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(54) **METHOD AND SYSTEM FOR EV FIRE EXTINCTION**

(57) The present invention relates to a construction element (100) for a barrier construction (200) suitable for surrounding a vehicle, e.g. electrical vehicle, positioned on a floor in case of a vehicle fire. The construction element (100) comprises at least one panel (102), rolling elements (104) attached to at least one panel (102) for moving the construction element (100) over the floor, and an adjustment means (106) for vertically adjusting the position of the rolling elements (104) with respect to the at least one panel (102). The construction element (100) furthermore comprises a sealing element (108) on at least one side of the at least one panel (102). The adjustment means (106) furthermore are configured for in one state allowing the construction element (100) to move over the floor by rolling using the rolling elements (104) and in another state allowing the at least panel (102) to contact the floor with the sealing element (108) for forming a seal between the at least one panel and the floor on which the barrier construction (200) is to be positioned.

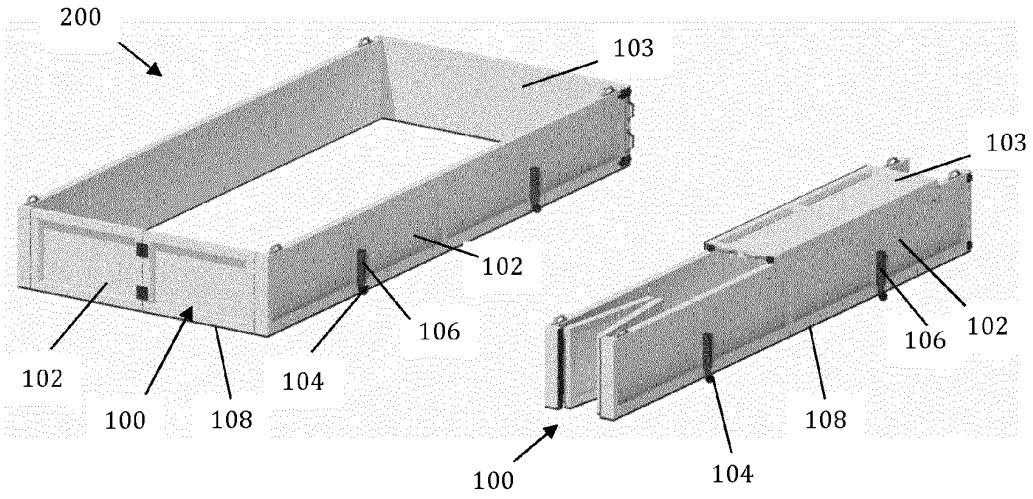

FIG. 1

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Description

Technical field of the invention

[0001] The present invention relates to the field of fire extinction. More particularly, the present invention relates to systems and methods for performing fire extinction, e.g. of electrical vehicles, especially suitable for underground parking lots.

Background of the invention

[0002] Extinguishing fires involving electric vehicles (EVs) poses some unique challenges compared to fire extinction involving traditional internal combustion engine vehicles.

[0003] Electrical batteries such as lithium-ion batteries which are commonly used in EV's can generate intense heat and can produce toxic waste streams, when these batteries catch fire. In some cases, also specialized fire suppressants may be required for battery fires. It is important that the corresponding toxic waste streams, caused by the fire or by the extinction thereof, are separated from classical waste streams.

[0004] Electrical vehicles furthermore often have sealed compartments for the battery, which can make it challenging for firefighters to access the source of the fire. Also, even after the fire is extinguished, the battery may pose risks of reignition. Therefore cooling the battery cells and the vehicle may be crucial to prevent further incidents.

[0005] Other challenges include the fact that electrical vehicles typically operate with high-voltage battery systems and traditional firefighting techniques typically are not suitable since these could lead to electrical shocks.

[0006] On the road, firefighters may typically use a type of container, wherein the burning electrical vehicle is positioned and which is filled with a suitable fire extinguishing or cooling agent.

[0007] Especially when occurring in underground parking lots, parking buildings, or spaces where a number of vehicles are positioned close to each other, fire extinction of electrical vehicles is even more challenging, since the amount of available space is limited. In such cases, the risk of damaging of neighbouring vehicles is also higher.

[0008] A number of solutions have been provided in the past : European patent application EP3890843 describes a closable bag in which a vehicle can be positioned and allowing filling of the bag when the vehicle would catch fire. US patent application US20220134154 and international patent application WO202311189 describe solutions of water fillable walls in between which an electrical vehicle can be positioned and which can serve as a container for being filled with fire extinguishing liquid or cooling liquid.

[0009] Nevertheless, both the stability of such systems as well as the positioning of these systems is not optimal.

[0010] There is thus still a need in the art for a system and method for the extinction of fire e.g. in electrical vehicles that address at least some of the above problems.

Summary of the invention

[0011] It is an object of the present invention to provide a construction element, a barrier construction made of one or more of such construction elements and a method for forming a barrier construction around a vehicle, e.g. an electrical vehicle, suitable for use during fire extinction of the vehicle.

[0012] It is an advantage of embodiments of the present invention that the system can even be positioned by a single person, if required.

[0013] It is an advantage of embodiments of the present invention that moving and positioning of the system can be performed easily in view of the system, or its components, are rollable over the floor. The latter allows for easy displacement, even for users with limited mobility.

[0014] The above objective is accomplished by a method and apparatus according to the present invention.

[0015] The present invention relates to a construction element for a barrier construction suitable for surrounding a vehicle, e.g. an electrical vehicle, positioned on a floor e.g. in case of during an electric vehicle fire,

the construction element comprising
at least one panel,
rolling elements attached to at least one panel for moving the construction element over the floor, and
an adjustment means for vertically adjusting the position of the rolling elements with respect to the at least one panel, and
a sealing element on at least one side of the at least one panel,
wherein the adjustment means is configured for in one state allowing the construction element to move over the floor by rolling using the rolling elements and in another state allowing the at least one panel to contact the floor with the sealing elements for forming a seal between the at least one panel and the floor on which the barrier construction is to be positioned.

[0016] In some embodiments, the construction element may comprise at least two panels hingeably connected to each other. The latter may allow a more compact storage and or transportation.

[0017] Where reference is made to panels that are hingeable connected, reference is made to a situation wherein panels are connected to each other so that they can perform a hinge movement with respect to each other. The latter may be performed by providing a hinging element between such panels.

[0018] According to some embodiments, the construction element may comprise panels hingeably connected

to each other which in open state, i.e. when the construction element is used in a barrier construction surrounding a vehicle, are not positioned in the same plane.

[0019] In case the construction element comprises more panels, sealing elements may be provided between the panels, so that aside also the joints where the panels are hinged are sealed, thus allowing to obtain a sealed barrier construction.

[0020] It is an advantage of embodiments of the present invention that the resulting system can be quickly installed. It is an advantage of embodiments of the present invention that positioning of the barrier construction can be performed quickly.

[0021] The at least two panels may be hingeably connected so as to be able to be configured in L-shape.

[0022] The at least two panels may be at least three panels so as to be able to be configured in U-shape.

[0023] It is an advantage of embodiments of the present invention that the construction element comprising two or more panels hingeably connected to each other can be moved easily, since such a construction can have an inherent stability against tilting of the panels.

[0024] In some embodiments, the adjustment system may be configured for lowering or elevating the rolling elements with respect to the at least one panel. The adjustment system may be such that the rolling elements can in one state be lowered so that the wheels make contact with the floor, rather than the panels, resulting in the possibility to roll the construction element over the floor, and in another state be lifted such that the sealing at the bottom side of the panel makes contact with the floor. In this state, the resulting barrier construction can form a sealed barrier, so that e.g. the barrier construction can for example be filled with a fluid for cooling or assisting otherwise with the fire extinction.

[0025] The rolling elements may be any of swivelling wheels or ball wheels.

[0026] The sealing elements may be a rubber.

[0027] The panels may be made of a metal material. It is an advantage of embodiments of the present invention that the panels can be made of a heavy material, so that their weight provides sufficient pressure on the sealing elements when the rolling elements are elevated, thus resulting in a liquid tight sealing between the construction element and the floor.

[0028] The present invention also relates to a barrier construction suitable for surrounding a vehicle, e.g. an electrical vehicle, the barrier construction comprising at least one construction element as described above, the at least one construction element being configurable to form a structure surrounding the vehicle, e.g. the electrical vehicle.

The barrier construction may comprise at least two construction elements as described above connectable to each other to form a structure suitable for surrounding the vehicle, e.g. electrical vehicle.

[0029] It is an advantage of embodiments of the present invention that, e.g. by selection of materials used, also a lightweight system can be obtained, thus resulting in a system that can more easily be displaced, loaded and unloaded from a transporting vehicle, such as for example a fire truck.

[0030] It is an advantage of embodiments of the present invention that the production of the systems can be relatively easy and/or cost efficient, since it can make use of standard materials.

[0031] It is an advantage of embodiments of the present invention that the system can be easily brought into position, e.g. surrounding a vehicle such as for example a car, even if only a limited amount of space is available around the vehicle.

[0032] It is an advantage of embodiments of the present that the system can be positioned or components of the system can be positioned and/or coupled to each other, without a risk of tilting or falling over to a wrong side. In other words, it is an advantage of embodiments of the present invention that the system is and stays in a stable position, during positioning and/or coupling of components or more generally during manipulation of the system, e.g. when positioning and installing a system around a vehicle for use. The latter is even the case, when erroneous manipulation of the system is performed by the user, e.g. when the system is unfold in the wrong direction.

[0033] The construction may be configurable in a substantially rectangular shape, suitable for surrounding the vehicle.

[0034] The barrier construction may comprise splinkers for creating a for or water or liquid curtain.

[0035] The barrier construction may comprises one or more throughputs for filling the barrier construction with a liquid for assisting in firefighting.

[0036] In yet another aspect, the present invention relates to a method for assisting in firefighting of a fire of a vehicle, the method comprising rolling at least one construction element towards the vehicle on fire using rolling elements on the at least one construction element, positioning the at least one construction element around the vehicle and adjusting the position of rolling elements on the construction element, thus forming a barrier construction around the vehicle, and applying a liquid assisting in the fire fighting in combination with the barrier construction.

[0037] In one aspect, the present invention also relates to a construction element as described above or a barrier construction as describe above, for assisting in fire fighting of a fire of a vehicle.

[0038] Although there has been constant improvement, change and evolution of devices in this field, the present concepts are believed to represent substantial new and novel improvements, including departures from prior practices, resulting in the provision of more efficient, stable and reliable devices of this nature.

[0039] The above and other characteristics, features and advantages of the present invention will become apparent from the following detailed description, taken

in conjunction with the accompanying drawings, which illustrate, by way of example, the principles of the invention. This description is given for the sake of example only, without limiting the scope of the invention. The reference figures quoted below refer to the attached drawings.

Brief description of the drawings

[0040]

FIG. 1 shows a barrier construction for surrounding a car made of two construction elements, according to an embodiment of the present invention. The barrier construction is shown in open state, i.e. the situation in which it forms a sealed barrier construction surrounding the vehicle, and in a folded state, used for storing the barrier construction and transporting the barrier construction..

FIG. 2 shows the barrier construction as shown in FIG. 1, when surrounding a car, as can be used for fire extinction of an electrical vehicle, according to embodiments of the present invention.

FIG. 3 to FIG. 5 illustrate another example of a barrier construction made of a single piece. FIG. 3 illustrates a transport mode for transporting the barrier construction, FIG. 4 illustrates a the open state, i.e. the state in which the barrier construction forms a sealed barrier surrounding the vehicle and FIG. 5 illustrates a configuration allowing to position the vehicle in the construction, whereafter the side that is hinged upwards for allowing entering of the vehicle can be hinged downwards to transform the construction into the open state as shown in FIG. 4.

[0041] In the different figures, the same reference signs refer to the same or analogous elements.

Description of illustrative embodiments

[0042] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not correspond to actual reductions to practice of the invention.

[0043] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequence, either temporally, spatially, in ranking or in any other manner. It is to be understood that the terms so used are interchangeable under appropriate circumstances and that the embodiments of the invention described herein are capable of operation in other sequences than described or illustrated herein.

[0044] It is to be noticed that the term "comprising", used in the claims, should not be interpreted as being restricted to the means listed thereafter; it does not exclude other elements or steps. It is thus to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. The term "comprising" therefore covers the situation where only the stated features are present and the situation where these features and one or more other features are present. The word "comprising" according to the invention therefore also includes as one embodiment that no further components are present. Thus, the scope of the expression "a device comprising means A and B" should not be interpreted as being limited to devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

[0045] Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment, but may. Furthermore, the particular features, structures or characteristics may be combined in any suitable manner, as would be apparent to one of ordinary skill in the art from this disclosure, in one or more embodiments.

[0046] Similarly it should be appreciated that in the description of exemplary embodiments of the invention, various features of the invention are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of one or more of the various inventive aspects. This method of disclosure, however, is not to be interpreted as reflecting an intention that the claimed invention requires more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive aspects lie in less than all features of a single foregoing disclosed embodiment. Thus, the claims following the detailed description are hereby expressly incorporated into this detailed description, with each claim standing on its own as a separate embodiment of this invention.

[0047] Furthermore, while some embodiments described herein include some but not other features included in other embodiments, combinations of features of different embodiments are meant to be within the scope of the invention, and form different embodiments, as would be understood by those in the art. For example, in the following claims, any of the claimed embodiments can be used in any combination.

[0048] Furthermore, some of the embodiments are described herein as a method or combination of elements

of a method that can be implemented by a processor of a computer system or by other means of carrying out the function. Thus, a processor with the necessary instructions for carrying out such a method or element of a method forms a means for carrying out the method or element of a method. Furthermore, an element described herein of an apparatus embodiment is an example of a means for carrying out the function performed by the element for the purpose of carrying out the invention.

[0049] In the description provided herein, numerous specific details are set forth. However, it is understood that embodiments of the invention may be practiced without these specific details. In other instances, well-known methods, structures and techniques have not been shown in detail in order not to obscure an understanding of this description.

[0050] Embodiments of the present invention are typically especially suitable for fire fighting of a fire of an electrical vehicle, but embodiments are not limited thereto and can also be used e.g. for fire fighting of a non-electrical vehicle.

[0051] The invention will now be described by a detailed description of several embodiments of the invention. It is clear that other embodiments of the invention can be configured according to the knowledge of persons skilled in the art without departing from the technical teaching of the invention, the invention being limited only by the terms of the appended claims.

[0052] In a first aspect, the present invention relates to a construction element. The construction element typically is for use in a barrier construction suitable for surrounding a vehicle, e.g. an electrical vehicle, positioned on a floor. Such barrier constructions may be used e.g. during an electric vehicle fire, thus allowing to create a bath in which the electrical vehicle is positioned. Such a bath can be filled with a cooling agent or with another agent that can assist in fire extinction. According to embodiments of the present invention, the construction element comprises at least one panel, rolling elements attached to at least one panel for moving the construction element over the floor, and an adjustment means for vertically adjusting the position of the rolling elements with respect to the at least one panel. The construction element also comprises a sealing element on at least one side of the at least one panel, allowing to form a seal between the panel and the floor on which the construction element is positioned. According to embodiments of the present invention, the adjustment means is configured for in one state allowing the construction element to move over the floor by rolling using the rolling elements and in another state allowing the at least panel to contact the floor with the sealing elements for forming a seal between the at least one panel and the floor on which the barrier construction is to be positioned.

[0053] The construction element may in some embodiments only have a single panel. In some embodiments, the construction element may comprise a plurality of panels that are hingeably connected to each other. The fact that the construction element comprises multiple panels, results in a more efficient positioning and installing of the construction element and the resulting barrier construction. The hingeably or hinge connection may be obtained by using a hinging element, e.g. a hinge.

[0054] If the construction element comprises multiple panels hingeably connected to each other, sealing elements also may be provided between the different panels, such that openings between the panels are avoided, when the construction element is folded open. Such sealing elements may be any suitable sealing elements, such as for example rubber sealings.

[0055] The construction element may be such that sealing elements are also present at the edges of the construction element, where the construction element can be connected to another construction element, to form the barrier construction.

[0056] As indicated above, the adjustment means may be arranged to allow the system to be in a first state wherein the rolling elements allow to roll the construction element over the floor, or in a second state wherein the rolling elements are lifted with respect to the panels, so that the panel or panels are in contact by means of sealing elements with the floor. The adjustment means thus may be configured for lowering or elevating the rolling elements with respect to the at least one panel. In some embodiments, the adjustment means may be combined with the rolling elements, i.e. by providing lifting wheels. Nevertheless, other adjustment means allowing to bring the construction element in the two states indicated above also can be used.

[0057] Further standard and optional features and advantages of construction elements according to embodiments of the present invention may be as illustrated in the embodiments and examples described.

[0058] In another aspect, the present invention relates to a barrier construction for surrounding a vehicle. The barrier construction typically forms, together with the floor on which the car and the barrier construction are positioned a sealed volume, which can be referred to as bath, around the vehicle. In case of fire, e.g. of an electrical vehicle, the barrier construction can be used for providing a cooling liquid around the car or another liquid that may assist in fire extinction. The barrier construction thus may, in some embodiments, in combination with the floor, function as a batch. In order to provide a sealed container with respect to the bottom and the sidewalls, sealing elements may be provided between the floor, the bottom portion of the panels of the construction element(s), and sides of the panels of the construction element(s).

[0059] According to embodiments of the present invention, the barrier construction comprises at least one construction element according to the first aspect or embodiments or examples thereof. The at least one construction element typically is configurable to form a structure surrounding the vehicle.

[0060] According to some embodiments of the present invention, sprinklers can be positioned on the barrier

construction to generate a water or fog curtain.

[0061] According to some embodiments of the present invention, one or more throughputs may be provided, e.g. in a panel, allowing filling and/or emptying of the barrier construction. Coupling components for fitting with conventional fire fighting equipment also can be provided.

[0062] Further standard and optional features of the barrier construction may be as described in the examples and/or embodiments shown.

[0063] By way of illustration, embodiments of the present invention not being limited thereto, a first example of a barrier construction 200 is shown in FIG. 1 and FIG. 2. FIG. 1 shows the barrier construction 200 in an open state, i.e. when being folded open, in which state it can be used for surrounding a vehicle, e.g. an electrical vehicle, e.g. in the case of fire. The barrier construction 200 comprises a construction element 100 existing of a plurality of panels 102 that are hingeably connected to each other. The latter allows for the construction element 100 to be stored, transported and positioned as a single element. The construction element 100 is configured such that it In the present example it can obtain a U-shape. The barrier construction 200 furthermore comprises an end panel 103 that can be positioned with respect to the construction element 100, such that a closed surrounding is obtained for the vehicle. For easily transporting of the system, the construction element 100 comprises rolling elements 104, such as ball wheels, swiveling wheels, lifting wheels, etc. connected to the panels, so as to carry their weight. The system furthermore comprises an adjustment means 106 for positioning the rolling elements 104 higher or lower with respect to the panels 102, so that in one state, the rolling elements 104 are lowest in position allowing the construction element 100 to roll over the floor and in another state, the bottom of the panels is lower than the rolling elements thus allowing, by means of a sealing element and the weight of the panels, to cause a good sealing between the barrier construction and the floor. In some embodiments, the panels may be made of a heavy weight material in order to assist in creating a good sealing between the floor and the upstanding walls. In some embodiments, the panels may be made of a more lightweight materials for rendering transportation easier. In these cases, where required, additional weights can be positioned on the panels in order to improve the sealing between the floor and the upstanding walls formed by the barrier construction. The materials used for the construction element(s) and the barrier construction may be selected to avoid too strong interaction between the construction element(s) and waste streams from the vehicle and/or agents used for fire fighting.

[0064] Suitable sealing elements 108 for providing a seal with respect to the floor, e.g. the sealing effect being at least partially caused by the weight of the panels, and seals at positions where otherwise openings would be present in the panels.

[0065] FIG. 2 illustrates the barrier construction 200 in a configuration wherein it can be transported and/or stored. By introducing additional hinges at the sides of the construction, a compact system can be obtained for transporting and or storing.

[0066] In a second example, a barrier construction 300 is shown in FIG. 3, FIG. 4 and FIG. 5, similar to the one shown in FIG. 1 and 2, but wherein the end plate 303 is hingeably connected to the other plates 302 such that the barrier construction 200 behaves as a single construction element that can be stored, transported and positioned in a single movement. FIG. 3 illustrates a transport mode for transporting the barrier construction 300, FIG. 4 illustrates a the open state, i.e. the state in which the barrier construction 300 forms a sealed barrier surrounding the vehicle and FIG. 5 illustrates a configuration allowing to position the vehicle in the construction 300, whereafter the end plate 303 that is hinged upwards for allowing entering of the vehicle can be hinged downwards to transform the construction into the open state as shown in FIG. 4.

[0067] In a third aspect, the present invention relates to a method for assisting in firefighting of a fire of a vehicle. The method according to embodiments of the present invention comprises rolling at least one construction element towards the vehicle on fire using rolling elements on the at least one construction element. It thereby is an advantage that the construction element can be easily transported towards the position where the fire occurs. The method also comprises positioning the at least one construction element around the vehicle and adjusting the position of rolling elements on the construction element, thus forming a barrier construction around the vehicle. Positioning the at least one construction element may include unfolding the construction fully or partly for bringing it in the appropriate shape. Adjusting the position of the rolling elements may include raising the rolling elements with respect to panels of the construction element so that the panels can contact the floor by sealing elements positioned at the bottom side of the panels. The method also comprises applying a liquid assisting in the fire fighting in combination with the barrier construction. The latter may include in some embodiments filling the barrier construction with a liquid, e.g. to form a cooling bath. The latter also or alternatively may include using sprinklers on the barrier construction so as to induce a liquid, e.g. water, or fog screen.

[0068] In yet another aspect, the present invention relates to the use of a construction element according to the first aspect or embodiments thereof, or of a barrier construction according to the second aspect, for the extinction of a fire of a vehicle, e.g. an electrical vehicle. Embodiments of the present invention are especially useful in case of fire in situations where only a limited amount of space is available, e.g. in parking lots, parking towers, situations wherein a plurality of vehicles are transported, e.g. shipped, etc.

[0069] It is to be understood that although preferred embodiments, specific constructions and configurations,

as well as materials, have been discussed herein for devices according to the present invention, various changes or modifications in form and detail may be made without departing from the scope of this invention. Steps may be added or deleted to methods described within the scope of the present invention.

Claims

1. - A construction element (100) for a barrier construction (200) suitable for surrounding a vehicle positioned on a floor in case of a fire,

the construction element (100) comprising

- at least one panel (102),
- rolling elements (104) attached to at least one panel (102) for moving the construction element (100) over the floor, and an adjustment means (106) for vertically adjusting the position of the rolling elements (104) with respect to the at least one panel (102), and
- a sealing element (108) on at least one side of the at least one panel (102),

wherein the adjustment means (106) is configured for in one state allowing the construction element (100) to move over the floor by rolling using the rolling elements (104) and in another state allowing the at least panel (102) to contact the floor with the sealing element (108) for forming a seal between the at least one panel (102) and the floor on which the barrier construction (200) is to be positioned.

2. - A construction element (100) according to claim 1, wherein the construction element (100) comprises at least two panels (102) hingeably connected to each other.

3. - A construction element (100) according to claim 2, wherein the at least two panels (102) are hingeably connected so as to be able to be configured in L-shape.

4. - A construction element (100) according to any of claims 2 or 3, wherein the at least two panels (102) are at least three panels (102) so as to be able to be configured in U-shape.

5. - A construction element (100) according to any of the previous claims, wherein the adjustment system (106) is configured for lowering or elevating the rolling elements (104) with respect to the at least one panel (102).

6. - A construction element (100) according to any of the previous claims, wherein the rolling elements (104) are any of swivelling wheels, lifting wheels or ball wheels.

7. - A construction element (100) according to any of the previous claims, wherein the sealing element (108) is made of or comprises rubber.

8. - A construction element (100) according to any of the previous claims, wherein the panels (102) are made of a metal material.

9. A barrier construction (200) for surrounding a vehicle, the barrier construction (200) comprising at least one construction element (100) according to any of the previous claims, the at least one construction element (100) being configurable to form a structure suitable for surrounding the vehicle.

10. A barrier construction (200) according to the previous claim, the barrier construction (200) comprising at least two construction elements (100) according to any of claims 1 to 8 connectable to each other to form a structure suitable surrounding the electrical vehicle.

11. A barrier construction (200) according to any of claims 9 to 10, wherein sealing elements on the at least one construction element are configured for obtaining a sealed barrier construction.

12. A barrier construction (200) according to any of claims 9 to 10, the construction (200) being configurable in a substantially rectangular shape, suitable for surrounding the vehicle.

13. A barrier construction (200) according to any of claims 9 to 12, wherein

- the construction comprises splinkers for creating a for or water curtain, and/or
- the construction comprises one or more throughputs for filling the barrier construction with a liquid for assisting in firefighting.

14. A method for assisting in firefighting of a fire of a vehicle, the method comprising

- rolling at least one construction element towards the vehicle on fire using rolling elements on the at least one construction element,
- positioning the at least one construction element around the vehicle and adjusting the position of rolling elements on the construction element, thus forming a barrier construction around the vehicle,
- applying a liquid assisting in the fire fighting in

combination with the barrier construction.

15. Use of a construction element according to any of claims 1 to 8 or of a barrier construction according to any of claims 9 to 13, for assisting in fire fighting of a fire of a vehicle.

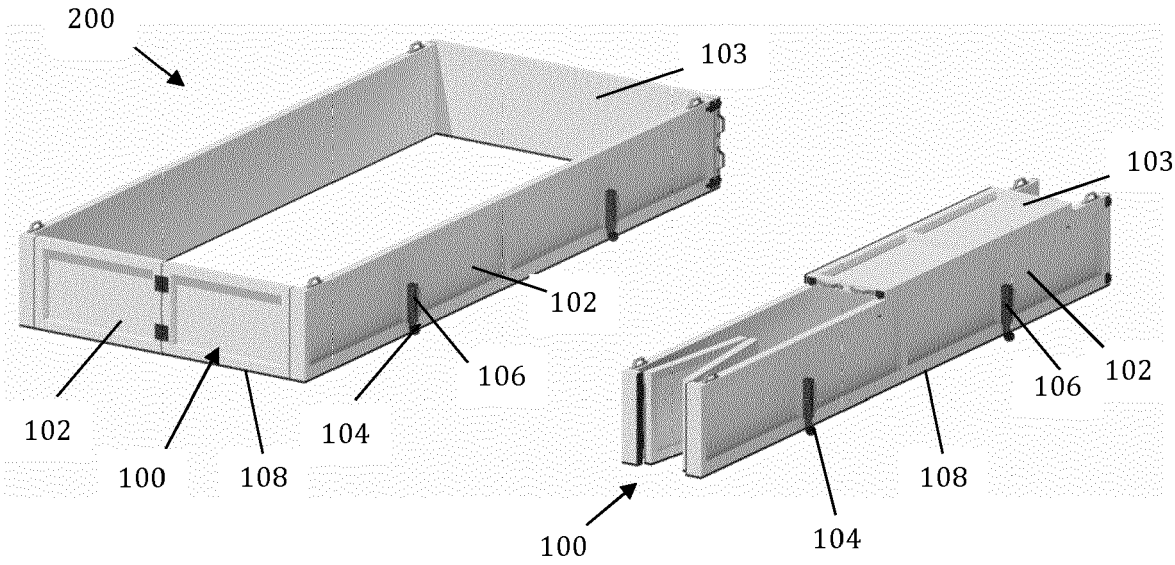
200
103
102
106
102
100
108
104
103
106
102
108
104
100

FIG. 1

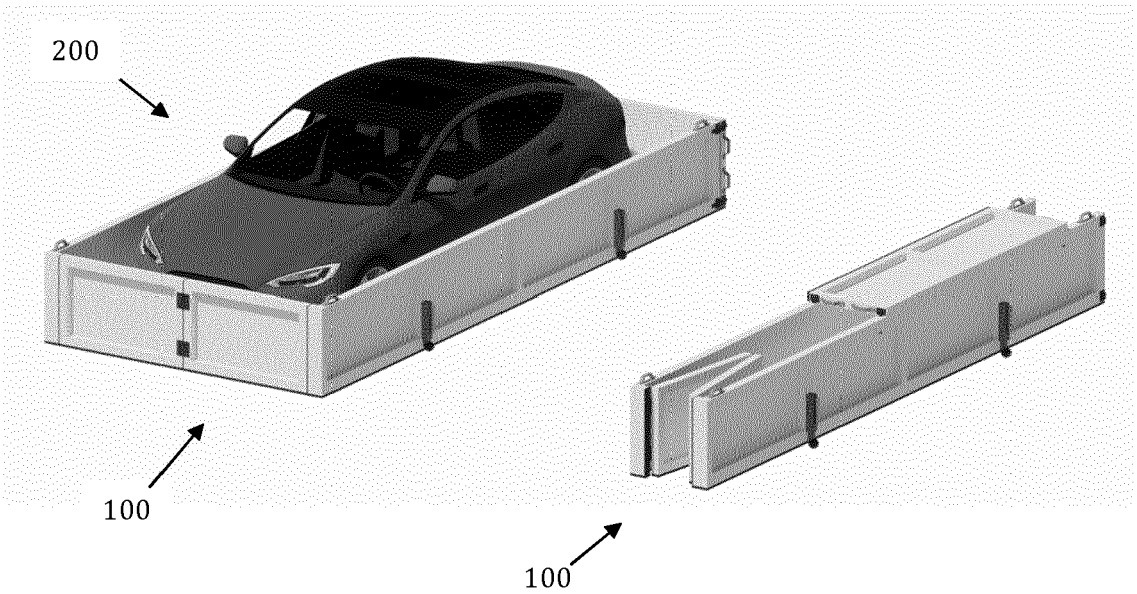
200
100
100

FIG. 2

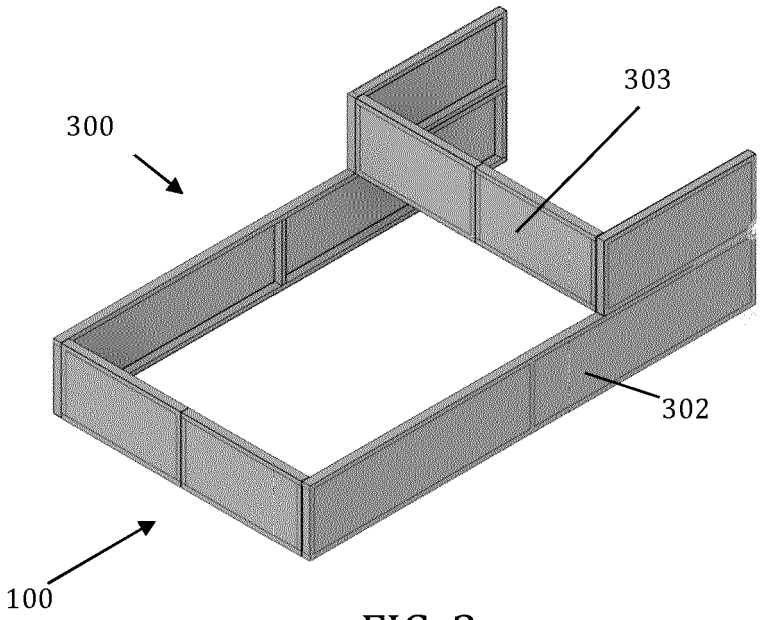

FIG. 3

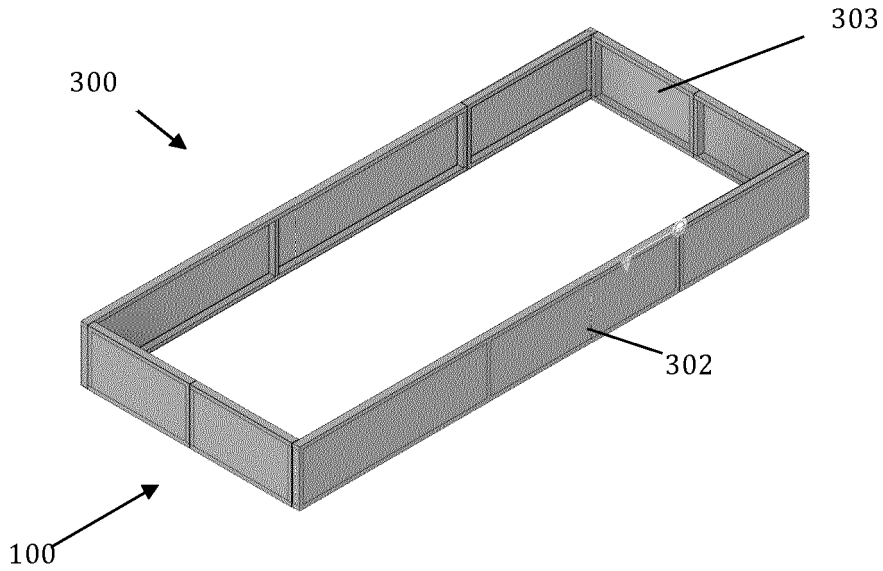

FIG. 4

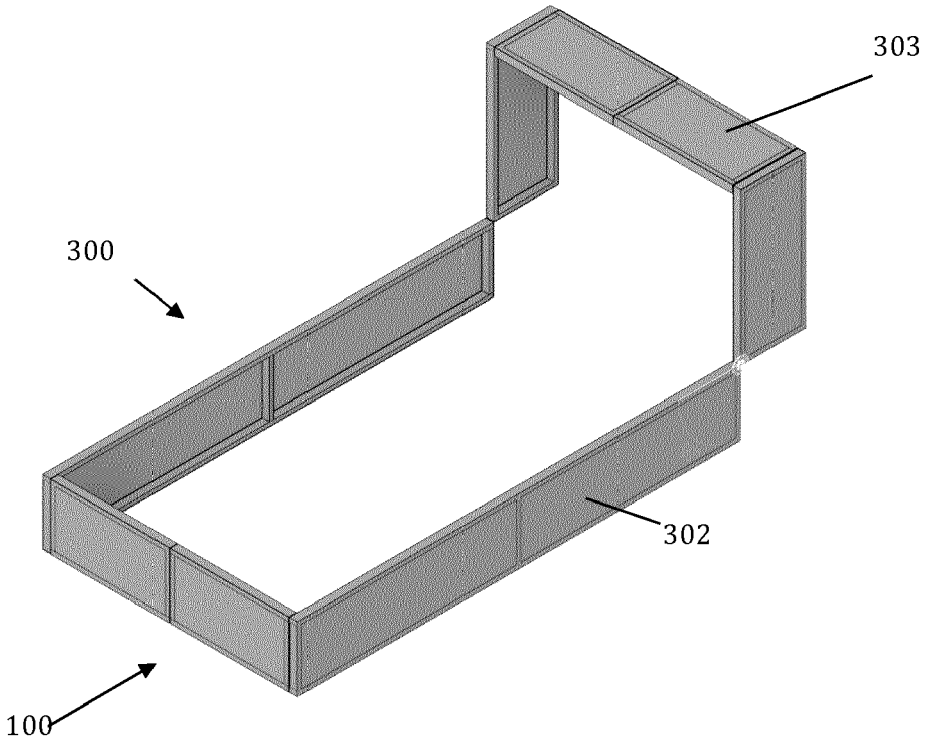

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 23 21 0223

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 4 166 199 A1 (BRANDAU MARCEL [DE]) 19 April 2023 (2023-04-19) * paragraphs [0010], [0011]; figures *	1-15	INV. A62C3/07 A62C3/16
A	WO 2022/118233 A1 (BECKER HEINZ HERBERT [DE]) 9 June 2022 (2022-06-09) * pages 10,11; figures *	1-15	
A	EP 3 881 903 A1 (CASTELLAN AG [DE]) 22 September 2021 (2021-09-22) * paragraph [0020]; figure *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

A62C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 March 2024	Vervenne, Koen

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
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 21 0223

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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28-03-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		EP 4166199 A1	19-04-2023
WO 2022118233 A1	09-06-2022	DE 102020007361 A1	09-06-2022
		WO 2022118233 A1	09-06-2022
EP 3881903 A1	22-09-2021	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 3890843 A **[0008]**
- US 20220134154 A **[0008]**
- WO 202311189 A **[0008]**