Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
Description

Field of the Invention

[0001] The present invention relates to a vehicle and fuel storage system for a vehicle.

Background Art

[0002] As non-conventional vehicles, such as hybrid electric vehicles (HEVs) and fuel cell vehicles (FCVs), begin to gain acceptance, vehicle designers are trying to provide some of the same features in these new vehicles that drivers have come to expect from conventional vehicles. For example, if a vehicle cannot travel more than 480 km prior to needing to be refuelled, it may not be accepted by the average consumer. In the case of FCVs, designers have been challenged to provide storage for enough fuel to ensure that the vehicle can travel 480 km or more without refuelling.

[0003] At some level, all designs require addressing competing interests. For example, in the case of increasing the size of a fuel storage system in a vehicle, it is necessary to consider the impact of such an increase on passenger room and comfort, and storage space. With a view to mitigating this problem solutions are provided by JP4368227 disclosing the preamble of claim 1, US2003/006349 and US2003/146214, however the implementation of each of these is not without its drawbacks. A further example of a vehicle body integrating a hydrogen fuel tank is described in U.S. Patent Application Publication No. 2005/0161934 published on July 28, 2005 (Rife et al.). Rife et al. describes a vehicle frame that includes a floor pan having a centrally positioned tunnel extending the length of the frame, and a fuel tank integrated into the central tunnel. Rife et al. describes an increase in the stiffness of the chassis which results from a larger tunnel, the size of which has been increased to accommodate the fuel tank. One limitation of the vehicle frame described in Rife et al. is that each different body style must be modified to create a tunnel large enough to accommodate the fuel storage tank. This issue is indicative of unibody construction, in which each vehicle body is formed to meet both the aesthetic and structural requirements of the vehicle. This is in contrast to a body-on-frame architecture, in which many of the structural elements of the body are found in a chassis that is configured to accommodate any of a number of vehicle bodies, thereby making it useful across a number of vehicle platforms. Another limitation of the vehicle frame described in Rife et al. is that configuring the tunnel to accommodate the storage tank necessarily increases the stiffness of the body, which detracts from options available to the vehicle designer.

[0004] Therefore, it would be desirable to have a fuel storage system for a vehicle that includes a fuel storage tank, and in particular, one capable of storing a compressed gas, that is large enough so the vehicle can travel a long distance before needing to be refuelled. In addition, it would be desirable to have a fuel storage system that does not require the vehicle body to be changed in order to accommodate a fuel storage tank. It would also be desirable to have a vehicle having a fuel storage system that does not dictate the stiffness of the vehicle body.

Summary of the invention

[0005] According to a first aspect of the invention, there is provided a fuel storage system for a vehicle, comprising: a frame including first and second opposing side rails, and first and second cross members disposed between the first and second side rails, the frame being configured to receive any one of a plurality of vehicle bodies, thereby forming a body-on-frame vehicle architecture; a single, generally cylindrical hydrogen fuel storage tank disposed between the side rails along a length of the frame; and a non-rigid mounting structure for attaching the tank to the frame, the mounting structure being configured to allow movement of the tank, thereby accounting for expansion and contraction of the tank as it is respectively pressurized and depressurised, characterised in that each of the tank ends is configured to allow the passage of fuel therethrough, thereby allowing fuel input at one of the tank ends and fuel output at the other of the tank ends such that the tank forms a fuel delivery conduit along a length of the frame.

[0006] A first advantage of the invention, is that it provides a fuel storage system for a vehicle which is adaptable to a vehicle frame, such that any of a number of different bodies may be attached to the frame without undergoing changes to the body to accommodate the fuel storage system. This allows the same fuel storage system to be attached to one frame and used across multiple vehicle platforms.

[0007] Another advantage of the invention is that it provides a vehicle having a fuel storage system including a fuel storage tank capable of holding compressed hydrogen gas, wherein the vehicle can travel more than 300 miles prior to needing to be refuelled.

[0008] A further advantage of the invention is that it provides a fuel storage system that does not unnecessarily increase the stiffness of the vehicle body, and thereby provides the vehicle designer greater flexibility in choosing the body design.

[0009] Another advantage of the invention is that it provides a fuel storage system that can utilize a single fuel storage tank, thereby providing a weight reduction over multiple tank systems.

[0010] According to a second aspect of the present invention, there is provided a vehicle as set forth in claim 8 of the appended claims.

Brief description of the drawings

[0011] The invention will now be described further, by way of example, with reference to the accompanying
16. A heat exchanger 26 is used to cool the fuel cell stack 16, located near the front of the vehicle 10. The fuel cell stack 16 supplies hydrogen gas to a fuel cell arrangement, or stack 16, located near the front of the vehicle 10. The fuel cell stack 16 uses the hydrogen gas supplied from the fuel tank 14, to generate electricity which can be used directly to the present invention, wherein a fuel storage tank is rigidly mounted to a vehicle frame.

Detailed description of the preferred embodiment(s)

[0012] Figures 1A and 1B show a vehicle 10 in accordance with an embodiment of the present invention. The vehicle 10 is a fuel cell vehicle configured to use hydrogen gas as a fuel to generate electricity to propel the vehicle 10. As shown in Figure 1A, the vehicle 10 includes a fuel storage system 12 having a large, generally cylindrical fuel tank 14. The fuel tank 14 is configured to hold compressed hydrogen gas, and in particular, is large enough to hold enough gas so that the vehicle 10 can travel more than 480 km before needing to be refuelled. The tank 14 supplies hydrogen gas to a fuel cell arrangement, or stack 16, located near the front of the vehicle 10. The fuel cell stack 16 uses the hydrogen gas supplied from the fuel tank 14, to generate electricity which can be used directly by front and rear electric transaxles 18, 20, or stored in a battery 22 for later use.

[0013] It is contemplated that the tank 14 will be large enough (e.g. 350-400 litres) to store 8-12 kg of compressed hydrogen fuel. Having a tank of this size helps to ensure that the vehicle 10 will be able to travel at least 480 km without refuelling, while at the same time, not adversely impacting trunk space, cargo capacity, rear seat height, or foot wells. Of course, different tank sizes may be used, and the storage capacity will depend not only on volume, but also on pressure. For example, at pressures greater than 34500 kPa, it may be possible to store 8-12 kg of hydrogen fuel in a tank smaller than 350 litres. The present invention does, however, make it possible to use a relatively large fuel tank if desired.

[0014] The vehicle 10 also includes a compressor 24, which provides air to the fuel cell stack 16 to facilitate the electricity-producing reactions within the fuel cell stack 16. A heat exchanger 26 is used to cool the fuel cell stack 16. As shown in Figure 1B, the fuel tank 14 is centrally located along a length of the vehicle 10. In a conventional vehicle, much of this space would be occupied by a transmission and a drive shaft, neither of which is present in the fuel cell vehicle 10. By placing the tank 14 down a central portion of the vehicle 10, the impact on passenger space and seating is minimized. In particular, the vehicle 10 is still able to accommodate three rows of seats, including a third row bench seat 28, second row bucket seats 30, 31, and front bucket seats 32, 34. Therefore, the vehicle 10 has the advantage of providing a large compressed gas storage tank to ensure a long driving range, while minimizing the adverse impact on passenger and cargo space.

[0015] As may be discerned from Figures 1A and 1B, the vehicle 10 has a body-on-frame architecture, such that a single frame design can accommodate a plurality of different vehicle bodies. In Figure 2, a chassis, or frame 36, of the vehicle 10 is shown in isolation with the fuel tank 14 and other elements of the storage system 12. As shown in Figure 2, the frame 36 forms a perimeter structure 38 having first and second ends 40, 42, and a generally open central interior portion 44. As shown in Figure 3, the frame 36 is configured to receive a vehicle body 46, and in particular, the frame 36 can receive any of a plurality of different styles of vehicle bodies, thereby adding flexibility of design to the vehicle 10. Returning to Figure 2, it is shown that the frame 36 includes first and second opposing side rails 48, 50, and a number of cross members disposed between the first and second side rails 48, 50, the cross members including first and second cross members 52, 54.

[0016] With reference to Figures 2 and 3, a front 55 of the vehicle 10 and a rear 57 of the vehicle 10, generally correspond to first and second ends 40, 42 of the vehicle frame 36. The tank 14 can be secured to the frame 36 in any of a number of different ways. For example, in the embodiment shown in Figure 2, the fuel storage system 12 includes a non-rigid mounting structure 56. As described in greater detail in Figures 4-7, the mounting structure 56 allows the tank 14 to be flexibly mounted to the frame 36 such that the tank 14 is secure, and yet may expand and contract as the tank 14 is pressurized and depressurised. The flexible mounting structure 56 also allows the tank 14 to be substantially isolated from movement of the frame 36 as it bends and twists while the vehicle 10 is in motion.

[0017] Figure 4 shows a portion of the tank 14, and in particular, the portion oriented toward the front 55 of the vehicle 10. The tank 14 includes a middle portion 58 which has a generally constant diameter along most of the length of the tank 14. The tank 14 includes a first end, forming a first neck 60, having a much smaller diameter than the middle portion 58. With reference to Figure 5, it is also shown that at the rear of the tank 14 is a second neck 62, also having a much smaller diameter than the middle portion 58 of the tank 14. Because the fuel cell stack 16 (see Figures 1A and 1B) is oriented toward the...
front 55 of the vehicle 10, a fuel delivery system 64 is attached to the front end of the tank 14.

[0018] The fuel delivery system is configured to be attached to the fuel cell stack 16, and allows the pressurized hydrogen gas to be metered to the fuel cell stack 16 as required. Similarly, as shown in Figure 5, a fuel receiving system 66 is located at the rear of the tank 14. The fuel receiving system 66 is configured to allow refuelling of the tank 14 with pressurized hydrogen gas from a fuel source. By having both ends of the tank 14 configured to allow the gas to pass through them, the tank 14 acts as a fuel delivery conduit along a length of the vehicle 10. This configuration helps to eliminate additional fuel lines and/or conduits which would be necessary if the tank 14 were shorter, or if access to the interior of the tank 14 was exclusively through one end.

[0019] As shown in Figures 4 and 5, the mounting structure 56 includes first and second portions 68, 70 respectively disposed at the front and rear ends of the tank 14. Figure 6 shows the first portion 68 of the mounting structure 56 isolated from the tank 14. As shown in Figure 6, the first portion 68 of the mounting structure 56 includes a circumferential portion, or mounting ring 72, which is configured to be disposed around the first neck 60 (see Figure 4).

[0020] The mounting ring 72 is configured as a split ring clamp, as evidenced by the slot 74. This configuration allows the mounting ring 72 to be securely tightened around the neck 60 of the tank 14. Bolts 76, 78, and respective nuts 80, 82, not only hold the mounting ring 72 to a bracket 84, but tighten the bolt 78 and nut 82, will also tighten the mounting ring 72 around the neck 60 of the tank 14. As noted above, the mounting structure 56 is a non-rigid mounting structure. To facilitate this type of attachment, the first portion 68, and in particular the bracket 84, includes a pair of elongate members, or extension members 86, 88, extending laterally outward from the mounting ring 72. Each of the extension members 86, 88 is configured for attachment to a portion of the frame 36 through a respective flexible mounting structure 90, 92.

[0021] The flexible mounting structures 90, 92 may include an elastomeric material, or other flexible material, which allows the bracket 84 to remain relatively stationary, as the frame 36 bends and twists. Each of the flexible mounting structures 90, 92 may be attached to the frame 36 through a nut and bolt configuration, similar to the one used on the mounting ring 72. The result of such a mounting configuration for the first portion 68 of the mounting structure 56 is that the tank 14 is inhibited from longitudinal movement near the front end, as the mounting ring 72 is securely locked around the first neck 60, and the bracket 84 is mounted to the frame 36. Because the tank 14 may expand both circumferentially and longitudinally when it is pressurized, the second portion 70 of the mounting structure 56 has a different configuration from the first portion 68.

[0022] Turning to Figure 7, it is shown that the second portion 70 of the mounting structure 56 also includes a circumferential portion, or mounting ring 94. The mounting ring 94 is configured to receive the second neck 62 of the tank 14. Unlike the clamp 72, the mounting ring 94 is not configured for rigid attachment to the second neck 62. Rather, the second neck 62 merely protrudes through an aperture 96, which is large enough to allow longitudinal movement of the second neck 62. Thus, with the second portion 70 of the mounting structure 56, the bolts 98, 100 and the nuts 102, 104, merely hold the mounting ring 94 onto a bracket 106; they do not rigidly clamp the second neck 62.

[0023] The bracket 106 also includes two elongate members, or extension members 108, 110, extending laterally outward from the mounting ring 94. A comparison of Figure 6 and Figure 7 reveals that the brackets 84, 106 have slightly different configurations. Because of the way the frame 36 is configured, differences between the two brackets 84, 106 increase the efficiency of the overall package, and conserve space. Returning to Figure 7, it is shown that the bracket 106 also includes flexible mounting structures 112, 114. Like their counterparts in the first portion 68, the flexible mounting structures 112, 114 on the second portion 70 can be made from an elastomeric material, or other flexible material, which allows the bracket 106 to remain relatively stationary as the frame 36 twists and bends. The bracket 106 may also be mounted to a portion of the frame 36 through bolts and nuts, or other fasteners, disposed through the flexible mounting structures 112, 114. As shown in Figure 3, the mounting structure 56 includes no circumferential attachment around the middle portion 58 of the tank 14. This facilitates diametral movement, or circumferential expansion, of the tank 14 as it is pressurized.

[0024] Figure 8 not according to the invention, includes a partial fragmentary view of a vehicle chassis, or frame 36'. The frame 36' is configured similarly to the frame 36 shown in Figure 2; therefore, features of the frame 36' are labelled with numbers using the prime (') symbol to indicate like components. The frame 36' defines a perimeter structure 38', the ends of which are not shown in Figure 8. The frame 36' includes a generally open central interior portion 44', having a fuel storage tank 14' disposed therein. Like the frame 36, the frame 36' is configured as part of a body-on-frame vehicle architecture, such that any of a plurality of different vehicle bodies can be mounted onto the frame 36'.

[0025] One obvious difference between the fuel storage system 12, shown in Figure 2, and the fuel storage system 12', shown in Figure 8, is the mounting of the fuel storage tanks 14, 14'. In particular, the tank 14' is mounted to the frame 36' using a rigid mounting structure that includes a plurality of hoop strap arrangements 116, 118, 120. The hoop strap arrangements are secured to the tank 14', and are also mounted to the frame 36', thereby acting as additional cross members. Of course, each of the hoop strap arrangements 116, 118, 120 is configured to allow for diametral expansion of the tank 14' when it
is pressurized. Using the type of mounting structure shown in Figure 8 adds stiffness to a vehicle frame, such as the frame 36. This increased stiffness may be an advantage in some situations; however, as described above and shown in the other illustrations, the present invention contemplates a non-rigid mounting structure which may not appreciably affect the rigidity of the vehicle frame. Therefore, the present invention provides flexibility with regard to the configuration of the fuel storage system and vehicle.

While the best mode for carrying out the invention has been described in detail, those familiar with the art to which this invention relates will recognize various alternative designs and embodiments for practising the invention as defined by the following claims.

Claims

1. A fuel storage system (12) for a vehicle, comprising: a frame (36) including first and second opposing side rails (48, 50), and first and second cross members (52, 54) disposed between the first and second side rails (48, 50), the frame (36) being configured to receive any one of a plurality of vehicle bodies, thereby forming a body-on-frame vehicle architecture; a single, generally cylindrically hydrogen fuel storage tank (14) disposed between the side rails (48, 50) along a length of the frame the first and second tank ends being disposed adjacent respective ends of the frame; characterised by a non-rigid mounting structure (56) for attaching the tank (14) to the frame (36), the mounting structure (56) being configured to allow movement of the tank (14), thereby accounting for expansion and contraction of the tank (14), as it is respectively pressurized and depressurised, wherein each of the tank ends is configured to allow the passage of fuel therethrough, thereby allowing fuel input at one of the tank ends and fuel output at the other of the tank ends such that the tank forms a fuel delivery conduit along a length of the frame (36).

2. A fuel storage system as claimed in claim 1, wherein the tank (14) includes first and second ends, each of the tank ends having a smaller diameter than a middle portion of the tank (58), thereby respectively forming first and second necks (60, 62), and wherein the mounting structure (56) includes a first portion configured to attach the first neck (60) to the frame (36), and a second portion configured to attach the second neck (62) to the frame (36).

3. A fuel storage system as claimed in claim 2, wherein the first portion (68) of the mounting structure (56) inhibits longitudinal movement of the tank (14), and the second portion (70) of the mounting structure (56) facilitates longitudinal movement of the tank (14).

4. A fuel storage system as claimed in claim 3, wherein the first portion (68) of the mounting structure (56) includes a circumferential portion (72) disposed around the first neck (60), and the second portion (70) of the mounting structure (56) includes a circumferential portion (94) disposed around the second neck (62), the mounting structure (56) being further configured to provide no circumferential attachment around the middle portion (58) of the tank (14), thereby facilitating diametral movement of the tank (14).

5. A fuel storage system as claimed in claim 4, wherein the first and second portions of the mounting structure (56) each include a pair of extension members (108, 110) laterally disposed from their respective circumferential portions, each of the extension members (108, 110) being attached to a portion of the frame (36).

6. A fuel storage system as claimed in claim 5, wherein at least one of the extension members (108, 110) of each of the first and second portions of the mounting structure (56) includes a flexible attachment (112) to a respective portion of the frame (36), thereby substantially isolating the tank (14) from twisting and bending movements of the frame (36).

7. A fuel storage system as claimed in any preceding claim, further comprising a rigid mounting structure for attaching the tank (14) to the frame (36) such that the tank (14) adds stiffness to the frame (36) whilst still allowing for diametral expansion the tank (14).

8. A vehicle (10) incorporating a fuel storage system (12), comprising a fuel cell arrangement (16) disposed adjacent the first end (40) of the chassis (36), the fuel cell arrangement being operable to receive hydrogen fuel and to output electrical energy; characterised in that the fuel storage tank (14) includes a fuel output (64) disposed adjacent the fuel cell arrangement (16), and a fuel input (66) disposed adjacent the second end (42) of the vehicle chassis (36), the tank (14) forming a fuel delivery conduit along a length of the chassis (36).

Patentansprüche

1. Kraftstoffspeichersystem (12) für ein Fahrzeug, folgendes umfassend:

einen Rahmen (36) mit ersten und zweiten, einander gegenüberliegenden Seitenholmen (48, 50) und zwischen den ersten und zweiten Seitenholmen (48, 50) angeordneten ersten und zweiten Querträgern (52, 54), wobei der Rahmen (36) so ausgebildet ist, daß er eine belie-
Kraftstoffspeichersystem nach Anspruch 3,
4.
Kraftstoffspeichersystem nach Anspruch 2,
3.
Kraftstoffspeichersystem nach Anspruch 1,
2.
unter Druck gesetzt bzw. druckentlastet wird,
tanks (14) berücksichtigt wird, wenn dieser jeweils
die Ausdehnung und das Zusammenziehen des
bewegung des Speichertanks (14) zuläßt, so daß
des Speichertanks (14) am Rahmen (36), wobei die
montagestruktur zur Befestigung
gekennzeichnet durch
eine unstarre Montagestruktur (56) zur Befestigung
des Speichertanks (14) am Rahmen (36), wobei die
bzw. (14) so ausgelegt ist, daß sie eine
bewegung des Speichertanks (14) zuläßt, so daß
die Ausdehnung und das Zusammenziehen des
Tanks (14) berücksichtigt wird, wenn dieser jeweils
unter Druck gesetzt bzw. druckentlastet wird,
wohin jedes der Enden des Tanks ausgelegt ist, den
Durchgang von Kraftstoff zu erlauben, so daß die
Einleitung von Kraftstoff an einem Ende des Tanks
und die Abgabe von Kraftstoff am anderen Ende des
Tanks ermöglicht wird, so daß der Speichertank eine
Kraftstoffabgabeleitung entlang der Länge des Rah-
mens (36) bildet.

2. Kraftstoffspeichersystem nach Anspruch 1,
wohin jedes Ende des Tanks einen kleineren Durch-
messer als der Mittelteil (58) des Tanks hat, so daß
jeweils erste und zweite Hälse (60, 62) gebildet wer-
den, und
wohin die Montagestruktur (56) einen ersten Ab-
schnitt aufweist, der ausgelegt ist, den ersten Hals
(60) am Rahmen (36) zu befestigen, sowie einen
zweiten Abschnitt, der ausgelegt ist, den zweiten
Hals (62) am Rahmen (36) zu befestigen.

3. Kraftstoffspeichersystem nach Anspruch 2,
wohin der erste Abschnitt (68) der Montagestruktur
(56) eine Längsbewegung des Tanks (14) verhin-
dert, und der zweite Abschnitt (70) der Montage-
strukturen (56) eine Längsbewegung des Tanks (14)
erleichtert.

4. Kraftstoffspeichersystem nach Anspruch 3,
wohin der erste Abschnitt (68) der Montagestruktur
(56) einen um den ersten Hals (60) herum angeord-
neten Umfangsabschnitt (72) beinhaltet, und worin
der zweite Abschnitt (70) der Montagestruktur (56)
en einen um den zweiten Hals (62) herum angeordne-
ten Umfangsabschnitt (94) beinhaltet, worin die Montagestruktur (56) des weiteren ausge-
legt ist, keine Festlegung des Mittelteils (58) des
Tanks (14) in Umfangsrichtung zu schaffen, so daß
eine diametrale Bewegung des Tanks (14) erleicht-
tert wird.

5. Kraftstoffspeichersystem nach Anspruch 4,
wohin die ersten und zweiten Abschnitte der Monta-
gestruktur (56) je zwei seitlich von ihren jeweiligen
Umfangsabschnitten angeordnete Verlängerungs-
glieder (108, 110) aufweisen, wobei jedes der Ver-
längerungsglieder (108, 110) an einem Abschnitt des
Rahmens (36) befestigt ist.

6. Kraftstoffspeichersystem nach Anspruch 5,
wohin wenigstens eines der Verlängerungsglieder
(108, 110) jedes der ersten und zweiten Abschnitte
der Montagestruktur (56) eine flexible Befestigung
(112) an einem entsprechenden Abschnitt des Rah-
mens (36) beinhaltet, so daß der Tank (14) im we-
sentlichen von den Verwindungs- und Biegebewe-
gungen des Rahmens (36) abgeschirmt wird.

7. Kraftstoffspeichersystem nach einem beliebigen der
vorangehenden Ansprüche, des weiteren eine starre
Montagestruktur zur Befestigung des Speichertanks
(14) am Rahmen (36) beinhaltet, so daß der Tank
(14) dem Rahmen (36) zusätzliche Steifigkeit ver-
leiht, während dennoch eine diametrale Ausdeh-
nung des Rahmens (14) zugelassen wird.

8. Fahrzeug (20) mit einem Kraftstoffspeichersystem
(12), mit einer angrenzenden auf einem Ende (40) des
Fahrgestells (36) angeordneten Brennstoffzellenan-
ordnung (16), wobei die Brennstoffzellenanordnung
derart betreibbar ist, daß sie Wasserstoff-Kraftstoff
aufnimmt und elektrische Energie abgibt;
dadurch gekennzeichnet, daß
der Kraftstoffspeichertank (14) einen an der Brenn-
stoffzellenanordnung angrenzenden angeordneten
Kraftstoffauslaß (64) und einen angrenzend am
zweiten Ende (42) des Fahrzeugfahrwerks (36) an-
geordneten Kraftstoffeintritt (66) aufweist, wobei der
Tank (14) eine Kraftstoffabgabeleitung entlang der
Länge des Fahrwerks (36) bildet.

Revendications
1. Système de réservoir de carburant (12) pour un vé-
hicule, comprenant: un châssis (36) possédant des
premier et deuxième rails latéraux en opposition (48,
50) et des première et deuxième entrettoises (52, 54)
disposées entre les premier et deuxième rails laté-
raux (48, 50), le châssis (36) étant apte à accommo-
der l'une quelconque parmi une pluralité de carros-
series de véhicules, formant ainsi une architecture
de véhicule carrosserie - sur - châssis ; un unique
réservoir de carburant hydrogène généralement cy-
lindrique (14), qui est disposé entre les rails latéraux
(48, 50) sur une longueur du châssis, les première
et deuxième extrémités de réservoir étant disposées
de façon adjacente à des extrémités respectives du
châssis ; caractérisé par une structure de montage
non-rigide (56) qui est apte à attacher le réservoir (14) au châssis (36), la structure de montage (56) étant apte à permettre le mouvement du réservoir (14), accommodant ainsi l’expansion et la contraction du réservoir (14) lorsqu’il est respectivement pressurisé et dépressurisé, chacune des extrémités du réservoir étant apte à permettre l’écoulement du carburant à leur travers, permettant ainsi l’admission de carburant au niveau de l’une des extrémités de réservoir et l’alimentation en carburant au niveau de l’autre des extrémités de réservoir, de sorte que le réservoir forme une conduite d’alimentation en carburant sur une longueur du châssis (36).

2. Système de réservoir de carburant selon la revendication 1, dans lequel le réservoir (14) possède des première et deuxième extrémités, le diamètre de chacune des extrémités étant inférieur à une portion médiane du réservoir (58), formant ainsi respectivement des premier et deuxième cols (60, 62), et dans lequel la structure de montage (56) inclut une première portion qui est apte à attacher le premier col (60) au châssis (36), et une deuxième portion qui est apte à attacher le deuxième col (62) au châssis (36).

3. Système de réservoir de carburant selon la revendication 2, dans lequel la première portion (68) de la structure de montage (56) empêche le mouvement longitudinal du réservoir (14), et la deuxième portion (70) de la structure de montage (56) facilite le mouvement longitudinal du réservoir (14).

4. Système de réservoir de carburant selon la revendication 3, dans lequel la première portion (68) de la structure de montage (56) comprend une portion circonférentielle (72) qui est disposée autour du premier col (60), et la deuxième portion (70) de la structure de montage (56) comprend une portion circonférentielle (94) qui est disposée autour du deuxième col (62), la structure de montage (56) étant en outre apte à ne fournir aucun attachement circonférentiel autour de la portion médiane (58) du réservoir (14), facilitant ainsi le mouvement diamétral du réservoir (14).

5. Système de réservoir de carburant selon la revendication 4, dans lequel les première et deuxième portions de la structure de montage (56) comprennent chacune une paire de membres d’extension (108, 110), qui sont disposés latéralement par rapport à leurs portions circonférentielles respectives, chacun des membres d’extension (108, 110) étant attaché à une portion du châssis (36).

6. Système de réservoir de carburant selon la revendication 5, dans lequel un au moins parmi les membres d’extension (108, 110) de chacune des premières et deuxième portions de la structure de montage (56) comportent un attachement flexible (112) à une portion respective du châssis (36), isolant ainsi substantiellement le réservoir (14) par rapport aux mouvements de torsion et de pliage du châssis (36).

7. Système de réservoir de carburant selon l’une des revendications précédentes, comprenant en outre une structure de montage rigide pour attacher le réservoir (14) au châssis (36), de sorte que le réservoir (14) apporte de la rigidité au châssis (36), tout en permettant l’expansion diamétrale du réservoir (14).

8. Véhicule (10) incorporant un système de réservoir de carburant (12), comprenant un ensemble de pile à combustible (16) qui est disposé de façon adjacente à la première extrémité (40) du châssis (36), l’ensemble de pile à combustible fonctionnant de sorte à recevoir du carburant hydrogène et à produire de l’énergie électrique; caractérisé en ce que le réservoir de carburant (14) comprend une sortie de carburant (64) qui est disposée de façon adjacente à l’ensemble de pile à combustible (16) et une admission de carburant (66) qui est disposée de façon adjacente à la deuxième extrémité (42) du châssis de véhicule (36), le réservoir formant une conduite d’alimentation en carburant sur une longueur du châssis (36).
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description