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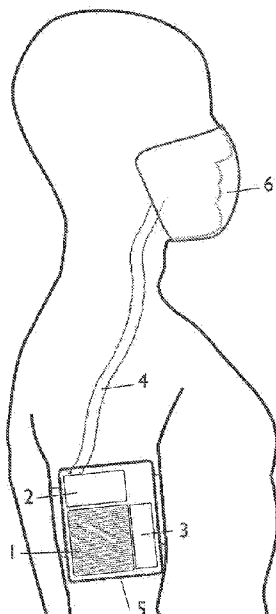


Fig. 1

(57) Abstract: The active respiratory protective device consists of an air handling unit (5) composed of an air filter (1) of the HEPA type series, a power bank (2) and a device (3) for pressurizing / flowing the air, which has a pneumatic connection (4) to the respiratory protective device (6). The respiratory protective device (6) is a face mask, transparent shield or respirator. The device (3) for pressurizing / flowing the air is a compressor, ventilator or blower. The pneumatic connection (4) is a hose, flex tube, channel or pipe and can be terminated by at least one nozzle. The air handling unit (5) may have fastening body elements or is implemented in a clamping head / neck skeleton (7) with at least one control element. A face holder (8) can be part of the clamping head / neck skeleton (7).

Active respiratory protective device

Technical field

The invention relates to an active respiratory protective device essentially as an overpressure air washer applied directly to the protected person. The invention falls within the field of personal protective and hygienic human necessities.

Background of the invention

Today, the world still grapples with the COVID-19 pandemic. Major cities are plagued by smog. People with asthma and allergies must face various allergens in the air. Infections are spread among people in confined spaces. Workers in various areas are exposed to dust pollution.

Various protective methods are currently known to protect persons, in particular against infection by pathogenic viruses, in general by microorganisms. The most basic protection is offered by wearing a hygienic face mask. However, no hygienic face masks or respirators guarantee 100% protection against infection to its wearer. This is among other things also due to the fact that they do not fit enough to the wearer's face.

Respirators are a higher degree of protection. Some types of respirators provide a higher level of protection, but only under specific conditions. For the highest possible efficiency, it is necessary to take certain measures: select a suitable respirator in terms of type and shape, put it on correctly and wear it properly. Globally, the N95 respirator is most preferred option for protection against Chinese coronavirus. This respirator protects its wearer from 95% of airborne particles with a diameter of 0.3 μm or larger. The equivalent for American N95 on our market might be FFP2 respirators. Respirators marked FFP3 provide the highest level of protection. These filter up to 99% of particles up to 0.6 μm in size. However, protective face masks, shields and respirators do not provide an easy and safe supply of fresh air, thus making breathing more difficult. In the case of face masks, additionally, a significant part of the already exhaled air is inhaled, including pollutants. Fixed protective devices also negatively affect speech intelligibility and comprehensibility.

A higher level of protection not only against viruses may be achieved by using a protective half mask or mask in combination with a suitably selected filter as a part of the personal protective equipment.

Full-face protective masks of e.g. 3M, CleanSpace and Spirotek brands provide protection against a wide range of risk factors. The ergonomically shaped protective mask is designated for the use in various areas of industry but is not convenient for ordinary social contact.

In the current state of the art, there are analogous solutions of diving suits with an "oxygen bottle" for firefighters or welders in a dangerous environment with closed air circulation, but these are also not usable in normal social contact.

The not yet fully explored issue of protective methods, especially from infection caused by pathogenic viruses and microorganisms challenged to propose in the context of current COVID-19 pandemic such protective method for the individual which would allow natural breathing, effective exchange of inhaled / exhaled air and its easy use. The aim is to provide a solution for anyone looking for protection from air pollutants (viruses, bacteria, smog, dust, pollen, etc.) and to provide a steady supply of fresh air anywhere and in any activity within the range of normal social contact (work, sports, shopping in a store, traveling by bus or plane, waiting room at the doctor, etc.). The result of this effort is the active respiratory protective device described in this invention.

Summary of the invention

The shortcomings in the prior art in the field of personal protective and hygienic human necessities, in particular against viruses and pathogenic microorganisms, are solved by the proposed active respiratory protective device according to the invention. For the purposes of the present invention, it is to be understood that the term "active" refers to the fact that into a respiratory protective device, e.g. into a face mask, which is in close contact with the person's face, the external filtered air is blown in under pressure for inhalation and the air is exhaled through the face mask or through leaks between the face mask and the face. Or, in the case of a shield use, the shield is advanced in front of the face, external filtered air is blown under pressure into the central open space between the shield and the face for inhalation and the air is exhaled through the peripheral space between the shield and the face. Or, in the case of a respirator used which is in close contact with

the person's face, external filtered air is blown into the respirator-enclosed space for inhalation under pressure and the air is exhaled through an exhalation valve. It is a simple version of the solution that provides the basic functionality, namely the supply of filtered air with the existing fixed protection of the face mask, shield or respirator type. The essence of the solution lies in the fact that the active respiratory protective device consists of at least one air handling unit composed of at least one air filter, a power bank respectively a source of electrical energy such as a battery or accumulator and the like, control electronics and at least one device for pressurizing / flowing the air, which has a pneumatic connection directly to the respiratory protective device or at least to the space of the respiratory protective device. Of course, the device for pressurizing / flowing the air also has a pneumatic connection to the air filter. For the purposes of the present invention, a face mask or a transparent elastic or rigid shield or an air curtain shield or respirator may be used as a respiratory protective device. It is also possible to use an air filter from the HEPA, SuperHEPA or ULPA type series or another suitable type of filter or combination of filters. For the purposes of the present invention, a compressor or a ventilator or a blower may be used as the device for pressurizing / flowing the air. The device for pressurizing / flowing the air is connected to a power bank and sucks air through an air filter, which also captures the corona virus of about 0.125 μm in size. The filtered air is forced under pressure by a pneumatic connection to a respiratory protective device. For the purposes of the present invention, a breathing hose, flex tube, pipe or channel in some part of the device may be considered a pneumatic connection. Then there are several options for bringing clean filtered air to a person's face. If a face mask or respirator is used, the filtered air may be brought to the face by sliding the outlet of the hose or flex tube under the face mask or respirator, thereby creating an air overpressure under the face mask or under the respirator. If e.g. a transparent plastic shield in front of a person's face covering at least the area of the nose and mouth or cheeks is used as a respiratory protective device, then it is suitable that the outlet of the pneumatic connection is in the area of the respiratory protective device terminated by several nozzles, by routing of which creation of a stable slightly pressurized area with clean filtered air intended for inhalation may be achieved, whereby the pneumatic connection could again be realized by hoses or flexi tubes and the like. An alternative to a transparent plastic shield mounted in front of a person's face covering at least the area of the nose and mouth or cheeks is an air

curtain shield realized by a pneumatic connection in the area of a respiratory protective device, which is terminated by at least two directional nozzles to create an air curtain shield.

From a design point of view, the solution provides many possibilities how and where to place, mount the air handling unit as a compact unit or its individual components, which do not have to be grouped into one compact unit, but may be separately distributed in the construction of active respiratory protective device while maintaining their interconnections and functional links.

In one embodiment, the air handling unit forms one compact unit with the included air filter, power bank and a device for pressurizing / flowing the air. In this case, the skeleton of the air handling unit has fastening body elements, which may be e.g. velcro tapes or rubber zippers, through which the skeleton of the air handling unit is attached, e.g. to a person's shoulder or waist. The fastening body elements may also be straps which are fastened to the air handling unit and the strap is hung vertically or obliquely over the person's shoulder. The fastening body elements may be e.g. leather or plastic eyes by which the air handling unit is put on the belt. In the simplest case, the air handling unit can only be inserted into a bag, handbag, pocket of clothing and the like.

In a second embodiment, the air handling unit again forms one compact unit with the included air filter, power bank and a device for pressurizing / flowing the air, whereby this air handling unit is implemented in a clamping head skeleton with at least one control element. In this case, the clamping head skeleton is formed by a flexible semicircle reaching over the vertex from the left ear to the right ear. The left and right air handling units are located in the area of ears in the end parts of the flexible semicircle. In an analogous solution, only one air handling unit may be inserted into the flexible semicircle created in such a way reaching over the top of the head from the left ear to the right ear. The second part of the flexible semicircle would remain free or some other further supporting elements of the active respiratory protective device would be located there. In an analogous solution, the air handling unit can have its structural elements distributed throughout the construction of the clamping head skeleton, where e.g. in the area of the left ear, only the device for pressurizing / flowing the air would be located in the clamping head skeleton, in the area of the right ear, only the air filter would be located in the clamping head

skeleton, in the central area in the top vertex part of the flexible semicircle of the clamping head skeleton e.g. power bank as a source of electricity would be located.

The active respiratory protective device can also be solved in such a way that at least one of the elements such as: loudspeakers, microphone, camera, augmented reality projector, LED lighting, photovoltaic cells, breath analyzer, air humidifier, shield holder is implemented in the clamping head skeleton. E.g. loudspeaker, breath analyzer and shield holder may be located in the second free part of the flexible semicircle of the clamping head skeleton, as described above. Alternatively, a camera, an augmented reality projector, LED lighting and photovoltaic cells may be located in the top vertex part of the flexible semicircle of the clamping head skeleton.

In a third embodiment, the air handling unit again forms one compact unit with the included air filter, power bank and a device for pressurizing / flowing the air, whereby this air handling unit is implemented in a clamping head skeleton with at least one control element. In this case, the clamping head skeleton is formed by a headband. The left and right air handling units are symmetrically located in the area of the skeleton ears. It is also possible to insert only one air handling unit in the area of one ear of the flexible headband. The second part of the headband would remain free or some other supporting elements of the active respiratory protective device would be located there. The clamping head skeleton formed by the headband may be supplemented by one or two face holders, in which the channels of the pneumatic connection of the device for pressurizing / flowing the air with the respiratory protective device may be guided.

In another embodiment, the air handling unit again forms one compact unit with the included air filter, power bank and a device for pressurizing / flowing the air, whereby this air handling unit is implemented in a clamping neck skeleton. In this case, the clamping neck skeleton is formed by a semicircle from the spinal part of the person's body encircling the person's neck. The clamping neck skeleton may be supplemented by one or two face holders in which the channels of the pneumatic connection of the device for pressurizing / flowing the air with the respiratory protective device may be guided.

Due to the fact that the space under the face mask, i.e. space between the face and the face mask has an overpressure of clean filtered air, greater than the ambient atmospheric pressure, the air contaminated by e.g. pathogenic

microorganisms does not have the possibility to penetrate into the airways of a person through the face mask, since it is located on the outside of the face mask at atmospheric pressure. As a result, the face mask does not have to be made of a breathable material, but may be made of transparent plastic. The person's exhaled air would leave the space under the face mask through leaks between the adjacent face mask and the face. Respectively, it would be possible to provide the face mask with sets of openings, through which clean filtered air supplied by the device for pressurizing / flowing the air would be continuously expelled and at the same time also the air exhaled by a person would be expelled through the same openings. This approach could also be applied to a respirator, which would also be made of transparent plastic. However, the squeezing out of the exhaled air would be through an exhaust valve of the respirator, which would be inserted into clear plastic. Such solutions are not self-serving, but fulfill the function of immediate natural contact between communicating persons, because communicating persons perceive the whole person's face even with their mouths and moving lips during communication.

An option is given also for a sophisticated solution, where the clamping head / neck skeleton with face holders are implemented in a helmet. Then at least one of the elements such as: loudspeakers, microphone, front camera, augmented reality projector, LED lighting, photovoltaic cells, breath analyzer, air humidifier, shield holder, essential oil reservoir may be located in the clamping head / neck skeleton.

The advantages of the respiratory protective device according to the invention are apparent from its externally manifested effects. The effects and originality lie in its unique configuration, which is basically an overpressure air washer applied directly to the protected person. Special filters (HEPA, SuperHEPA, ULPA or other suitable type of electrostatic, photocatalytic and UV filter) clean the air from microparticles, including the coronavirus up to $0.125\ \mu\text{m}$, in several steps. The system of e.g. microturbines of a compressor, blower or ventilator, in turn, ensure the supply of such pre-filtered air directly in front of the nose and mouth in a volume of 3 to 8 l / min. The vital capacity of the lungs, i.e. the amount of the air that is exchanged at maximum expiration after maximum inspiration, is about 3.5 l in women and 5 l / min in men on average. In addition, separate air distribution with higher pressure and volume of more than 16 l / min. creates a cloud-shaped air

shield in front of the face using a system of directional micronozzles. This ensures that the filtered air does not disperse into the outside environment and, on the other hand, protects the person from inhaling the outside unfiltered air. Pressurized face mask respectively the respirator, even if it is only made of ordinary fabric, prevents the penetration of possible infected ambient air with a lower atmospheric pressure.

The benefits of the solution according to the invention are: supply of healthy filtered and fresh air at the time of social separation, elimination of inhalation of exhaled air, possibility of normal social life, including work and sports. In addition, the possibly built-in analyzer of exhaled air can detect thousands of gaseous compounds in the breath and isolate those associated with occurrence of viruses and other pathogens in the air, allowing quick and timely diagnosis, and for yourself and your surroundings it allows functioning of the given individual and the whole society also in time of social separation. The highest version for demanding conditions contains electronic equipment, which includes a microphone, loudspeaker, front image and infrared camera, head-up augmented reality projector and bluetooth interface for connection to a smartphone, photovoltaic cells for charging, outdoor LED lighting. The solution is modular. The basic elements are e.g. a flow generator – blower, compressor or other device for pressurizing / flowing the air, system of exchangeable filters, energy sources of various capacities and several possible ways of supporting components. The basic elements may be extended by supplementary protection modules and smart functions. The solution is scalable, providing several levels of protection from the affordable basic version, through the extended to the highest to the toughest conditions.

Description of the drawings

The active respiratory protective device according to the invention is presented in the drawings, where Fig. 1 shows active respiratory protective device applied directly to a person's shoulder also with a detail of the air handling unit. Fig. 2 shows active respiratory protective device applied by a vertex arch directly to a person's head. Fig. 3 shows active respiratory protective device applied directly to a person's neck. Fig. 4 shows in a side view a clamping head skeleton of an active respiratory protective device applicable by a headband directly to a person's head. Fig. 5 shows in a top view a clamping head skeleton of an active respiratory protective device applicable by a headband directly to a person's head. Fig. 6 shows

in a side view a clamping head skeleton of an active respiratory protective device applicable by a headband directly to a person's head also with a shield. Fig. 7 shows in a top view a clamping head skeleton of an active respiratory protective device applicable by a headband directly to a person's head also with a shield from an air curtain formed by external nozzles. Fig. 8 shows in a side view a clamping head skeleton of an active respiratory protective device applicable by a headband directly to a person's head also with two separate shields, which is incorporated into the helmet. Fig. 9 shows in a side view a clamping head skeleton of an active respiratory protective device applicable by a headband directly to a person's head also with an associated full-face shield, which is incorporated into the helmet.

Examples of embodiment

It is to be understood that the individual embodiments of the active respiratory protective device according to the invention are presented for illustration and not as a limitation of the technical solutions. Those skilled in the art will find out or be able to ascertain by using no more than routine experimentation many equivalents to specific embodiments of the active respiratory protective device according to the invention. Such equivalents will also fall within the scope of the following claims.

It cannot be a problem for those skilled in the art to optimally design the active respiratory protective device. Therefore, these features have not been solved in detail.

Example 1

In this example of a particular embodiment of the invention, one configuration of the active respiratory protective device shown in Fig. 1 is described. The active respiratory protective device consists of an air handling unit 5, the covering body - box of which is attached to a person's shoulder with velcro. The air handling unit 5 consists of an air filter 1 of the SuperHEPA type, a power bank 2 with a capacity of 20,000 mAh and a device 3 for pressurizing / flowing the air, which in this case is an air piston compressor with an adjustable output of 2x4.5 l/min of compressed air. The air piston compressor has a pneumatic connection 4 through a hose with the respiratory protective device 6, which in this case is a textile face mask attached to

the head e.g. with rubber bands. Alternatively, the face mask may be made of transparent plastic and may have exhalation openings around the perimeter.

Alternatively, the air handling unit 5 may be worn in a garment pocket or slung over the shoulder on a strap or attached to a belt or hung around the neck and the like.

In another alternative, the respiratory protective device 6 is a textile respirator or a respirator made of transparent plastic.

In another alternative, a set of air filters 1 of the SuperHEPA type, an electrostatic filter, a photocatalytic filter and UV filter may be used.

Example 2

In this example of a particular embodiment of the invention, another configuration of the active respiratory protective device shown in Fig. 2 is described. The active respiratory protective device consists of two air handling units 5, which are formed by an air filter, in this case of a SuperHEPA filter and an electrostatic filter, a device for pressurizing / flowing the air, in this case an air turbine compressor and a power bank, thus forming a compact unit. In this case, the air handling units 5 are implemented in the clamping head skeleton 7 with a control element fulfilling the ON / OFF function for the device for pressurizing / flowing the air. In this case, the clamping head skeleton 7 is formed by a flexible semicircle reaching over the vertex from the left ear to the right ear. The left and right air handling units 5 are located in the area of ears in the end parts of the flexible semicircle. The air turbine compressors of the air handling units 5 have pneumatic connections 4 with the respiratory protective device 6, which in this case is a face mask attached to the head e.g. with rubber bands. Pneumatic connections 4 are in the form of channels in the body of the left and right face holder 8, which are part of the clamping head skeleton.

It is possible to implement an analogous solution in which the respiratory protective device 6 – face mask is replaced by a transparent plastic shield, which is anchored to the clamping head skeleton 7 or to the body of the face holder 8.

The pneumatic connection 4 by a channel may alternatively be replaced by a flex tube or a breathing hose. Attachment of the face mask to the head attached e.g. with rubber bands may alternatively be replaced by grip to the clamping head skeleton 7 or to the air handling unit 5 or to the body of the face holder 8.

In one analogous solution, only one air handling unit 5 may be inserted into the flexible semicircle of the clamping head skeleton 7 reaching over the top of the head from the left ear to the right ear. The second part of the flexible semicircle would remain free or some other further supporting elements of the respiratory protective device as e.g. a loudspeaker would be located there.

In a second analogous solution, the air handling unit 5 is no longer a compact unit, but can have its structural elements distributed throughout the construction of the clamping head skeleton 5, which is not shown in the figure. E.g. in the area of the left ear there would be only the device for pressurizing / flowing the air located in the clamping head skeleton 7, in the area of the right ear, only the air filter would be located in the clamping head skeleton and in the central area in the top vertex part of the flexible semicircle of the clamping head skeleton 7 e.g. power bank also with a possible connector for external charging would be located.

Example 3

In this example of a particular embodiment of the invention, further configuration of the active respiratory protective device shown in Fig. 3 is described. The active respiratory protective device consists of an air handling unit 5, which is already sufficiently described in the previous examples. In this case, the air handling unit 5 is implemented in the clamping head skeleton 7 with a control element fulfilling the ON / OFF function for the device for pressurizing / flowing the air. In this case, the clamping head skeleton 7 is formed by a flexible semicircle from the spinal part of the person's body encircling the person's neck. The clamping neck skeleton 7 may be supplemented by one or two face holders 8 in which the channels or pipes of the pneumatic connection 4 of the device for pressurizing / flowing the air with the respiratory protective device 6 – face mask may be guided.

Example 4

In this example of a particular embodiment of the invention, further configuration of the active respiratory protective device shown in Fig. 4 to 6 is described. The active respiratory protective device consists of two air handling units 5, which are already sufficiently described in the previous examples and is not a compact unit, but may have its structural elements distributed throughout the

construction of the clamping head skeleton 7. In this case, the air handling units 5 are implemented in the clamping head skeleton 7, which in this case is formed by a flexible headband. The clamping head skeleton 7 formed by the flexible headband is supplemented by two face holders 8, in which the devices 3 for pressurizing / flowing the air – blowers or ventilators are located and channels of the pneumatic connection 4 of the device 3 for pressurizing / flowing the air with respiratory protective device 6 are guided in them, which in this case is a face mask attached to the head e.g. with rubber bands. It is possible to implement an analogous solution in which the respiratory protective device 6 – face mask is replaced by a transparent plastic shield, which is anchored to the clamping head skeleton 7 or to the body of the face holder 8 as shown in Fig. 6. The location of the air filters 1, in this case of a SuperHEPA filter, photocatalytic filter and UV filter, is in the back part of the headband. In the side parts of the headband there are power banks 2 located. In the area of ears of the flexible headband there is a control element fulfilling the ON / OFF function for the device for pressurizing / flowing the air located, respectively loudspeaker, breath analyzer, shield holder and the like. As shown in Fig. 5, the channels of the pneumatic connection 4 are terminated by nozzles 9 for the supply of filtered air intended for breathing. This example illustrates one basic configuration of the layout of the individual functional elements of the device, without prejudice to other possible interchanges in the types of individual elements or their layouts, and this also applies to loudspeakers, microphone, front camera, augmented reality projector, LED lighting, photovoltaic cells, breath analyzer, shield holder, essential oil reservoir.

Example 5

In this example of a particular embodiment of the invention, further configuration of the active respiratory protective device shown in Fig. 7 with the support of Fig. 4 is described. The active respiratory protective device consists of two air handling units 5, which are already sufficiently described in the previous examples and is not a compact unit, but may have its structural elements distributed throughout the construction of the clamping head skeleton 7. In this case, the air handling units 5 are implemented in the clamping head skeleton 7, which in this case is formed by a flexible headband. The clamping head skeleton 7 formed by the flexible headband is supplemented by two face holders 8, in which the devices 3 for

pressurizing / flowing the air – blowers or ventilators are located and channels of the pneumatic connection 4 of the device 3 for pressurizing / flowing the air with respiratory protective device 6 are guided in them, which in this case is an air curtain shield. This is realized in such a way that it has both a pneumatic connection 4, which is terminated by at least two nozzles 9 for the supply of filtered air intended for breathing and also has a pneumatic connection 4, which is terminated in the area of the respiratory protective device 6 by at least two nozzles 21 to create an air curtain shield. The location of the air filters 1, in this case of a SuperHEPA filter, photocatalytic filter and UV filter, is in the back part of the headband. In the side parts of the headband there are power banks 2 located. In the area of ears of the flexible headband there is a control element fulfilling the ON / OFF function for the device for pressurizing / flowing the air located.

Example 6

In this example of a particular embodiment of the invention, further configuration of the active respiratory protective device shown in Fig. 8 is described. The active respiratory protective device consists of two air handling units 5, which are already sufficiently described in the previous examples and is not a compact unit, but may have its structural elements distributed at least in a part of the construction of the clamping head skeleton 7. The clamping head skeleton 7 with face holders 8 are implemented in a helmet 20. The helmet 20 also has a vision shield 19 and a transparent shield, which in this case serves as a respiratory protective device 6. In the clamping head skeleton 7 and in particular in the helmet 20 there are implemented: loudspeakers 10, microphone 17, front camera 12, augmented reality projector 13, shield holder 18.

Example 7

In this example of a particular embodiment of the invention, further configuration of the active respiratory protective device shown in Fig. 9 is described. The active respiratory protective device is sufficiently described in the previous example. In the clamping head skeleton 7 and in particular in the helmet 20 there are implemented: loudspeakers 10, microphone 17, front camera 12, augmented reality

projector 13, LED lighting 14, photovoltaic cells 15, breath analyzer 11, full-face shield holder 18, essential oil reservoir 16.

Industrial usability

Configuration of the active respiratory protective device according to the invention is intended: for the personal need of people in everyday life during periods of viral pandemics, for allergy sufferers, asthmatics, people in cities with high dust and smog concentrations and for medical staff, shop assistants, people in outpatient waiting rooms, workers in contaminated or dusty environment, drivers and passengers in buses, trains and planes, police officers, motorcyclists, cyclists, etc.

CLAIMS

1. Active respiratory protective device, **characterized in that** it consists of at least one air handling unit (5) composed of at least one air filter (1), a power bank (2) and at least one device (3) for pressurizing / flowing the air, which has a pneumatic connection (4) to the area of the respiratory protective device (6).
2. Active respiratory protective device according to claim 1, **characterized in that** the respiratory protective device (6) is a face mask.
3. Active respiratory protective device according to claim 1, **characterized in that** the respiratory protective device (6) is a transparent shield.
4. Active respiratory protective device according to claim 1, **characterized in that** the respiratory protective device (6) is an air curtain shield.
5. Active respiratory protective device according to claim 1, **characterized in that** the respiratory protective device (6) is a respirator.
6. Active respiratory protective device according to claim 1, **characterized in that** the air filter (1) is a filter from the HEPA, SuperHEPA or ULPA type series.
7. Active respiratory protective device according to claim 1, **characterized in that** the device (3) for pressurizing / flowing the air is a compressor.
8. Active respiratory protective device according to claim 1, **characterized in that** the device (3) for pressurizing / flowing the air is a ventilator.
9. Active respiratory protective device according to claim 1, **characterized in that** the device (3) for pressurizing / flowing the air is a blower.

10. Active respiratory protective device according to claim 1, **characterized in that** the pneumatic connection (4) of the device (3) for pressurizing / flowing the air with the respiratory protective device (6) is via a hose / breathing hose.

11. Active respiratory protective device according to claim 1, **characterized in that** the pneumatic connection (4) of the device (3) for pressurizing / flowing the air with the respiratory protective device (6) is via a flex tube.

12. Active respiratory protective device according to claim 1, **characterized in that** the pneumatic connection (4) of the device (3) for pressurizing / flowing the air with the respiratory protective device (6) is via a channel / pipe.

13. Active respiratory protective device according to claim 1, **characterized in that** the pneumatic connection (4) is in the area of respiratory protective device (6) terminated by at least one nozzle (9) for the supply of filtered air intended for breathing.

14. Active respiratory protective device according to claim 1, **characterized in that** the pneumatic connection (4) is in the area of respiratory protective device (6) terminated by at least two nozzles (21) to create an air curtain shield.

15. Active respiratory protective device according to claim 1, **characterized in that** the air handling unit (5) has fastening body elements.

16. Active respiratory protective device according to at least one of claims 1 to 15, **characterized in that** the air handling unit (5) is implemented in a clamping head / neck skeleton (7) with at least one control element.

17. Active respiratory protective device according to claim 16, **characterized in that** a part of the clamping head / neck skeleton (7) at least one face holder (8).

18. Active respiratory protective device according to claims 16 and 17, **characterized in that** the clamping head / neck skeleton (7) with face holders (8) are implemented in a helmet (20).

19. Active respiratory protective device according to claims 16 to 18, **characterized in that** in the clamping head / neck skeleton (7) and in the helmet (20) at least one of the following elements is implemented: loudspeakers (10), microphone (17), front camera (12), augmented reality projector (13), LED lighting (14), photovoltaic cells (15), breath analyzer (11), shield holder (18), essential oil reservoir (16) and air humidifier.

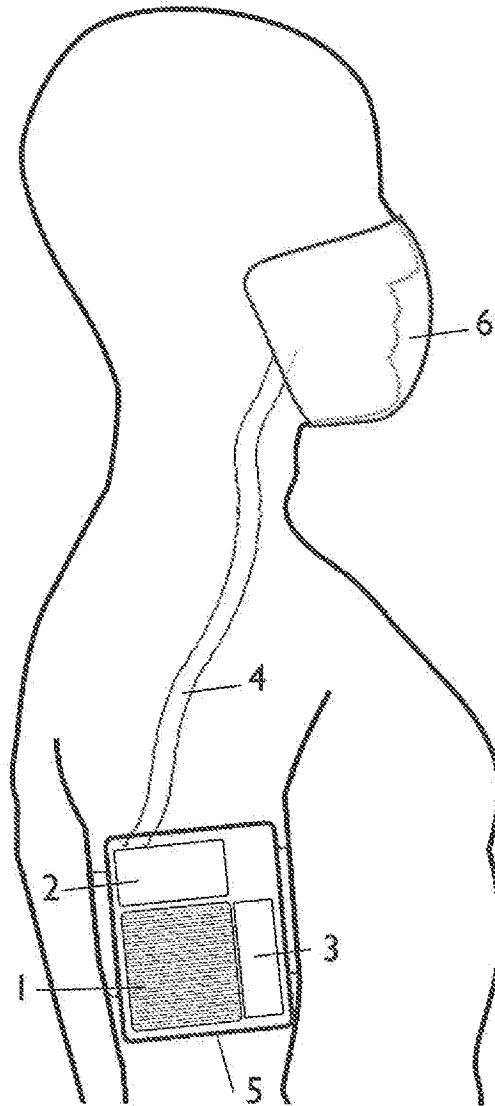


Fig. 1/9X *

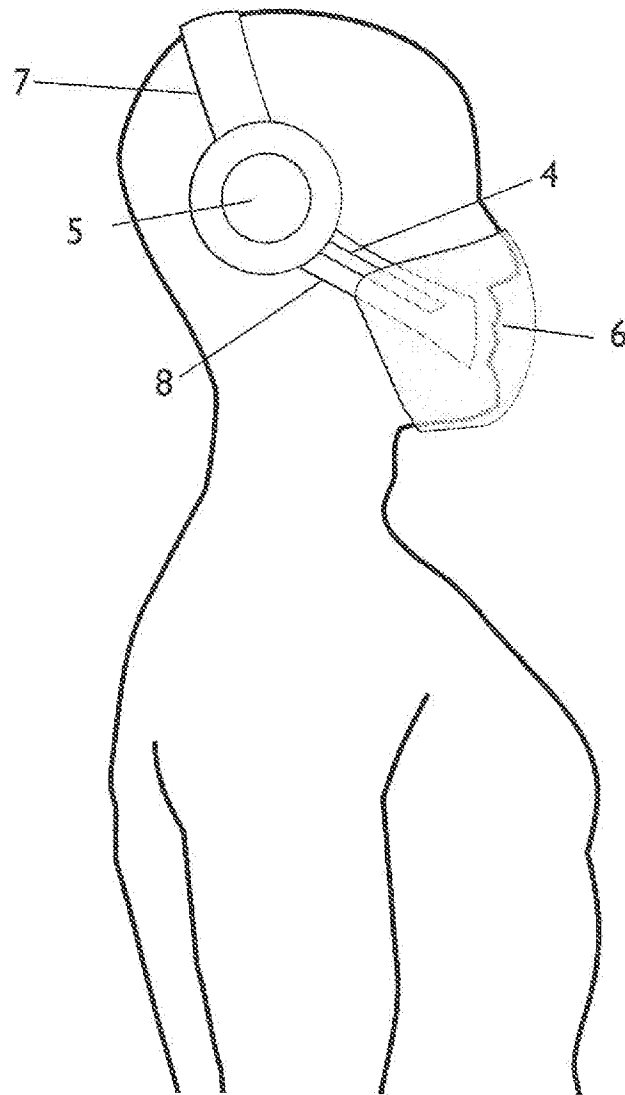


Fig. 2/9X *

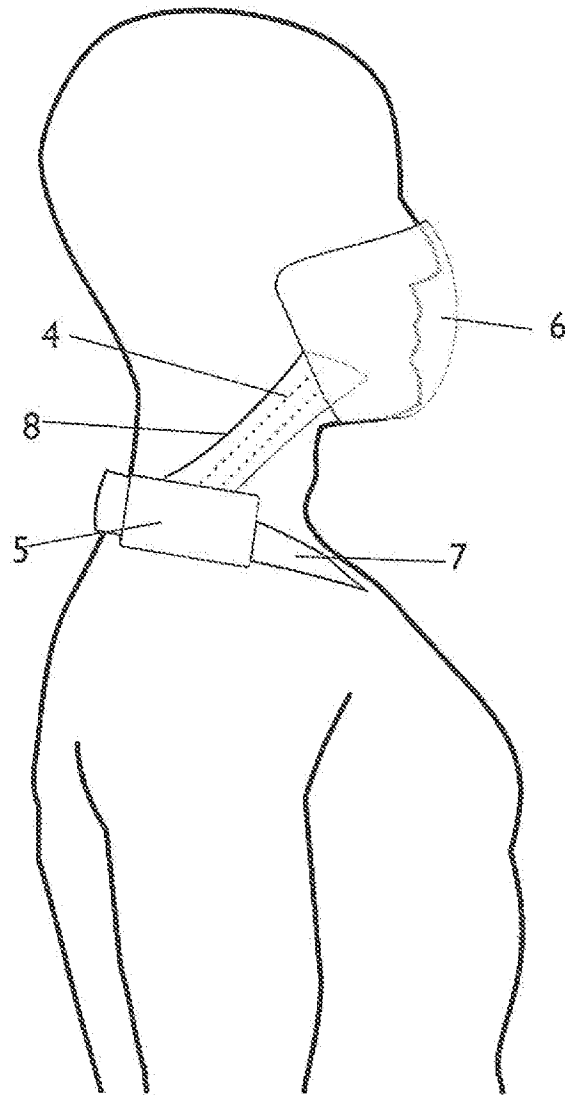


Fig. 3/2X *

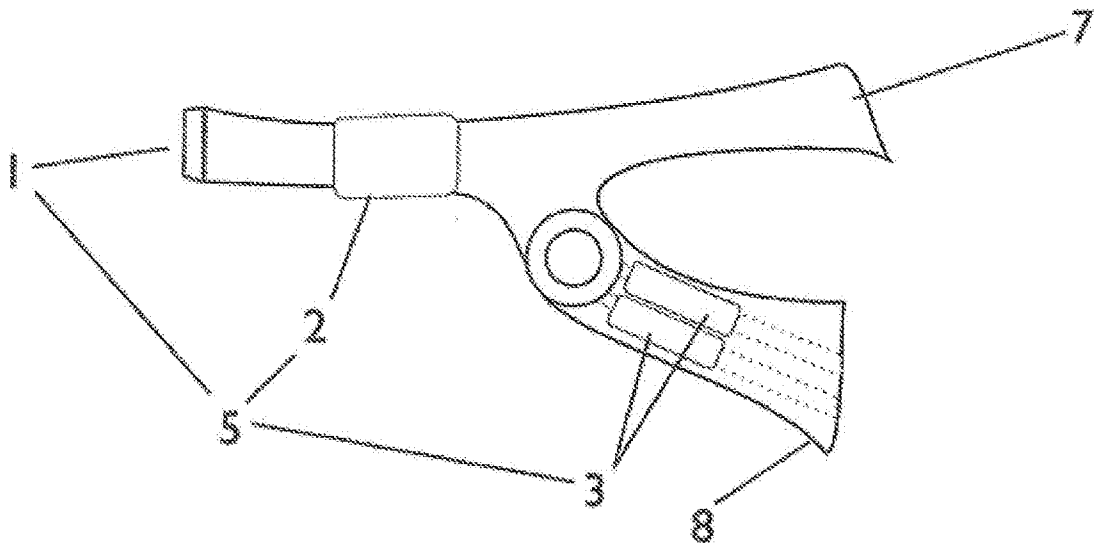


Fig. 4/9 *

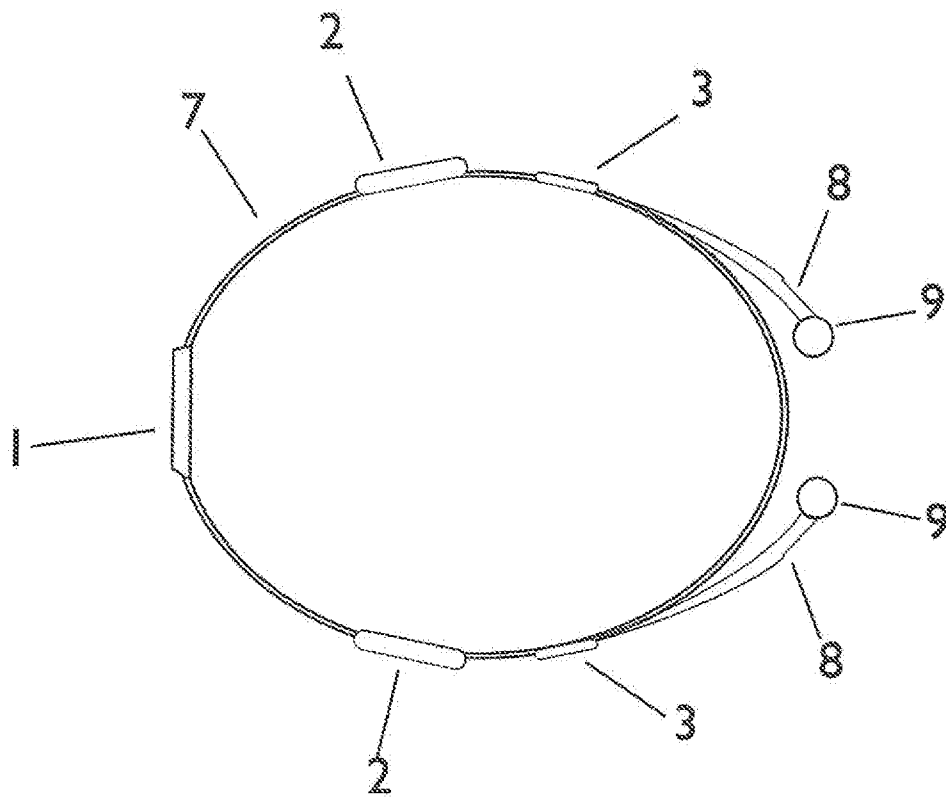


Fig. 5/9 *

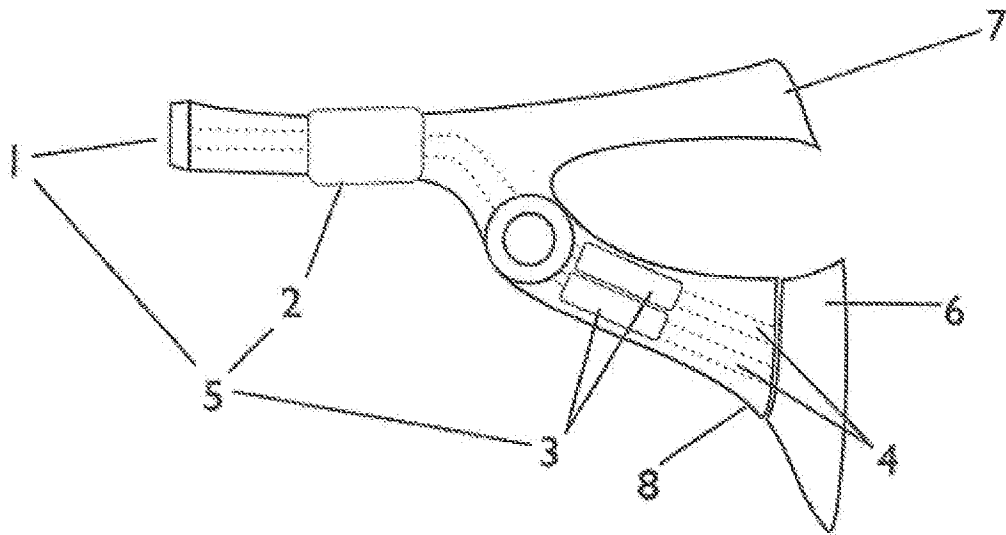


Fig. 6/9 XX *

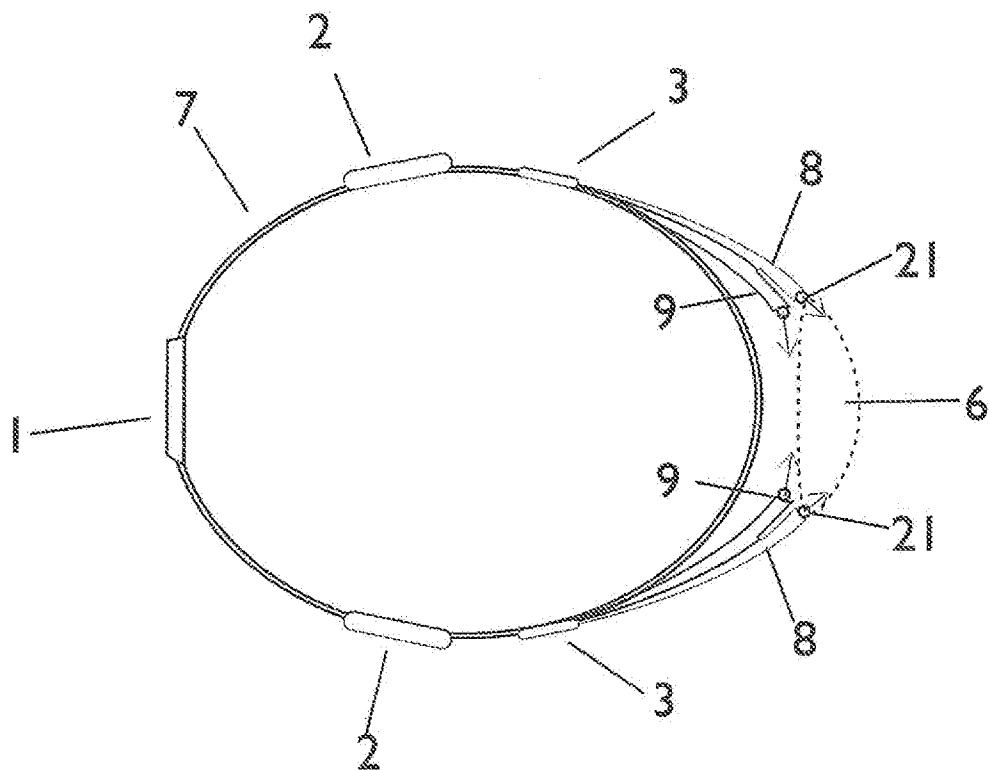


Fig. 7/9X *

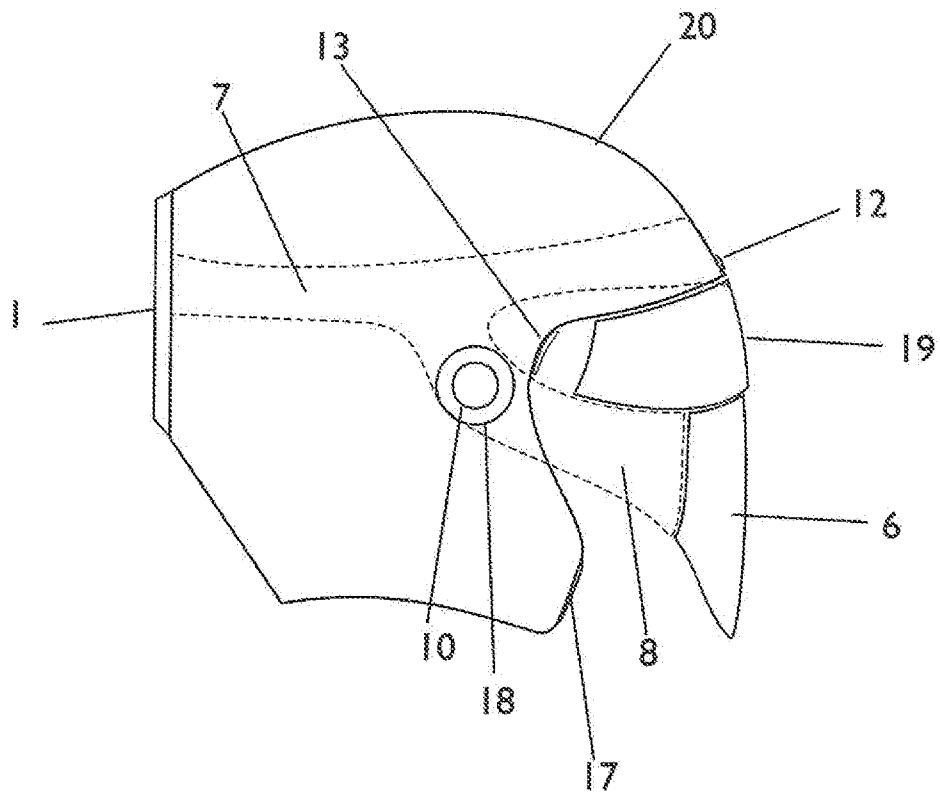


Fig. 8/9

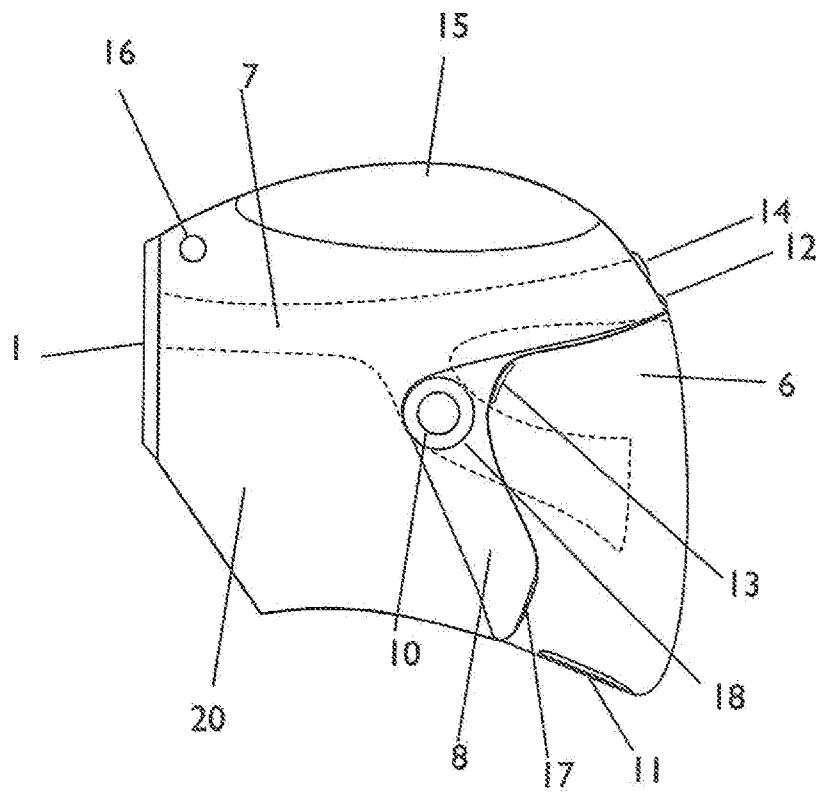


Fig. 9/10

INTERNATIONAL SEARCH REPORT

International application No

PCT/SK2020/000007

A. CLASSIFICATION OF SUBJECT MATTER

INV. A62B18/00

ADD.

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)

A62B

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	WO 2017/065620 A1 (CLEAR AIR TECH LTD [NZ]) 20 April 2017 (2017-04-20) figures -----	1,2, 9-12, 15-17
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X	WO 2017/074954 A1 (WILSON JOHN PAUL [US]; WILSON SANDRA [US]) 4 May 2017 (2017-05-04) figures paragraph [0080] ----- -/-	1,3,5, 7-15,19



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

17 December 2020

Date of mailing of the international search report

12/01/2021

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Authorized officer

Andlauer, Dominique

INTERNATIONAL SEARCH REPORT

International application No
PCT/SK2020/000007

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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