, outlet mouth 12 can be connected to a device for collecting the flow breathed out by the user, in case arranged to destroy toxins, bacteria, or viruses, that can be present avoiding to pollute the surrounding environ-

ment.

[0044] In particular, as diagrammatically shown in figure 8, the visor 20 can be reversibly engaged to the frame 10. More in detail, the frame 10 and the visor 20 can be provided with engagement members configured to removably engage with each other. For example, the engagement members 15 and 25 can be configured to be quickly engaged and disengaged with each other, and provide one or more "teeth" 25 at the visor 20, or frame 10, arranged to engage in respective holes 15 made, respectively, at the frame 10, or of the visor 20, only two of which are shown in figure 8. This solution allows to easily position the glasses 100, and in particular the arms, or rods, 105a and 105b in the respective passageways 45a and 45b made at the face member 40 and, therefore, engage the visor 20 to the frame 10 by the aforementioned engagement members 15 and 25, only in a second moment, in order to assemble the mask 1. According to a further alternative embodiment of the invention shown in figures 9A and 9B, the frame 10 and the visor 20 can be engaged with each other by a hinge 120 arranged to allow these to rotate with respect to one another in order to move the visor 20 and the frame 10 from a disassembled configuration (figure 9A) which allows to position the glasses 100 within the mask 1, and, in particular, the arms 105a and 105b, respectively, in the passageways 45a and 45b of the face member 40, to an assembled configuration (figure 9B). Also in this case engagement members can be however provided, not shown in the figures for simplicity, arranged to guarantee to firmly anchor the visor 20 to the frame 10 in the closed configuration.

[0045] According to a further alternative embodiment that is shown in figure 10, the mask 1 provides a visor 20 comprising a base portion 20a and at least a removable portion 20b, for example able to rotate with respect to the base portion 20a by a hinge 120b. In particular, in this case engagement members 25a and 25b can be, advantageously, provided respectively integral to the base portion 20a and to the movable portion 25b and arranged to removably mutually engage with each other in the assembled configuration indicated in figure 10 with a broken line.

[0046] As diagrammatically shown as an example in the figures 9A, 9B and 10, a stabilizer member 150 can be provided arranged to be interposed, in use, between the glasses 100 and the visor 20. In particular, the spacer member 150 can have a tubular shape. More in particular, the stabilizer member 150 can be configured to keep the glasses 100 at a determined distance from the visor 20. For example, the stabilizer member 150 can have a telescopic structure comprising at least a first and a second portion 151 and 152, for example having a tubular shape, arranged to slide one with respect to the other in such a way to allow the user to adjust the distance of the glasses 100, in particular of the lenses from the visor 20. In this way, it is possible to avoid that the glasses 100 can move from a correct position when the user uses the mask 1.

More in particular, the spacer member 150 can be provided with a fastening portion 155 arranged to constrain the spacer member 150 to the glasses 100.

[0047] In particular, the removable portion 20b of the visor 20, or a part of the same, preferably the upper portion 20', can be made of an anti-reflective material, i.e. able to filter the sun's rays and, therefore, avoid to have maddening reflexes on the glasses 100 of the user. For example, the transparent material of the visor 20 can be subjected to an anti-reflective treatment to be coated at least partially with at least a layer of a known anti-reflective material, for example fluorides of several materials such as calcium fluoride, magnesium fluoride, but also fluoropolymers, in case alternating to layers of zirconium dioxide, or layers of silicon-based materials, for example one or more layers of nanoparticles of mesoporous silica.

[0048] In particular, the upper portion 20' of the visor 20 can be planar, or substantially planar (see for example figure 8). In this way, it is possible to avoid distortion of the visual field for the user wearing the glasses.

[0049] The foregoing description of a specific embodiment will so fully reveal the invention according to the conceptual point of view, so that others, by applying current knowledge, will be able to modify and/or adapt for various applications such an embodiment without further research and without parting from the invention, and it is therefore to be understood that such adaptations and modifications will have to be considered as equivalent to the specific embodiment. The means and the materials to carry out the different functions described herein could have a different nature without, for this reason, departing from the field of the invention. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Claims

1. A mask (1) comprising:

- a frame (10) provided with an inlet mouth (11) for the introduction of a flow of air, or other gas, during an inspiration phase of a user, and at least an outlet mouth (12) for the exit of a flow of air, or other gas, breathed out by the user during an expiration phase;
- a visor (20) made of a transparent material, said visor (20) being arranged to engage said frame (10);
- a face member (40) made of a flexible material and configured to be engaged inside said frame (10), said face member (40) having a front surface (41) facing towards said visor (20) and a rear surface (42) configured to be positioned, in use, in contact with the user's face, and being provided with a partition member (43) configured to divide the volume between said visor (20) and said face member (40) into an upper

chamber (21) pneumatically connected with said inlet mouth (11), and a lower chamber (22) arranged to house, in use, the nose and the mouth of the user and pneumatically connected with said outlet mouth (12);

- at least a one-way valve (50) arranged to pneumatically connect said upper chamber (21) with said lower chamber (22) and configured to allow the air, or other gas, breathed in by the user to move from said upper chamber (21) to said lower chamber (22) during the inspiration phase, and, instead, to impede to move in the opposite direction, i.e. from said lower chamber (22) to said upper chamber (21) during the expiration phase;

said mask (1) being **characterized in that** said face member (40) is provided with a first and a second passageway (45a, 45b) which extend between said front surface (41) and said rear surface (42) **in that** said first and second passageways (45a, 45b) are made at opposite sides with respect to a longitudinal plane (140) of said face member (40) **and in that** said first and second passageways (45a, 45b) are configured to be crossed, in use, respectively by a first and a second arm (105a, 105b) of a pair of glasses (100) in such a way to be engaged to said face member (40).

2. Mask (1), according to claim 1, wherein each said first and second passageways (45a, 45b) are delimited, respectively, by a first and a second lateral wall (46a, 46b) made at said face member (40), said first and second lateral walls (46a, 46b) having a substantially conical shape, the transverse cross section of which decreases going from said front surface (41) to said rear surface (42).
3. Mask (1), according to claim 1, or 2, wherein said face member (40) is made of a material arranged to be elastically deformed in order to sealingly engage said first and second arms (105) of said glasses (100) when they are introduced, respectively, into said first passageway (45a) and into said second passageway (45b).
4. Mask (1), according to any of the previous claims, wherein said first and said second passageways (45a, 45b) are associated to at least a respective sealing element (48a, 48b) arranged to hydraulically isolate said front surface (41) from said rear surface (42) when said first and second arms (105a, 105b) of said glasses (100) are positioned respectively in said first and second passageways (45a, 45b).
5. Mask (1), according to any of the previous claims, wherein said visor (20) and said frame (10) are configured to move between an assembled configura-

tion where said visor (20) is sealingly engaged to said frame (10), and a disassembled configuration, where said visor (20) can be moved away from said frame (10) in order to position said arms (105a, 105b) of said glasses (100) respectively in said first and second passageways (45a, 45b) from the side of said front surface (41).

6. Mask (1), according to any of the previous claims, wherein said visor (20) is rotatably connected to said frame (10), in such a way to move between an assembled configuration, where said visor (20) is sealingly engage to said frame (10), and a disassembled configuration, where a part of said visor (20) is spaced from said frame (10).

7. Mask (1), according to any of the previous claims, wherein said visor (20) comprises a base portion (20a) and at least a removable portion (20b) configured to removably sealingly engage with each other, in such a way that said removable portion (20b) is arranged to move between an assembled configuration where is sealingly engaged to said base portion (20a), and a disassembled configuration, where it is possible to reach said face member (40) from the side of said front surface (41) to position said first and second arms (105a, 105b) of said glasses (100), respectively, at said first passageway (45a) and at said second passageway (45b).

8. Mask (1), according to any of the previous claims, wherein at least a part of said visor (20) is made of an anti-reflective material.

9. Mask (1), according to any of the previous claims, wherein a stabilizer member (150) is, furthermore, provided arranged to be interposed, in use, between said glasses (100) and said visor (20), said stabilizer member (150) being configured to keep said glasses (100) in a correct position with respect to said visor (20).

10. Mask (1), according to any of the previous claims, wherein a filtering device (55) is, furthermore, provided configured to be connected to said frame (10) upstream of said inlet mouth (11), said filtering device (55) being arranged to destroy bacteria, or microorganisms, in case these are present in said flow of air, or other gas, fed into said mask (1).

11. Mask (1), according to claim 10 wherein said filtering device (55) comprises a container body (52) of tubular shape, said container body (52) comprising a base body (53) arranged to engage said frame (10) at an engagement portion (16), and a closure (54) arranged to removably engage said base body (53).

12. Mask (1), according to claim 11 wherein said closure

(54) is provided with a plurality of apertures, or slits (56) through which said flow of air, or other gas, is arranged to enter into said base body (53).

13. Mask (1), according to claim 12 wherein inside of said base body (53) a filtering member (57) is provided arranged to mechanically block any dangerous particles present in said flow of air, or other gas, breathed in by the user and to hold microorganisms, bacteria, dusts, viruses, or other potentially dangerous polluting particles.

14. Mask (1), according to claim 13 wherein said filtering member (57) being removable in order to be replaced with a new filtering member, said filtering member (57) comprising at least a layer of a predetermined material formed by fibres of polypropylene, polyester, or synthetic fibres of different type.

15. A system for the respiration of a user comprising:

- a mask (1) provided with:

- a frame (10) having at least an inlet mouth (11) for the introduction of air, or other gas, during an inspiration phase, and at least an outlet mouth (12) for the exit of a flow of air, or other gas, breathed out by the user during an expiration phase;

- a visor (20) made of a transparent material and engaged to said frame (10);

- a face member (40) made of a flexible material configured to be engaged inside of said frame (10) and having a rear surface (41) configured to be positioned, in use, in contact with the user's face, said face member (40) being provided with a partition member (43) configured to divide the volume between said visor (20) and said face member (40) into an upper chamber (21) pneumatically connected with said, or each, inlet mouth (11), and a lower chamber (22) arranged to house, in use, the nose and the mouth of the user, said lower chamber (22) being pneumatically connected with said, or each, outlet mouth (12);

- at least a one-way valve (50) arranged to pneumatically connect said upper chamber (21) with said lower chamber (22) and configured to allow the flow of air, or other gas, to move from said upper chamber (21) to said lower chamber (22) during the inspiration phase, and, instead, to impede the same to move in the opposite direction, i.e. from said lower chamber (22) to said upper chamber (21) during the expiration phase;

- a pair of glasses (100);

said system (1) being **characterized in that** said face member (40) of said mask is provided with a first and a second passageway (45a, 45b) configured to be crossed, in use, respectively by a first and a second arm of the glasses in such a way to be engaged to said face member (40).

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Fig. 1

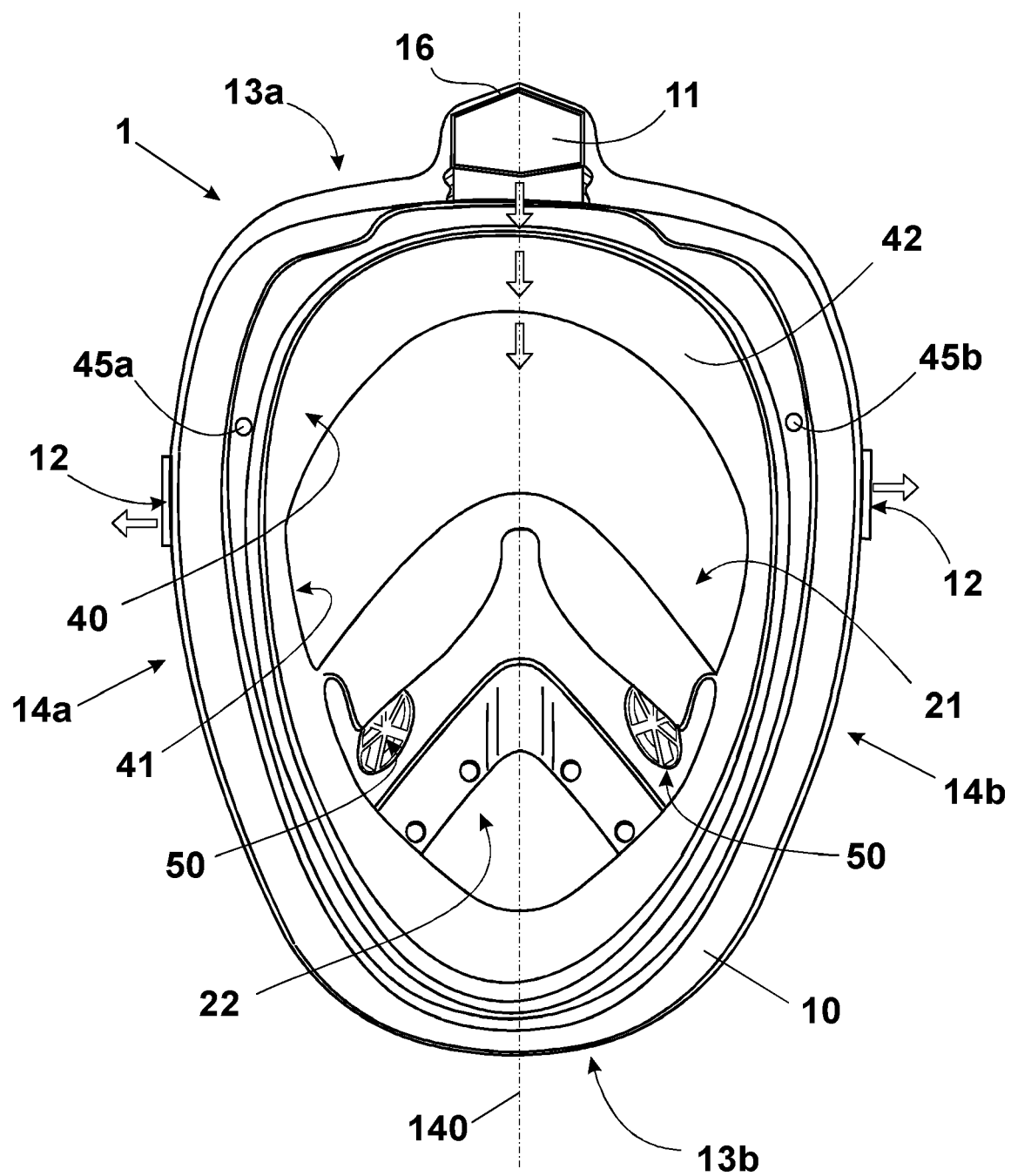


Fig. 2

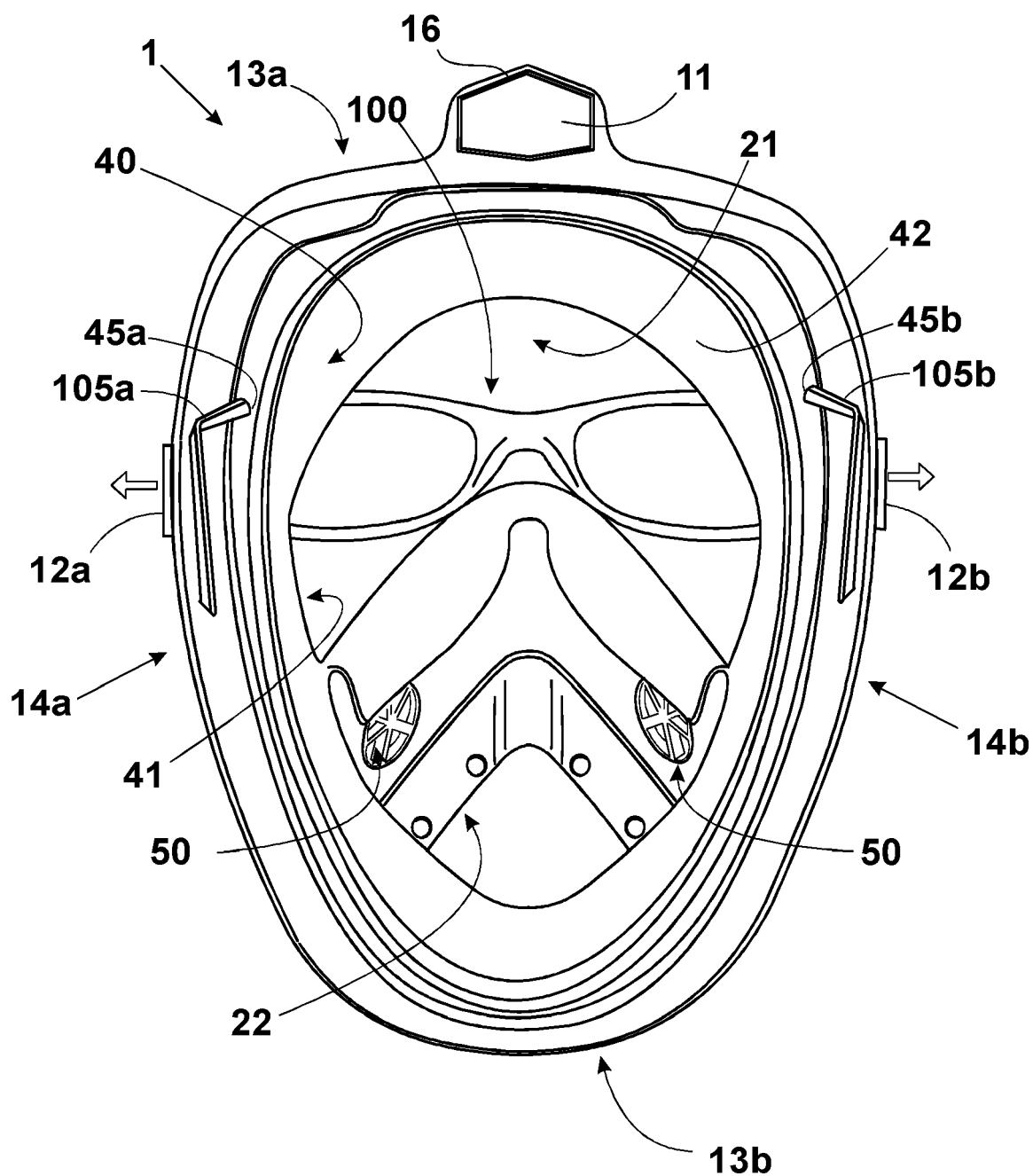


Fig. 3B

Fig. 3A

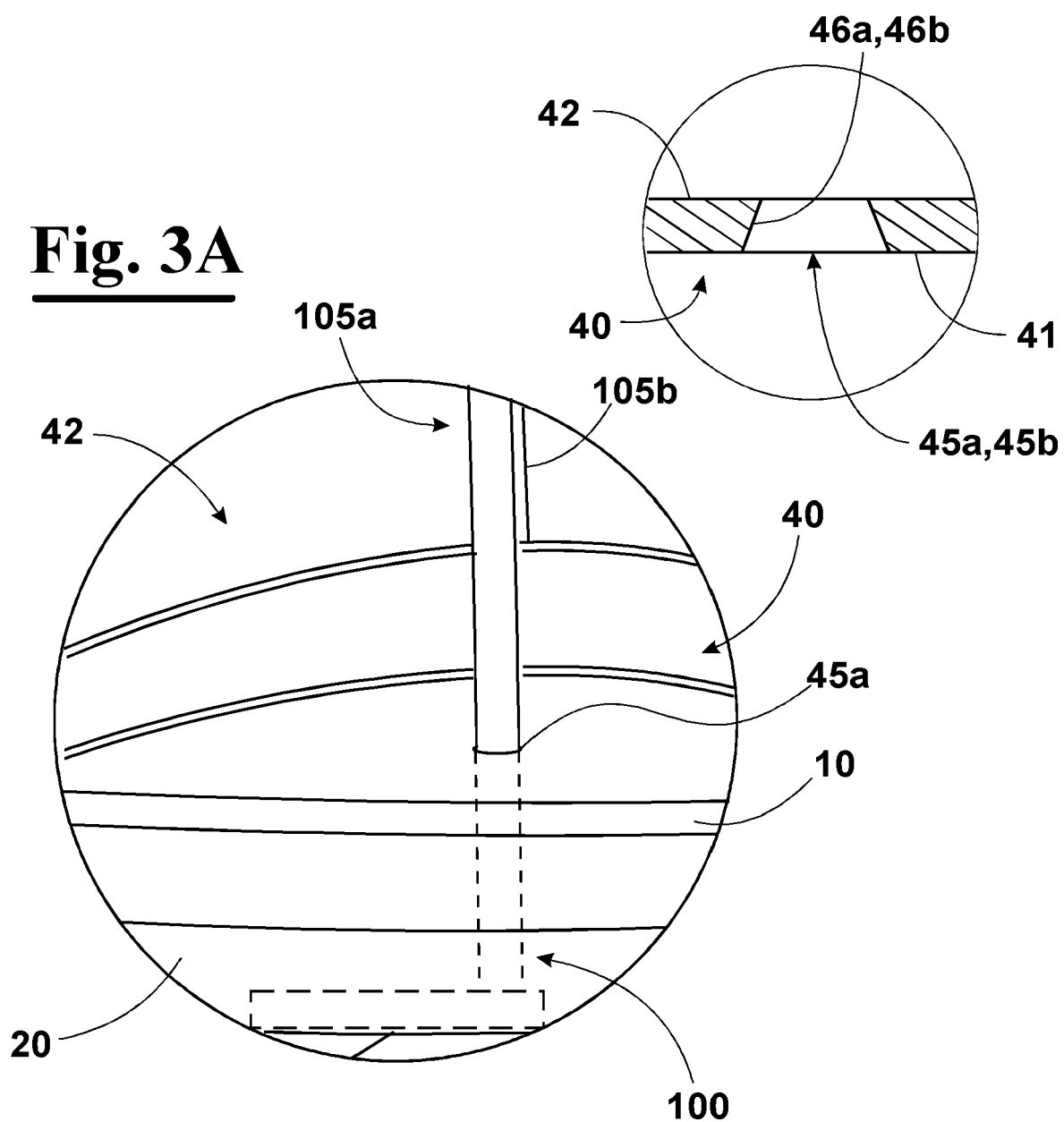


Fig. 4B

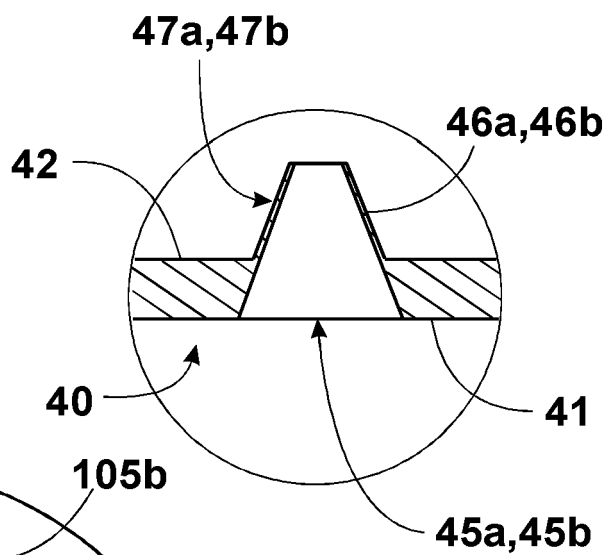


Fig. 4A

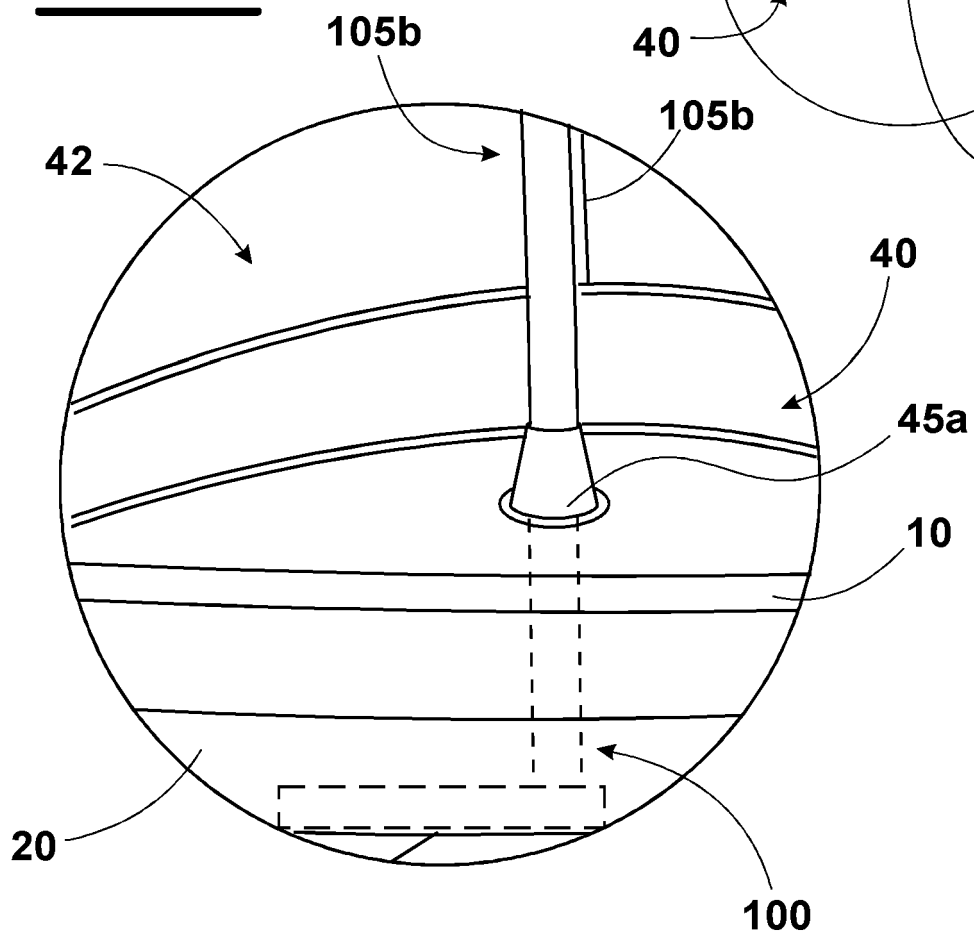


Fig. 5B

Fig. 5A

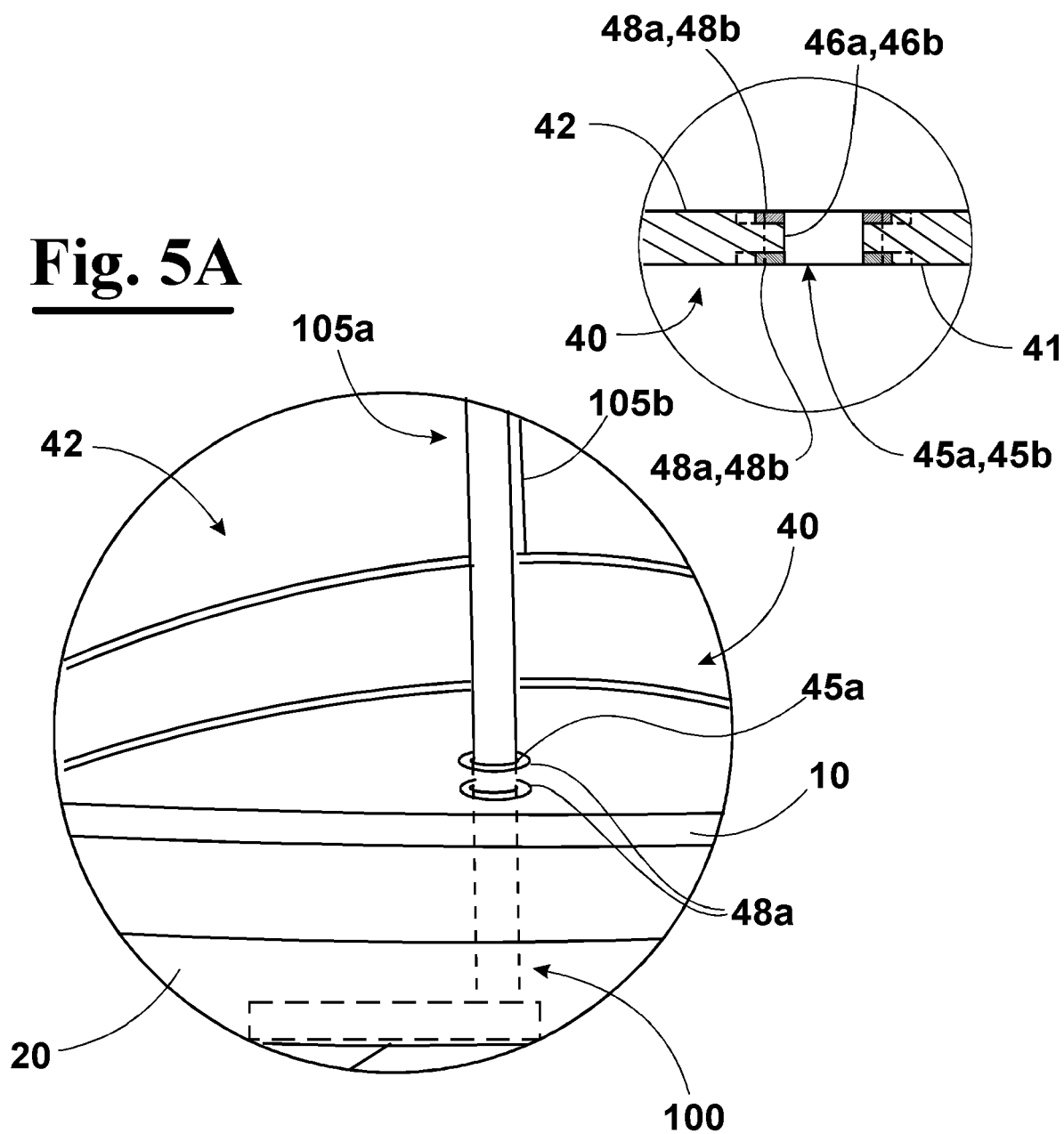
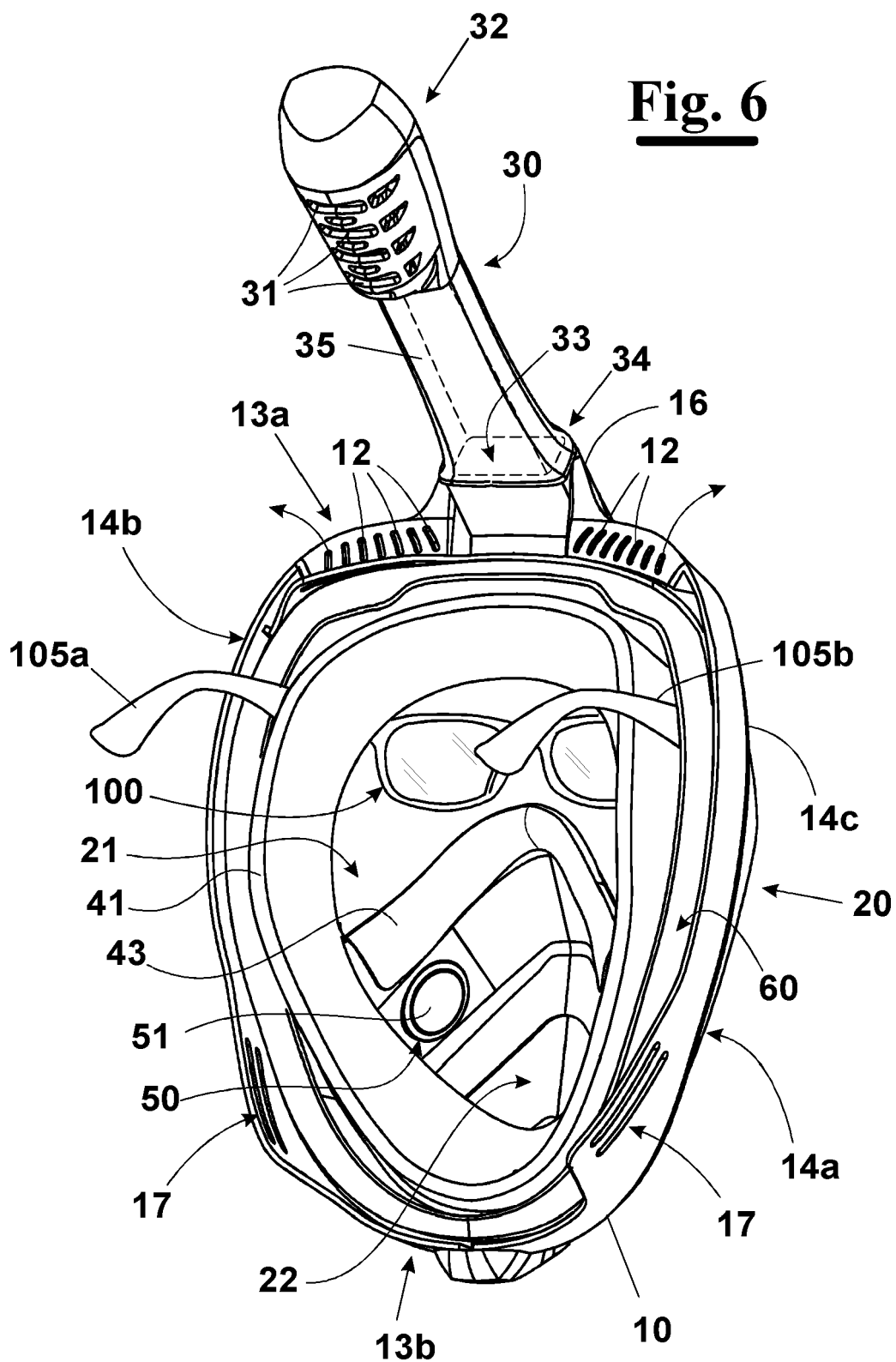


Fig. 6



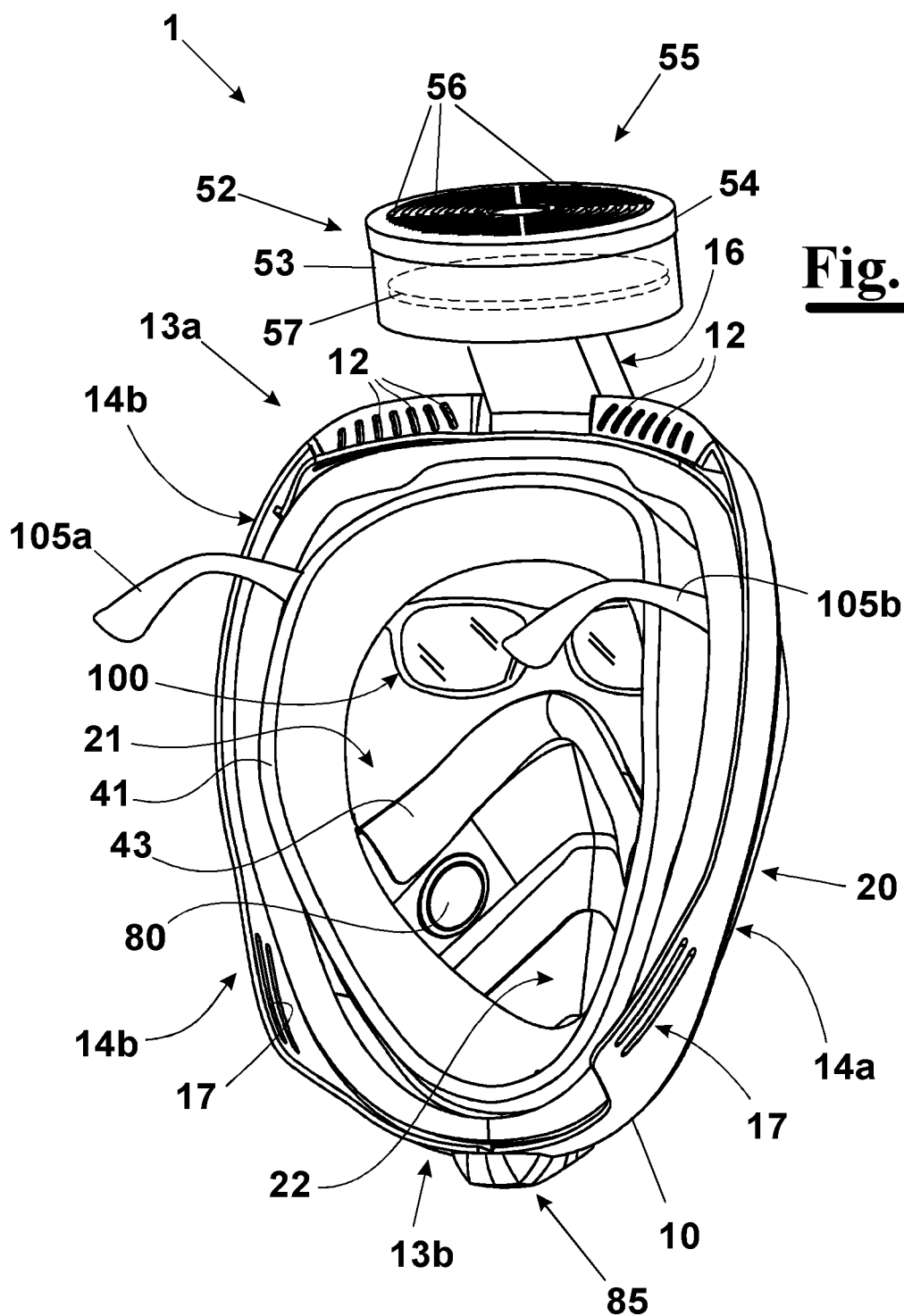


Fig. 8

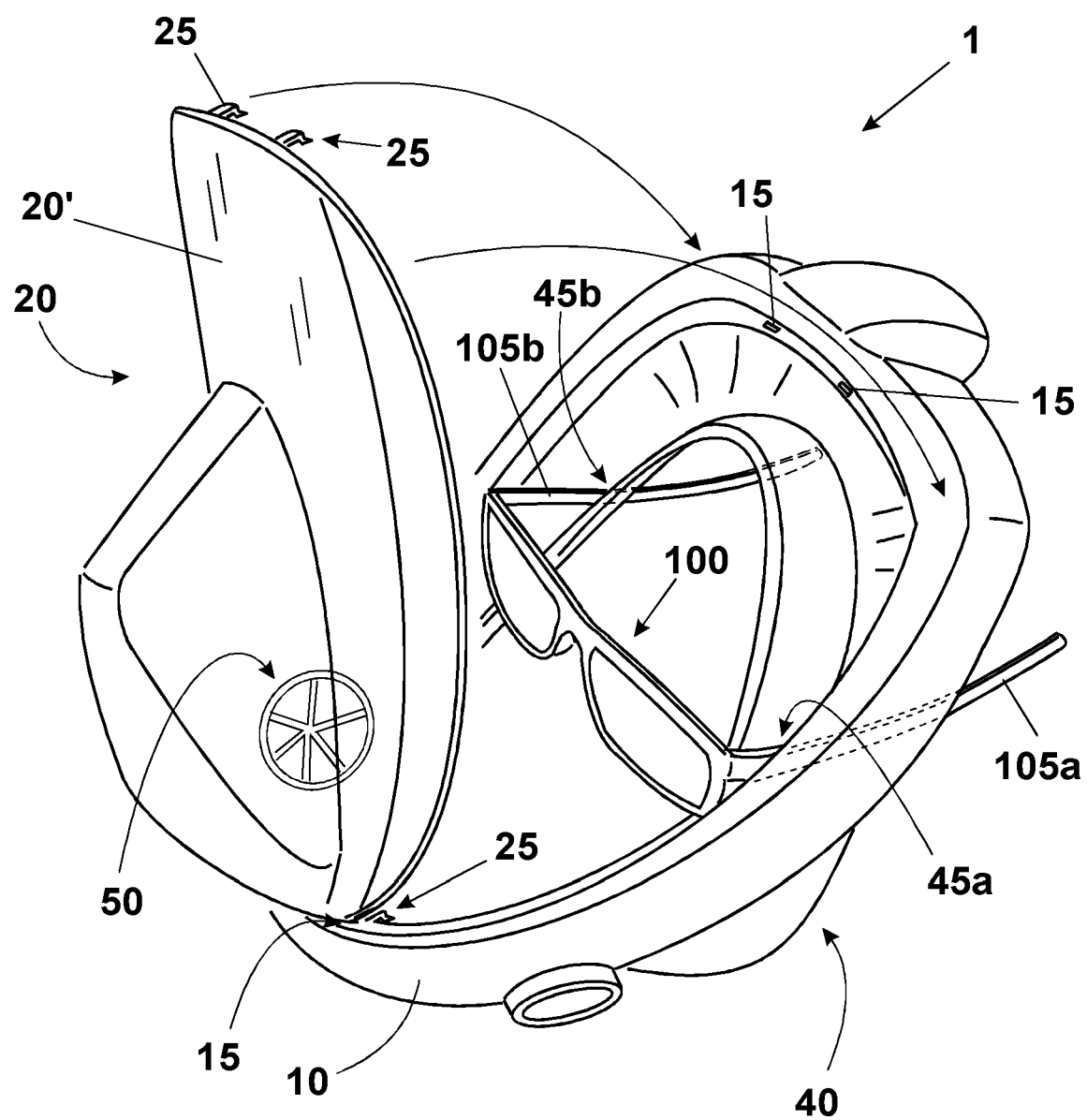


Fig. 9A

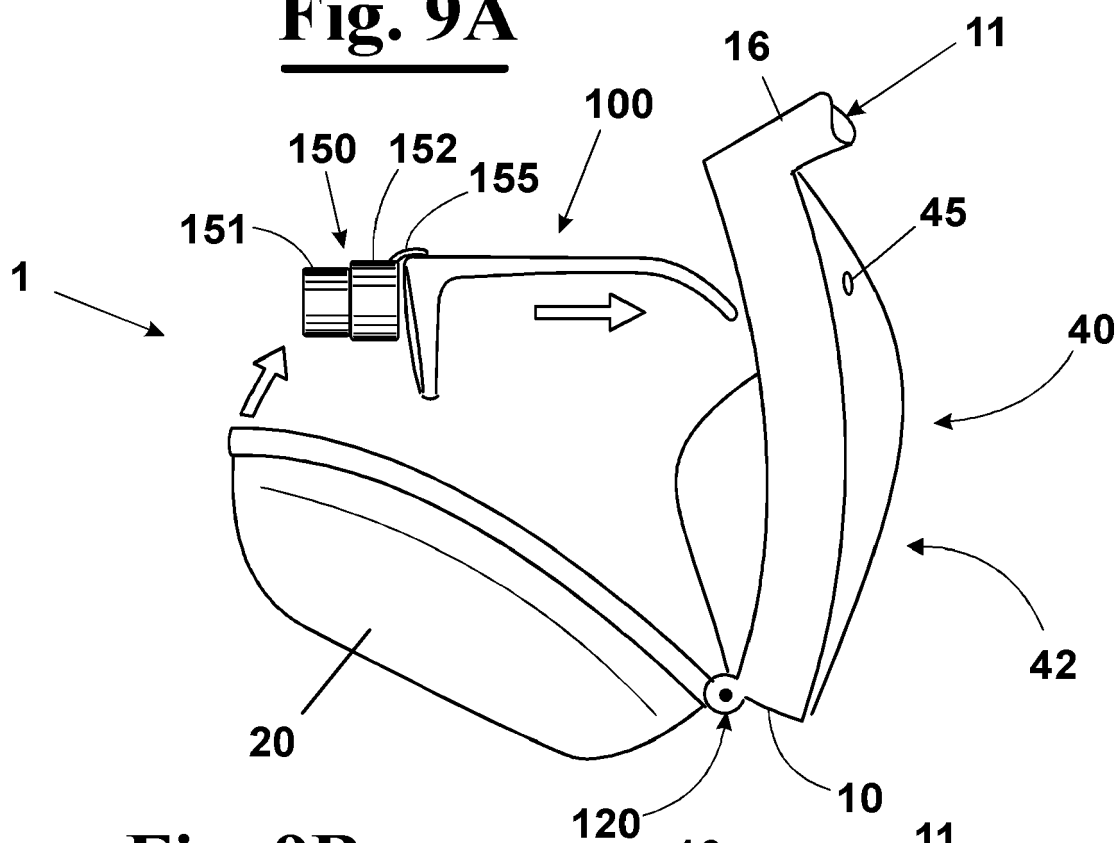


Fig. 9B

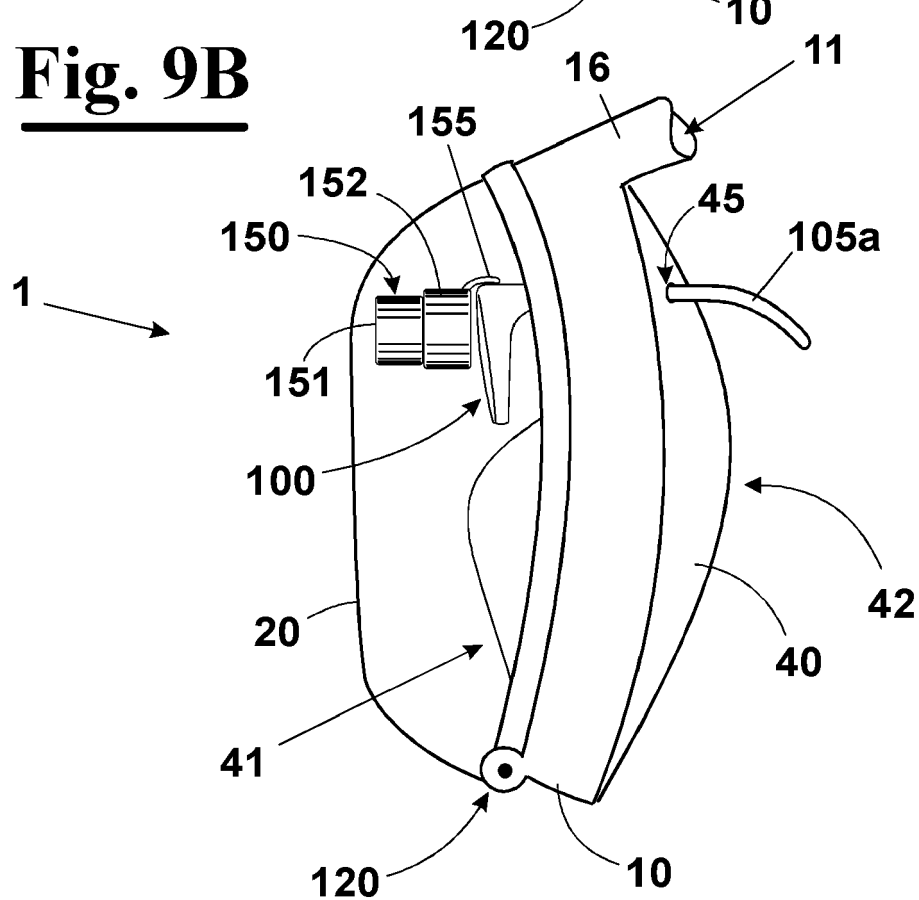
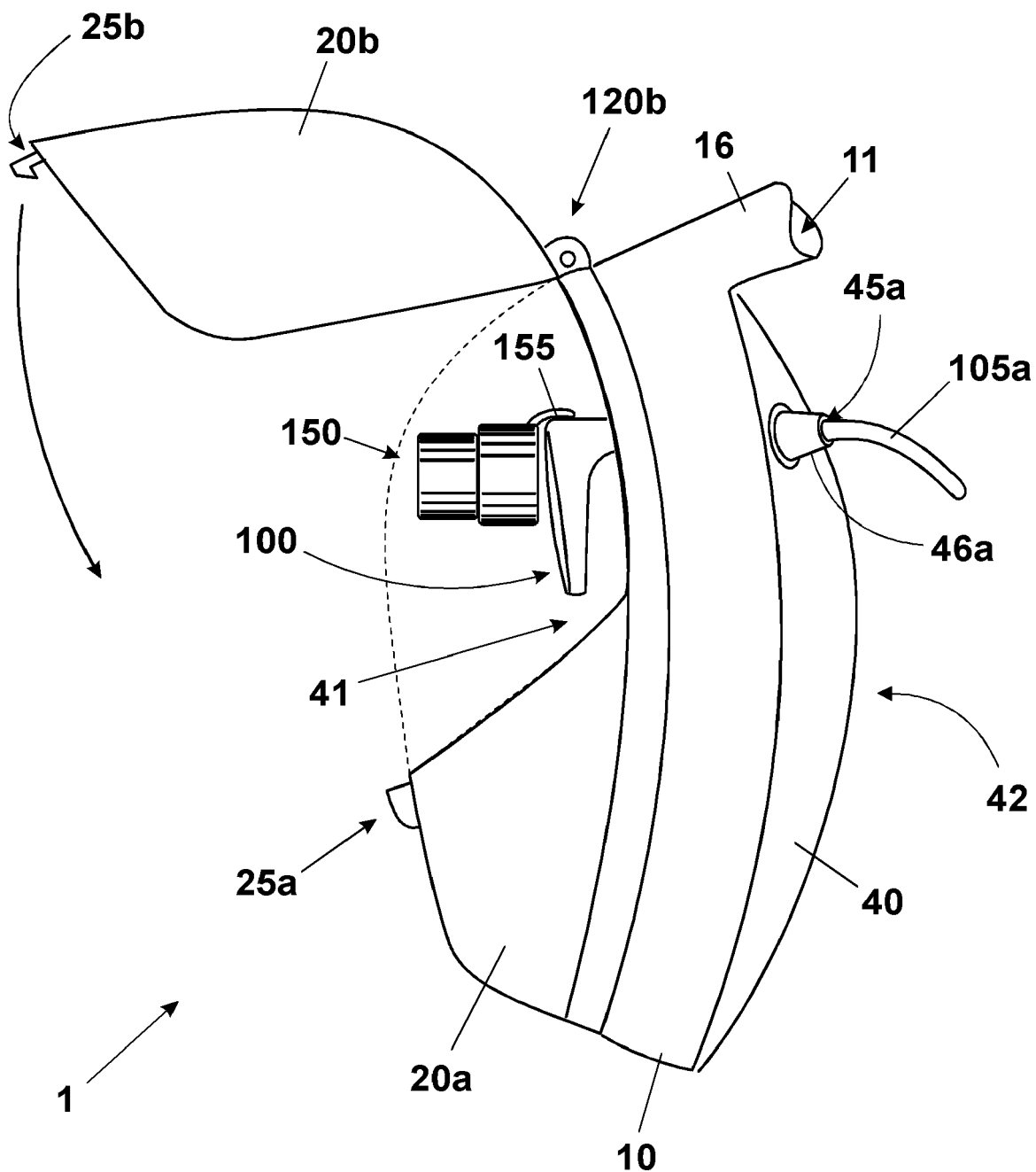


Fig. 10





EUROPEAN SEARCH REPORT

Application Number

EP 21 18 5983

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 1 258 710 A (HELLY HANSEN) 30 December 1971 (1971-12-30) * page 1, line 34 - line 78 * * figure *	1-15	INV. A62B18/08 B63C11/16
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A	US 7 494 218 B1 (ROTELLA JOHN R [US]) 24 February 2009 (2009-02-24) * column 4 * * figures 12,13 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			A62B A62C B63J B63C
3 The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 6 December 2021	Examiner Roldán Abalos, Jaime
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			

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 21 18 5983

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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06-12-2021

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