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Vehicle, especially military combat vehicle

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The present invention relates to a vehicle, in particular a military combat vehicle, with a vehicle hull and a weapon turret arranged above the vehicle hull, so as to be rotatable about an azimuth axis, and accommodating a
20 weapon, at the rear of which at least one rear box with an air treatment device for decontaminating and/or temperature-regulating of the vehicle interior air is arranged.

Such vehicles are used in the military sector, for example, as main battle
25 tanks or infantry fighting vehicles in various variants.

The vehicle comprises a vehicle hull, usually designed to protect against military threats, for example made of armored steel, to accommodate the vehicle crew, and a weapon turret arranged above the vehicle hull so that
30 it can rotate around an azimuth axis extending essentially in a vertical direction. The weapon turret can also be designed to accommodate one or more crew members, which is more common in main battle tanks. Alternatively, the weapon turret can also be unmanned and remotely controlled from inside the vehicle hull.

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The weapon turret usually houses a weapon being the vehicle's main armament, which can be aimed around an additional elevation axis that extends essentially in a horizontal direction. In order to enable a graduated weapon effect, secondary armament is often provided on the weapon turret in addition to the actual main armament, such as a mount for a machine gun having a small caliber compared to the main armament.

In known vehicles of this type, so-called rear boxes are often located at the rear of the weapon turret in the main direction of travel of the vehicle. Depending on the vehicle's configuration or mission-specific requirements, these boxes can be used to store various devices and/or equipment.

Rear boxes are known, which accommodate an air treatment device that supplies the vehicle interior with fresh air. The air treatment device allows fresh air to be taken in from outside the vehicle and treated in a targeted manner before it is directed into the vehicle interior, i.e., the interior of the vehicle hull and/or the interior of the weapon turret, as breathing air for the crew members accommodated there.

Usually, the air treatment device located in the rear box is supplied with fresh air locally via a ventilation slot provided on the rear box as a fresh air supply. This has proven to be a simple way of supplying fresh air to the air treatment device, but may lead to problems in certain situations. For example, in vehicles where secondary armament is located on top of the weapon turret in addition to the main armament, exhaust gases produced by the operation of the secondary armament may be taken in locally through the ventilation slot in the rear box area. Due to this local intake via the ventilation slot in the rear box area, it is therefore possible that heavily polluted fresh air may be taken in in certain situations.

The object of the present invention is therefore to provide a vehicle with an improved fresh air supply.

In a vehicle of the type mentioned at the beginning, this object is solved by the features defined in claim 1.

- 5 The weapon turret has a roof structure arranged on the turret roof with a fresh air supply to provide the air treatment device with fresh air. This allows for diffuse fresh air intake. The risk of taking in locally polluted fresh air, as is the case with local, unidirectional fresh air intake, is significantly reduced by the possibility of diffuse fresh air intake in the area of the roof
10 structure.

Advantageous embodiments and further developments of the vehicle are specified in the dependent claims.

- 15 An advantageous embodiment of the vehicle provides for the roof structure to have a mounting level spaced apart from the turret roof for arranging an attachment device, in particular a viewing device and/or secondary armament, and/or for arranging roof protection modules. A viewing device and/or secondary armament can be arranged on the mounting level at a
20 distance from the actual turret roof of the weapon turret. Similarly, roof protection modules can be arranged at a certain distance from the turret roof to provide protection against military threats.

- In this context, it is particularly advantageous if the fresh air supply is provided in the area between the mounting level and the turret roof. A kind of sandwich construction can be created in the area between the mounting level and the turret roof. The fresh air supply can be advantageously arranged in the resulting space between the mounting level and the turret roof. This also results in continuous ventilation of the mounting level when
25 the vehicle is in operation. This can improve the heat balance of the vehicle interior and/or the infrared signature of the vehicle.
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A further advantageous embodiment in this context provides for the fresh air supply to have several intake openings, resulting in diffuse intake of fresh air at different positions from different directions. This results in a large number of partial volume flows at different positions, which are combined to form a common fresh air volume flow. The intake openings can draw in fresh air from different directions. Furthermore, the intake openings can be positioned at different locations on the vehicle. Locally concentrated intake from only one direction is avoided. The result is diffuse intake. The risk of blocking of the intake openings by intake material, such as leaves or similar objects, is also reduced.

Another advantageous embodiment provides that the intake openings are designed in a slit shape. The slit shaped design reduces the risk of larger contaminants such as leaves, branches, etc. being sucked in unintentionally. There is no risk of coarse contaminants being sucked in and carried into the system.

In an advantageous manner, the intake openings may extend in a vertical direction. The areas between them can serve as a kind of stand for raising the mounting level above the turret roof and may support the components arranged on the roof structure, such as a secondary weapon, a viewing device, or the like. The intake openings may also extend substantially in a vertical direction. In this case, the intake openings have a certain orientation transverse to the vertical, which may also be advantageous for certain roof structures.

Another advantageous embodiment is that the intake openings extend, at least partially, along two side surfaces and/or a rear surface and/or a front surface of the roof structure. This also promotes diffuse intake of fresh air at different positions on the vehicle.

Another advantageous embodiment provides for the fresh air supply to be connected to the air treatment device via a flow channel. Negative pressure can be generated via the air treatment device to draw in fresh air. This negative pressure can be fed via the flow channel into the roof structure area and used there to draw in fresh air via the fresh air supply. A filter for filtering the drawn-in fresh air can be arranged inside the flow channel.

A construction that is structurally advantageous is an embodiment in which the flow channel extends along the turret roof into an area above the rear box. In particular, the flow channel can run parallel to the turret roof.

An embodiment that is advantageous for maintenance purposes, for example, provides for the rear box to be arranged so as to be pivotable relative to the weapon turret about a pivot axis extending in the vertical direction. This way, the rear box can be pivoted away from the weapon turret into a maintenance position, for example for maintenance purposes, and maintenance work can be carried out on the components provided in the interior of the rear box, in particular on the air treatment device. Cleaning work can also be carried out on the air-conducting elements. In the operating position of the rear box, in which it rests against the weapon turret, a watertight assembly is formed. A corresponding seal may be provided for this purpose. This also allows the vehicle to travel underwater without water being able to penetrate the rear box and/or the weapon turret in the area of the rear box.

In this context, it is also advantageous if the flow channel has a first section which is fixed to the turret and a second section which can be pivoted together with the rear box relative the weapon turret. The fresh air can be drawn into the rear box area via the two sections. Advantageously, the second section of the flow channel can be sealed watertight, which is advantageous in the event of underwater travel. The second section of the flow

channel can also be designed as a hood. In this case, the result is a structurally simple construction in which the second section of the flow channel is reduced to a hood and no further flow channels or the like are provided.

- 5 A particularly advantageous embodiment provides that the flow channel, and in particular the pivotable second section of the flow channel, is connected to the air treatment device via a flow opening. The flow opening can be formed in the upper side of the rear box. The flow opening can be arranged at the intake end of the flow channel.

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Another advantageous embodiment provides for the flow opening to be arranged on the upper side of the rear box above an installation space for the air treatment device in the rear box. The air treatment device can draw fresh air into the rear box via the flow opening.

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A particularly advantageous embodiment provides for the flow opening to be designed to be manually closable. The flow opening can be manually moved between its open operating position and the closed position. For this purpose, the flow opening can be operated by hand or by means of a tool
20 which can engage with corresponding tool surfaces, such as a key adapter for engaging a key tool. The flow opening can have an external thread raised above the top of the rear box and can be closed by a cover with partially engaging threaded cams. This results in a circumferential annular gap that is only blocked in the area of the threaded cams, which forms the in-
25 take cross-section.

An embodiment that is advantageous with regard to possible underwater travel of the vehicle provides that the flow opening is sealed in its closed position so as to be watertight with respect to the rear box. This seal also
30 ensures that no moisture enters the system during underwater travel. The two end positions of the hood, i.e., its open position and its closed position, can be fixed in place by means of locking bolts.

A structurally advantageous embodiment provides for the flow opening to be connected to the air treatment device via a hose line.

- 5 Another structurally advantageous embodiment provides for the flow opening to be formed as a hood.

Another advantageous embodiment provides for the hood also covering a vent for ventilating the installation space of the air treatment device in the
10 rear box.

In order to prevent also rainwater or spray from entering, it is also proposed that the hood be equipped with a water trap to prevent unwanted water ingress. The water trap can be designed in such a way that water
15 cannot enter the hood up to a certain water level.

It is also proposed that the air treatment device be an AC and/or CBRN system. The AC (“Air Condition”) system can be used to condition the fresh air, which is particularly advantageous for vehicle missions in very warm re-
20 gions. The CBRN system can be used to clean the fresh air that is drawn in to protect the vehicle crew from CBRN threats (chemical, biological, radiological, nuclear).

Further advantages and details of a vehicle according to the invention will
25 be explained below with reference to the accompanying drawings of an exemplary embodiment. These show:

Fig. 1 a perspective view of a vehicle,

- 30 Fig. 2 a view corresponding to the representation of the vehicle in Fig. 1, in which the view of some internal components is revealed,

Fig. 3 in a schematic sectional view, an area of the roof of the weapon turret,

Fig. 4 a view corresponding to the representation in Fig. 3 to illustrate
5 the air flow, and

Fig. 5 Another schematic cross-sectional view in the area of the flow opening to illustrate ventilation.

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Fig. 1 shows a perspective, schematic view of a vehicle 1, which is a tracked military vehicle.

Vehicle 1 has a vehicle hull 2. The vehicle hull 2 is supported by a tracked
15 chassis 12 and serves to accommodate the crew of vehicle 1. In order to protect the vehicle crew inside the vehicle hull 2 from military threats, the vehicle hull 2 is armored.

Above the vehicle hull 2 there is a weapon turret 3, which carries a weapon
20 4. The weapon 4 is the main armament of vehicle 1. In the embodiment, the weapon 4 is designed as a large-caliber cannon. In order to be able to aim the weapon 4 in azimuth, the weapon turret 3 is arranged on a vehicle hull 2 so that it can be aimed relative to the vehicle hull 2 about an azimuth axis A. The azimuth axis A extends in the vertical direction. The
25 weapon 4 is also mounted on the weapon turret 3 such that it can be rotated about an elevation axis E, allowing it to be rotated both in elevation and azimuth.

The vehicle 1 shown in Fig. 1 is a main battle tank. The crew of the vehicle
30 1 is accommodated both in the vehicle hull 2 and in the weapon turret 3, which is designed for this purpose as a basket turret with a basket extending into the vehicle hull 2 to accommodate a crew member. Since the

weapon turret 3 is manned, it is also armored for protection against military threats. Alternatively, it would also be conceivable for the weapon turret 3 to be unmanned and remotely controllable from inside the vehicle hull 2. In this case, the weapon turret 3 could be less heavily armored for weight reasons.

In order to achieve a graduated weapon effect, the vehicle 1 is equipped not only with weapon 4, which serves as the main armament, but also with a secondary armament 13. The secondary armament 13 is a weapon station located on the weapon turret 3, which can be remotely controlled from inside vehicle 1 and can accommodate, for example, a medium-caliber machine gun, a grenade launcher, or another secondary weapon.

As can also be seen in Fig. 1, the weapon turret 3 has an overall elongated geometry. The weapon 4 is located at the front area of the weapon turret 3 in the main direction of travel of the vehicle 1. In the embodiment, two rear boxes 5, 6 are provided at the rear area of the weapon turret 3 in the main direction of travel of the vehicle 1. The rear box 5 is shown in the figures in the operating position, in which it rests against the rear of the weapon turret. The rear box 5 is pivotably arranged on the weapon turret 3 and can be pivoted away from the weapon turret 3 from the operating position into a maintenance position. For this purpose, the rear box 5 has a pivot axis S_1 . The pivot axis S_1 extends in the vertical direction and is arranged laterally on the weapon turret 3.

The rear boxes 5, 6 are used to store various devices and/or equipment. In the example shown, the rear box 5 located on the right-hand side of the vehicle in the direction of travel houses an air treatment device 7, which can be used to draw in fresh air, treat it in a targeted manner, and then feed it into the interior of the vehicle, see also Figs. 3 and 4. Inside the vehicle, the fresh air drawn in can then be used, for example, as breathing air for the crew members accommodated inside the vehicle 1. In contrast,

the rear box 6 on the left in Fig. 1, which is designed as a storage compartment, is used to store equipment such as tools, tension belts, spare parts, or similar items.

- 5 As can further be seen in Fig. 1, there is a roof structure 8 on the turret roof 3.1 of the weapon turret 3, which raises the surface of the turret roof 3.1. The roof structure 8 is designed in the manner of a roof hood. The roof structure 8 extends across the middle section of the weapon turret 3, whereas the front section of the weapon turret 3 and the rear section of
10 the weapon turret 3 do not have a roof structure 8. Alternatively, the roof structure 8 could also extend across other sections of the weapon turret 3 or even across the entire weapon turret 3.

- As an essential element, the roof structure 8 comprises a mounting level
15 8.1. The secondary armament 13 is arranged on the mounting level 8.1 of the roof structure 8. The mounting level 8.1 extends essentially parallel to the turret roof 3.1 of the weapon turret 3. Towards its edges, the roof structure 8 is closed in the area of the two side surfaces 8.3, 8.4, as well as the front surface 8.6 and the rear surface 8.5 by a circumferential side wall
20 8.7.

As will be explained in more detail below, there is a fresh air supply 9 in the area of the roof structure 8 to supply fresh air to the air treatment device 7 housed in the rear box 5.

- 25 The fresh air supply 9 is formed by a plurality of intake openings 9.1, which are formed in the side wall 8.7. In the embodiment, the intake openings 9.1 are distributed across the side surfaces 8.3, 8.4 and the rear surface 8.5 of the roof structure 8. The intake openings 9.1 have a slit-shaped geometry. The intake openings 9.1 extend in a substantially vertical direction. The areas of the side wall 8.7 of the roof structure 8 remaining between the intake openings 9.1 of the fresh air supply 9 form mounting
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stands 8.2. The mounting stands 8.2 extend continuously from the turret roof 3.1 to the mounting level 8.1 of the roof structure 8. The mounting stands 8.2 serve as supporting elements for supporting the mounting level 8.1 and the objects arranged on it, in particular the secondary armament 13, any hatches, optics, or similar objects.

The mounting stands 8.2 can also be designed as walls or bridges, in particular as partially continuous walls or bridges, and arranged in such a way that an interior space is created in the area between the turret roof 3.1 and the mounting level 8.1. The interior space can be closed off to the side by the walls or bridges. The interior space thus formed can be used, for example, as additional storage space, for example for stowing accessories, electronics, and/or other functional assemblies. In order to keep the corresponding interior space accessible, a cover, flap, or similar can be arranged in the area of the roof structure 8 which lies above the interior space in the mounting level 8.1.

As can also be seen in Figs. 3 and 4, the schematically depicted air treatment device 7 is arranged within an installation space of the rear box 5. Via the air treatment device 7 a negative pressure is generated for sucking in fresh air, which is sucked into the air treatment device 7 following the resulting pressure gradient.

In the embodiment, the air treatment device 7 is a kind of air treatment device that can be used to filter CBRN threats and to condition the fresh air that is drawn in. The air treatment device 7 thus fulfills a dual function. It is designed as a CBRN device to protect the vehicle crew from CBRN threats. It also serves to regulate the temperature, as the air treatment device 7 is also designed as an AC device or air conditioning device.

In order to minimize the risk of sucking in locally contaminated fresh air, for example due to exhaust gases produced during the actuation of the secondary armament 13, the fresh air supply 9 is designed in such a way that the fresh air is sucked in diffusely. Fresh air is drawn in via the fresh air
 5 supply 9 from different directions at several intake openings 9.1 spaced apart from each other, see Fig. 4. This results in an overall diffuse intake with a reduced risk of contaminated fresh air intake.

As can be seen further in Figs. 3 and 4, the air treatment device 7 is con-
 10 nected to the roof structure 8 and the fresh air supply 9 located on the roof structure 8, respectively, via a flow channel 10. The flow channel 10 extends from an area above the air treatment device 7 to the roof structure 8. The flow channel 10 is a closed channel, one end of which opens into the roof structure 8. The other end of the flow channel 10 is formed by a flow
 15 opening 15 designed as a hood 11 on the upper side of the rear box 5 in which the air treatment device 7 is housed. Instead of a hood 11, a simple opening would also be conceivable here.

However, the hood 11 offers the advantage that it can be closed if neces-
 20 sary, which, in the case of underwater travel, has the advantage that no liquid can enter the rear box 5. Furthermore, the hood 11 can be designed with a water trap so that rainwater or other splash water cannot enter the interior of the rear box 5.

25 The hood 11 has a lid 11.1 and a pipe socket 11.2. The pipe socket 11.2 forms the actual flow opening 15. The lid 11.1 can be moved manually relative to the pipe socket 11.2 in the axial direction of the pipe axis of the pipe socket 11.2. In order to move the lid 11.1 relative to the pipe socket 11.2, these are connected to each other via two threaded sections 11.7,
 30 11.8 in such a way that a rotation of the lid 11.1 relative to the fixed pipe socket 11.2 is converted into an axial movement of the lid 11.1. The

threaded section 11.7 located on the lid 11.1 is an internal threaded section. The threaded section 11.7 does not extend over the entire circumference of the lid 11.1, but is arranged at several cams 11.6 distributed over the circumference of the lid 11.1 and designed in the manner of threaded
 5 cams. In the embodiment, a total of three cams 11.6 are provided. This allows fresh air F to flow through the hood 11 with virtually no obstruction when the lid 11.1 is in the open position. The threaded section 11.7 interacts with a threaded section 11.8 provided on the pipe socket 11.2. The threaded section 11.8 is designed as an external threaded section.

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The lid 11.1 is movable from the open position, in which fresh air F can flow through the hood 11, to a closed position, in which the hood 11 is closed. In the open position, the lid 11.1 is spaced apart from the pipe socket 11.2. In this position, fresh air F can enter the hood 11 in the areas
 15 between the cams 11.6. In the closed position, the lid 11.1 rests against the pipe socket 11.2. A seal 11.3 is provided in the contact area between the lid 11.1 and the pipe socket 11.2. In the example shown, the seal 11.3 is designed as an O-ring seal and is arranged in a groove in the lid 11.1. When the hood 11 is in the closed position, it is sealed watertight by the
 20 seal 11.3.

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As can also be seen in Fig. 5, the hood 11 has a vent 11.9. The vent 11.9 is designed as a pipe. The vent 11.9 extends parallel to the pipe socket 11.2. The vent 11.9 has a smaller diameter than the pipe socket 11.2. The vent
 25 11.9 serves to ventilate the installation space of the air treatment device 7. By integrating the vent 11.9 into the hood 11, the outer contours of the rear box 5 are reduced, and both the pipe socket 11.2 and the vent 11.9 can be closed with a single movement for underwater travel. The vent 11.9 is located below the lid 11.1. The axial length of the vent 11.9 is also
 30 adapted to the axial length of the pipe socket 11.2 and the geometry of the lid 11.1 in such a way that the lid 11.1 closes both the vent 11.9 and the pipe socket 11.2 when in the closed position. A seal 11.4 is provided on the

lid 11.1 to seal the vent 11.9. The seal 11.4 is designed as a ring-shaped flat seal and is located on the underside of the lid 11.1. The vent 11.9 can also be designed as an opening in the form of a transverse borehole on the flow opening 15 in the installation space of the air treatment device 7.

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To secure the hood 11 in the open and/or closed position against unwanted movement, it has a locking element 11.5. The locking element 11.5 is designed as a locking bolt that can be moved against the force of a tensioning spring and which automatically locks with the lid 11.1 in the open and/or closed position. In the locked position, the locking element engages in a form-fit manner with the lid 11.1. The lid 11.1 can therefore only be rotated after the locking element 11.5 has been manually released.

As can additionally be seen in Figures 3 and 4, the flow channel 10 has a section 10.1 that is fixed to the tower and a section 10.2 that can be pivoted together with the rear box 5. One or both of the sections 10.1, 10.2 of the flow channel 10 can be covered by a cover 10.3. The cover 10.3 can be designed in the manner of a cover hood.

In the operating position shown in Fig. 2, for example, the two sections 10.1 and 10.2 of the flow channel 10 are located closely together. A seal may be provided in the area between the two sections 10.1 and 10.2. This prevents unwanted suction of fresh air or particle ingress in the area between the two sections 10.1 and 10.2 of the flow channel 10.

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The air treatment device 7 generates a negative pressure inside the rear box 5, which is transmitted via the flow channel 10 into the roof structure 8, where it is used to draw in fresh air via the intake openings 9.1 of the fresh air supply 9, see Fig. 4.

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Due to the slit-shaped geometry of the intake openings 9.1, the risk of coarse contaminants such as leaves, branches, etc. being sucked in is also

reduced. A filter 14 is provided to filter out finer contaminants. The filter 14 is located in the flow channel 10. In the embodiment, the filter 14 is located in the turret-fixed section 10.1 of the flow channel 10, and the filter 14 can be cleaned or replaced with a new filter 14 as required.

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The fresh air supply 9 provided on the roof structure results in diffuse intake of fresh air at various points and from various directions. The risk of contaminated fresh air being drawn in is significantly reduced compared to local fresh air intake. The volume flows of the individual intake openings

10 9.1 add up to a single fresh air flow that is sufficient to provide the desired fresh air supply for the interior of the vehicle 1.

Reference numbers:

	1	vehicle
	2	vehicle hull
5	3	weapon turret
	3.1	turret roof
	4	weapon
	5	rear box
	6	rear box
10	7	air treatment device
	8	roof structure
	8.1	mounting level
	8.2	mounting stand
	8.3	side surface
15	8.4	side surface
	8.5	rear surface
	8.6	front surface
	8.7	side wall
	9	fresh air supply
20	9.1	intake openings
	10	flow channel
	10.1	section
	10.2	section
	10.3	cover
25	11	hood
	11.1	lid
	11.2	pipe socket
	11.3	seal
	11.4	seal
30	11.5	locking element
	11.6	cams
	11.7	threaded section

	11.8	threaded section
	11.9	vent
	12	tracked chassis
	13	secondary armament
5	14	filter
	15	flow opening
	16	hose line
	A	azimuth axis
10	E	elevation axis
	S ₁	pivot axis
	F	fresh air

Claims:

- 5 1. Vehicle, in particular military combat vehicle, with a vehicle hull (2)
and a weapon turret (3) arranged above the vehicle hull (2) so as to
be rotatable about an azimuth axis (A) and accommodating a weapon
(4), at the rear of which at least one rear box (5) with an air treat-
ment device (7) for decontaminating and/or temperature-regulating
10 the vehicle interior air is arranged,
characterised in that
that the weapon turret (3) has a roof structure (8) built on the turret
roof (3.1) of the weapon turret (3) with a fresh air supply (9) for sup-
plying fresh air (F) to the air treatment device (7).
- 15 2. Vehicle according to claim 1, characterized in that the roof structure
(8) has a mounting level (8.1) spaced apart from the turret roof (3.1)
for arranging an attachment, in particular a viewing device and/or
secondary armament (13), and/or for arranging roof protection mod-
20 ules.
3. Vehicle according to claim 2, characterized in that the fresh air sup-
ply (9) is provided in the area between the mounting level (8.1) and
the turret roof (3.1).
4. Vehicle according to one of the preceding claims, characterized in
25 that the fresh air supply (9) has several intake openings (9.1).
5. Vehicle according to claim 4, characterized in that the intake open-
ings (9.1) are designed in a slit shape.
6. Vehicle according to claim 5, characterized in that the intake open-
ings (9.1) extend in a vertical direction.

7. Vehicle according to one of claims 4 to 6, characterized in that the intake openings (9.1) extend, at least partially, along two side surfaces (8.3, 8.4) and/or a rear surface (8.5) and/or a front surface (8.6) of the roof structure (8).
- 5 8. Vehicle according to one of the preceding claims, characterized in that the fresh air supply (9) is connected to the air treatment device (7) via a flow channel (10).
9. Vehicle according to claim 8, characterized in that the flow channel (10) extends along the tower roof (3.1) into an area above the rear box (5).
- 10 10. Vehicle according to one of the preceding claims, characterized in that the rear box (5) is arranged so as to be pivotable relative to the weapon tower (3) about a pivot axis (S_1) extending in the vertical direction.
- 15 11. Vehicle according to claim 10, characterized in that the flow channel (10) has a first section (10.1) fixed to the turret and a second section (10.2) which can be pivoted together with the rear box (5) relative to the weapon turret (3).
- 20 12. Vehicle according to one of claims 8 to 11, characterized in that the flow channel (10), and in particular the pivotable section (10.2) of the flow channel (10), is connected to the air treatment device (7) via a flow opening (15).
- 25 13. Vehicle according to claim 12, characterized in that the flow opening (15) is arranged on the upper side of the rear box (5) above an installation space for the air treatment device (7) in the rear box (5).
14. Vehicle according to one of claims 12 or 13, characterized in that the flow-through opening (15) is designed to be manually closable.

15. Vehicle according to claim 14, characterized in that the flow opening (15) is sealed in its closed position so as to be watertight with respect to the rear box (5).
- 5 16. Vehicle according to one of claims 12 to 15, characterised in that the flow-through opening (15) is connected to the air treatment device (7) via a hose line (16).
17. Vehicle according to one of claims 12 to 16, characterised in that the flow-through opening (15) is designed as a scoop (11).
- 10 18. Vehicle according to claim 17, characterised in that the scoop (11) has a vent (11.9) for venting the installation space of the air treatment device (7) in the rear box (5).
19. Vehicle according to one of claims 17 or 18, characterised in that the scoop (11) has a water trap to prevent unwanted water ingress.
- 15 20. Vehicle according to one of the preceding claims, characterised in that the air treatment device (7) is an AC and/or CBRN system.