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LIQUID STORAGE STRUCTURE FOR VEHICLE

Abstract

A liquid storage structure for a vehicle is applied to a vehicle in which a vehicle interior outer chamber is provided outside a vehicle interior, and a trunk and a liquid tank having a liquid storage chamber are disposed in the vehicle interior outer chamber. A framework portion of the liquid tank is configured by a tank body portion, the tank body portion having a wall portion forming an outer shell portion. The tank body portion has an opening in a part of the wall portion. In a state in which the opening is closed by a part of the trunk, the wall portion of the tank body portion is attached to the trunk at a peripheral edge portion of the opening in a close contact state. The liquid tank is constituted by the tank body portion and the part of the trunk that closes the opening.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS
[0001] This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2024-022093 filed on Feb. 16, 2024, the entire content of which is incorporated herein by reference.
TECHNICAL FIELD The present disclosure relates to a liquid storage structure for a vehicle.
BACKGROUND ART
[0002] A front end panel (which may be called a front face support or a radiator support) is attached to a front end portion of a vehicle to maintain the rigidity of a vehicle body. A radiator, headlights, and the like are fixed to the front end panel which is a structural member (framework member).
[0003] In the vehicle, a washer tank that stores a washer fluid is mounted in a vehicle interior outer chamber provided outside a vehicle interior, for example, a power source room that accommodates a power source such as an engine or a motor.
[0004] With regard to such a front end panel and a washer tank, JP2003-72591A describes a liquid storage structure configured by attaching a washer tank made of resin to a front end panel.
SUMMARY OF INVENTION
[0005] When a washer tank is attached to a front end panel which is a main structural member (framework member) of a vehicle, the following concern arises. The washer tank and washer fluid increase the total weight of the front end panel, reducing the natural frequency. This may lead to a decrease in ride comfort due to the rigidity of a vehicle body, which may affect the steering stability of the vehicle.
[0006] As the washer fluid is consumed or replenished, the total weight of the front end panel including the washer fluid greatly fluctuates. Accordingly, the natural frequency of the front end panel fluctuates, and the ride comfort due to the rigidity varies over time. This may also be a factor that affects the steering stability of the vehicle. Such problems may commonly occur in any liquid storage structure in which a liquid tank that stores a liquid other than the washer fluid is attached to the front end panel.
[0007] JP2021-146741A describes disposing a storage structure in the vehicle interior outer chamber. Based on this, it is conceivable that a liquid storage structure could be constructed by attaching a liquid tank such as the washer tank to a member disposed in the vehicle interior outer chamber. Although the liquid tank is attached to the front end panel in this configuration, such a liquid storage structure occupies a large space in the vehicle interior outer chamber, and there is room for improvement in terms of space efficiency.
[0008] According to an aspect of the present disclosure, there is provided a liquid storage structure for a vehicle having a following configuration. [0009] (1) A liquid storage structure for a vehicle, the liquid storage structure being applied to a vehicle in which a vehicle interior outer chamber is provided outside a vehicle interior, and a trunk and a liquid tank having a liquid storage chamber are disposed in the vehicle interior outer chamber, in which [0010] a framework portion of the liquid tank is configured by a tank body portion, the tank body portion having a wall portion forming an outer shell portion, [0011] the tank body portion has an opening in a part of the wall portion, [0012] in a state in which the opening is closed by a part of the trunk, the wall portion of the tank body portion is attached to the trunk at a peripheral edge portion of the opening in a close contact state, and [0013] the liquid tank is constituted by the tank body portion and the part of the trunk that closes the opening.
[0014] According to the above configuration, unlike the front end panel, the trunk disposed in the vehicle interior outer chamber does not serve as a main structural member (framework member) of the vehicle. The trunk has a smaller effect on the ride comfort due to the rigidity of the vehicle

body than the main structural member of the vehicle. Therefore, even if the natural frequency of the entire trunk and liquid tank is reduced due to the addition of the tank body portion and the liquid, the ride comfort due to the rigidity is unlikely to be reduced due to the addition of the tank body portion and the liquid. Here, the total weight of the liquid tank is defined as the sum of the weight of the liquid tank and the weight of the liquid in the storage chamber. Therefore, even if the total weight of the liquid tank fluctuates due to consumption or replenishment of the liquid, the consumption or replenishment of the liquid has a small effect on the ride comfort due to the rigidity.

[0015] According to the above configuration, the portion of the trunk that closes the opening also serves as a part of the wall portion of the liquid tank. In other words, a part of the trunk and a part of the wall portion of the liquid tank are shared. Therefore, as compared with a case where the trunk and the wall portion of the liquid tank do not have a common portion, the tank body portion is disposed at a location closer to the trunk. The liquid storage structure in which the tank body portion is attached to the trunk occupies less space in the vehicle interior outer chamber as compared with the case where the trunk and the wall portion of the liquid tank do not have a common portion.

[0016] (2) The liquid storage structure for a vehicle according to (1), in which a liquid stored in the storage chamber is a washer fluid, and the trunk and the tank body portion are each made of a resin material.

[0017] According to the above configuration, when the washer fluid freezes, the volume of the washer fluid increases. At this time, stress generated due to the expansion acts on the tank body portion and the trunk. However, the tank body portion and the trunk are both made of a resin material.

[0018] Therefore, the extension (deformation) of the tank body portion and the trunk absorbs a part of the stress.

[0019] (3) The liquid storage structure for a vehicle according to (1) or (2), in which the trunk and the tank body portion are made of a resin material or a composite material obtained by reinforcing a resin material with a reinforcing material, and the wall portion of the tank body portion is joined to the trunk at the peripheral edge portion of the opening by welding.

[0020] According to the above configuration, the wall portion of the tank body portion is joined to the trunk at the peripheral edge portion of the opening by welding. That is, an interface between the wall portion of the tank body portion and the trunk is melted by heat, and thus the wall portion is joined to the trunk. The portion where the wall portion of the tank body portion and the trunk are joined together is sealed without any gaps. Therefore, leakage of the liquid stored in the storage chamber from the joint portion is appropriately restricted.

[0021] According to the present invention, it is possible to improve space efficiency of a vehicle interior outer chamber while reducing the effect on steering stability of a vehicle.

Description

BRIEF DESCRIPTION OF DRAWINGS

[0022] Exemplary embodiment(s) of the present invention will be described in detail based on the following figures, wherein:

[0023] FIG. **1** is a perspective view of a liquid storage structure according to an embodiment, as viewed obliquely from the front;

[0024] FIG. **2** is a partial perspective view of a front portion of a vehicle to which the liquid storage structure of FIG. **1** is applied, illustrating a state in which a bonnet hood is slightly opened;

[0025] FIG. **3** is a partially exploded perspective view of FIG. **1**;

[0026] FIG. **4** is a perspective view of the liquid storage structure according to the embodiment, as

viewed obliquely from the rear;
[0027] FIG. **5** is a partially exploded perspective view of FIG. **4**; and
[0028] FIG. **6** is a cross-sectional view taken along line **6**-**6** of FIG. **1**.
DESCRIPTION OF EMBODIMENTS
[0029] Hereinafter, an embodiment of a liquid storage structure for a vehicle will be described with reference to the drawings.
[0030] In the following description, a forward moving direction of a vehicle **10** is referred to as the front, and a backward moving direction is referred to as the rear. An upper-lower direction refers to an upper-lower direction of the vehicle **10**, and a left-right direction refers to a vehicle width direction, which coincides with a left-right direction when the vehicle **10** moves forward.
[0031] As shown in FIG. **2**, the vehicle **10** has a vehicle interior **15** as a space in which an occupant rides, and has a vehicle interior outer chamber outside the vehicle interior **15**. The vehicle **10** of the present embodiment has a power source room **12** in which a power source (not shown) is accommodated as the vehicle interior outer chamber, and the power source room **12** is provided in front of the vehicle interior **15**. The power source room **12** is called an engine room in an internal combustion engine vehicle in which an internal combustion engine is mounted as a power source, or in a hybrid vehicle in which an internal combustion engine and a motor are mounted as power sources. The power source room **12** is called a motor room in a fuel cell vehicle, an electric vehicle, or the like.
[0032] A front end panel (not shown, also called a radiator support) is attached to a front end portion of the power source room **12** for the purpose of maintaining the rigidity of a vehicle body **11**. A radiator (not shown), headlights **16**, and the like are fixed to the front end panel which is a structural member (framework member).
[0033] In the power source room **12**, at least an engine, a motor, and the like as power sources are accommodated behind the front end panel. In addition to the power sources, a transmission, auxiliary equipment, a battery, and the like are appropriately accommodated in the power source room **12**.
[0034] As shown in FIGS. **1** and **2**, a trunk **20** is disposed in the power source room **12**, and a washer tank **30** serving as a liquid tank is disposed in the power source room **12**. Since the trunk **20** is located in a front portion of the vehicle body **11**, the trunk **20** is also called a “frunk”.
Trunk **20**
[0035] As shown in FIGS. **1** and **4**, the trunk **20** includes a bottom wall portion **21**, a front wall portion **22**, a rear wall portion **23**, and a pair of side wall portions **24** as wall portions. The front wall portion **22** rises upward from a front edge portion of the bottom wall portion **21**. The rear wall portion **23** is inclined with respect to the horizontal plane so as to be located upward toward a rear side from a rear edge portion of the bottom wall portion **21**. The rear wall portion **23** is inclined to avoid interference with other components disposed in the power source room **12**. The side wall portions **24** rise upward from both side edge portions of the bottom wall portion **21** in the left-right direction. A space surrounded by the bottom wall portion **21**, the front wall portion **22**, the rear wall portion **23**, and the side wall portions **24** constitutes an accommodation portion **25** for accommodating luggage and the like. An upper end portion of the accommodation portion **25** is open. The open portion of the accommodation portion **25** is a portion that functions as an entrance and an exit for luggage and the like. When a bonnet hood **13** (see FIG. **2**) of the vehicle **10** is closed, the open portion is closed by the bonnet hood **13**.
[0036] A flat plate-shaped extension portion **26** extending downward from the rear wall portion **23** is formed at a rear portion of each of the side wall portions **24**.
[0037] The trunk **20** has flange portions **27** around the accommodation portion **25**. Here, the “side” and “direction” that intersect wall portions of the trunk **20**, that is, the bottom wall portion **21**, the front wall portion **22**, the rear wall portion **23**, and the pair of side wall portions **24**, and that are away from a center portion (center of gravity) of the accommodation portion **25** are referred to as

an “outside” and “outward”, respectively. The “side” and “direction” that intersect a wall portion of the trunk **20**, such as the side wall portions **24**, and that approach the center portion (center of gravity) of the accommodation portion **25** are referred to as “inside” and “inward”, respectively. A part of each of the flange portions **27** protrudes forward from an upper end portion of the front wall portion **22** outward in the front-rear direction. A part of the flange portion **27** protrudes outward in the left-right direction from an upper end portion of the side wall portion **24**.

[0038] The flange portion **27** has a notch **28** formed at a location above each of the left and right extension portions **26**. The notch **28** extends inward from an outer edge portion of the flange portion **27**, that is, an edge portion on a side not connected to the side wall portion **24**. Instead of the notch **28**, a hole that vertically penetrates the flange portion **27** may be formed.

Washer Tank **30**

[0039] As shown in FIG. **6**, the washer tank **30** has a storage chamber **32** for storing a washer fluid **31** as a liquid. The washer fluid **31** is a cleaning fluid that is to be sprayed toward a windshield **14** (see FIG. **2**) of the vehicle **10**.

[0040] The washer tank **30** is configured by a part of the trunk **20** (the rear portion of the side wall portion **24** and the extension portion **26**) and a tank body portion **33** provided separately from the trunk **20**.

[0041] The tank body portion **33** is a member that constitutes a framework portion of the washer tank **30**. The tank body portion **33** is disposed on one side of the trunk **20** in the left-right direction, that is, outside the left side wall portion **24** in the present embodiment, and below the flange portion **27**.

[0042] As shown in FIGS. **3**, **5**, and **6**, an outer shell portion of the tank body portion **33** is configured by a wall portion. The tank body portion **33** has an opening **39** that connects the inside and the outside of the storage chamber **32** in the left-right direction in an inner portion which is a part of the wall portion. The wall portion includes a lower wall portion **34** and an upper wall portion **35** located above the lower wall portion **34**. The wall portion further includes a front connecting wall portion **36**, a rear connecting wall portion **37**, and outer connecting wall portions **38** that extend in the upper-lower direction. The front connecting wall portion **36** connects a front edge portion of the lower wall portion **34** and a front edge portion of the upper wall portion **35**. The rear connecting wall portion **37** connects a rear edge portion of the lower wall portion **34** and a rear edge portion of the upper wall portion **35**. The outer connecting wall portions **38** connect outer edge portions of the lower wall portion **34** and outer edge portions of the upper wall portion **35**.

[0043] The wall portion does not have a portion corresponding to an inner connecting wall portion. The opening **39** is defined by inner edge portions of the lower wall portion **34**, the upper wall portion **35**, the front connecting wall portion **36**, and the rear connecting wall portion **37**.

[0044] The opening **39** is closed by a part of the trunk **20**. The wall portion of the tank body portion **33** is attached to the rear portion of the side wall portion **24** and the extension portion **26** at a peripheral edge portion of the opening **39** in a close contact state. A space surrounded by the tank body portion **33** and a portion of the trunk **20** that closes the opening **39** constitutes the storage chamber **32**.

[0045] The tank body portion **33** includes an injection pipe portion **41** for injecting the washer fluid **31** into the storage chamber **32** from the outside. The injection pipe portion **41** protrudes upward from the upper wall portion **35** in a state in which the inside and the outside of the storage chamber **32** communicate with each other. The injection pipe portion **41** penetrates the flange portion **27** at the notch **28** in the upper-lower direction. At least a part of the injection pipe portion **41** including an upper end portion is exposed above the flange portion **27**. A piping member (not shown) that guides the washer fluid **31** to the storage chamber **32** is connected to the exposed portion.

Materials for Forming Trunk **20** and Tank Body Portion **33**

[0046] The trunk **20** and the tank body portion **33** are each made of a resin material. Examples of the resin material include polypropylene (PP) and acrylonitrile-butadiene-styrene copolymer

(ABS). In the present embodiment, the trunk **20** and the tank body portion **33** are made of the same type of resin material. The trunk **20** and the tank body portion **33** may be made of different types of resin materials on condition that the trunk **20** and the tank body portion **33** can be welded.

[0047] The trunk **20** is formed using a resin material colored in black or the like, for example, a colored resin material in which a coloring agent such as a pigment, for example, black, is mixed into the resin material. This is to prevent members located below the trunk **20** from being seen through the trunk **20** by restricting visible light from passing through the trunk **20**.

Attachment Structure of Tank Body Portion **33** to Trunk **20**

[0048] The wall portion of the tank body portion **33** is joined to the trunk **20** at the peripheral edge portion of the opening **39** by welding in a close contact state. That is, an interface between the wall portion of the tank body portion **33** and the trunk **20** is melted by heat, and thus the wall portion is joined to the trunk **20**. In the tank body portion **33**, portions to be welded are inner edge portions of the lower wall portion **34**, the upper wall portion **35**, the front connecting wall portion **36**, and the rear connecting wall portion **37**. In the trunk **20**, portions to be welded are a part of an outer side surface **24***a* of the side wall portion **24** on one side (left side) and a part of an outer side surface **26***a* of the extension portion **26**. By the joining, the washer tank **30** is integrated with the trunk **20**.

Operations of Present Embodiment

[0049] As shown in FIG. **2**, the trunk **20**, which is disposed in the power source room **12** and has the accommodation portion **25**, does not serve as a main structural member (framework member) of the vehicle **10**, unlike the front end panel. The trunk **20** has a smaller effect on the ride comfort due to the rigidity of the vehicle body **11** than the main structural member of the vehicle **10**. Therefore, even if the natural frequency of the entire trunk **20** and washer tank **30** is reduced due to the addition of the tank body portion **33** and the washer fluid **31**, the ride comfort due to the rigidity is unlikely to be reduced due to the addition of the tank body portion **33** and the washer fluid **31**.

[0050] Here, the total weight of the washer tank **30** is defined as the sum of the weight of the washer tank **30** and the weight of the washer fluid **31** in the storage chamber **32**. As the washer fluid **31** is consumed, a fluid level **31***a* drops, for example, as shown by a two-dot chain line in FIG. **6**. When the washer fluid **31** is replenished, the fluid level **31***a* rises, for example, as shown by a solid line in FIG. **6**. As the fluid level **31***a* drops and rises, the total weight of the washer tank **30** fluctuates. However, this has little effect on the ride comfort due to the rigidity. The ride comfort due to the rigidity is unlikely to vary over time due to the fluctuation in the weight.

[0051] A portion of the trunk **20** that closes the opening **39** also serves as a part of the wall portion of the washer tank **30**. In other words, a part of the trunk **20** and a part of the wall portion of the washer tank **30** are shared. Therefore, as compared with a case where the trunk **20** and the wall portion of the washer tank **30** do not have a common portion, the tank body portion **33** is disposed at a location closer to the trunk **20**. The liquid storage structure in which the tank body portion **33** is attached to the trunk **20** occupies less space in the power source room **12** as compared with the case where the trunk **20** and the wall portion of the washer tank **30** do not have a common portion.

[0052] Further, the tank body portion **33** and the trunk **20** are sealed without any gaps at the portions joined by welding.

[0053] When the washer fluid **31** freezes in winter or the like, the washer fluid **31** expands and increases in volume. At this time, stress generated due to the expansion acts on the tank body portion **33** and the trunk **20**. However, the tank body portion **33** and the trunk **20** are both made of a resin material. Therefore, the extension (deformation) of the tank body portion **33** and the trunk **20** absorbs a part of the stress.

Effects of Present Embodiment

[0054] (1) As shown in FIG. **6**, the tank body portion **33** constituting an outer frame portion of the washer tank **30** has an opening **39** in a part of the wall portion. In a state in which the opening **39** is closed by the rear portion of the side wall portion **24** and the extension portion **26** of the trunk **20**, the wall portion of the tank body portion **33** is attached to the trunk **20** at the peripheral edge

portion of the opening **39** in a close contact state. The washer tank **30** is constituted by the tank body portion **33** and the portion of the trunk **20** that closes the opening **39**.
[0055] Therefore, it is possible to suppress a decrease in the ride comfort due to the rigidity of the vehicle body **11** caused by the addition of the tank body portion **33** and the washer fluid **31**. Further, even if the total weight of the washer tank **30** fluctuates due to consumption and replenishment of the washer fluid **31**, the effect due to the consumption and replenishment on the ride comfort due to the rigidity may be reduced. In either case, the tank body portion **33** is attached to the trunk **20** and the washer fluid **31** is stored in the storage chamber **32**, but the effect on the steering stability of the vehicle **10** may be reduced.
[0056] The tank body portion **33** can be disposed at a location closer to the trunk **20**. The liquid storage structure may reduce the space it occupies in the power source room **12** and improve the space efficiency of the power source room **12**.
[0057] (2) In an electric vehicle, as shown in FIG. **2**, the power source room **12** tends to be provided in front of the vehicle interior **15**. In the electric vehicle, there is a need to dispose the trunk **20** (frunk) having a large-capacity accommodation portion **25** in the power source room **12**.
[0058] On the other hand, in a case where the trunk **20** and the washer tank **30** are separately attached to the vehicle body **11**, a gap is provided between the trunk **20** and the washer tank **30** to avoid mutual interference. The capacity of the accommodation portion **25** is reduced by the amount of this gap.
[0059] In this regard, in the present embodiment, since the washer tank **30** is configured by joining the tank body portion **33** to the trunk **20**, no gap is required between the tank body portion **33** and the trunk **20**. This unnecessary gap may be used to increase the capacity of the accommodation portion **25**, thereby meeting the need for a large-capacity accommodation portion **25**.
[0060] (3) As shown in FIG. **6**, the trunk **20** and the tank body portion **33** are both made of a resin material. Therefore, even if the washer fluid **31** freezes and expands, and stress is generated due to the expansion and acts on the trunk **20** and the tank body portion **33**, the stress may be reduced.
[0061] Since the front end panel described in Patent Literature **1** is made of a resin material having high strength, it is difficult to obtain such an effect.
[0062] (4) The wall portion of the tank body portion **33** is joined to the trunk **20** at the peripheral edge portion of the opening **39** by welding. Therefore, it is possible to appropriately restrict the washer fluid **31** stored in the storage chamber **32** from leaking from the joint portion between the tank body portion **33** and the trunk **20**.
[0063] The number of components may be reduced compared with a case where the washer tank **30** is attached to the trunk **20** by a fastening member, a locking member, or the like after the trunk **20** and the washer tank **30** are formed separately. In addition, it is possible to reduce the number of attachment steps and improve the ease of attachment.
[0064] (5) The trunk **20** and the tank body portion **33** are made of the same type of resin material. Therefore, at the time of welding, the tank body portion **33** and the trunk **20** that are melted by heat may be suitably mixed at the interface portion and joined more firmly.
[0065] (6) As shown in FIGS. **1** and **4**, the washer tank **30** is integrated with the trunk **20** to form a module. Therefore, by attaching the trunk **20** to the vehicle body **11**, the washer tank **30** may also be attached to the vehicle body **11** together with the trunk **20**. The ease of attachment may be improved as compared with a case where the trunk **20** and the washer tank **30** are separately attached to the vehicle body **11**.
[0066] (7) The front end panel may be integrated with the tank body portion **33**. On the other hand, the front end panel is a structural member of the vehicle **10**, and is an extremely important member as a framework member. Therefore, it is desirable that the front end panel can be commonly used for different vehicle models rather than being developed for each vehicle model. However, if the front end panel is integrated with other members such as the tank body portion **33**, it is difficult to commonly use the front end panel. In this regard, in the present embodiment, the tank body portion

33 is not integrated with the front end panel. Therefore, the front end panel may be easily used in common for different vehicle models.

[0067] On the other hand, the shape of the trunk **20** generally tends to be different depending on the vehicle model. Therefore, there is little advantage in commonly using the trunk **20** for different vehicle models. In this regard, in the present embodiment, the tank body portion **33** is integrated with the trunk **20**. There are no or few disadvantages caused by integrating the tank body portion **33** with the trunk **20**.

[0068] (8) The trunk **20** has more regions where the tank body portion **33** can be joined than the front end panel. Therefore, there are many options for the location where the tank body portion **33** is to be disposed. Therefore, there is a high degree of freedom in design related to the location where the tank body portion **33** is disposed.

Modifications

[0069] The present embodiment can be modified and implemented as follows. The present embodiment and the following modifications can be combined with each other and implemented without technical contradiction.

Configuration of Trunk **20**

[0070] The flange portion **27** may be formed at a location lower than an upper end portion of the accommodation portion **25**.

[0071] The shape of the trunk **20** may be changed to a shape different from that of the above embodiment in accordance with the arrangement of surrounding components.

[0072] The accommodation portion **25** may be open at a location different from an upper end portion of the trunk **20**, for example, at a rear end portion or a side end portion.

Materials for Forming Trunk **20** and Tank Body Portion **33**

[0073] The trunk **20** and the tank body portion **33** may be formed using a composite material in which a resin material is used as a base material and the base material is reinforced with a reinforcing material. Examples of the composite material include those obtained by reinforcing PP as a base material with talc, glass fiber, EPDM, or the like as a reinforcing material. In this case, since the base material is a resin material, it is possible to obtain the same effect as in (3) described above by deforming the trunk **20** and the tank body portion **33** when the washer fluid **31** freezes, depending on a blending amount of the reinforcing material.

[0074] One of the trunk **20** and the tank body portion **33** may be made of a composite material, and the other may be made of a resin material not blended with a reinforcing material. The base material in the former composite material and the latter material may be the same type of resin material or different types of resin materials. In this case, one of the trunk **20** and the tank body portion **33** made of the latter material can be deformed when the washer fluid **31** freezes. One of the trunk **20** and the tank body portion **33** made of the former material can be deformed when the washer fluid **31** freezes, depending on the blending amount of the reinforcing material.

[0075] Therefore, in this modification, it is also possible to obtain the same effect as in (3) described above.

[0076] In addition, the trunk **20** and the tank body portion **33** may be made of a composite material in which a reinforcing material is mixed with a resin material as a base material at different mixing ratios. The base materials in the composite material may be the same type of resin material or different types of resin materials. In this case, since the base materials are resin materials, it is possible to obtain the same effect as in (3) described above by deforming the trunk **20** and the tank body portion **33** when the washer fluid **31** freezes, depending on a blending amount of the reinforcing material.

Liquid Tank

[0077] The liquid tank may be changed to a tank that stores a liquid different from the washer fluid **31**, for example, a reservoir tank that stores a coolant.

[0078] The shape of the tank body portion **33** may be changed to a shape different from that of the

above embodiment in accordance with the arrangement of surrounding components.
[0079] The tank body portion **33** having an opening **39** in a part of a wall portion may be disposed in the accommodation portion **25**. In a state in which the opening **39** is closed by a part of the trunk **20**, the wall portion of the tank body portion **33** may be attached to the trunk **20** at a peripheral edge portion of the opening **39** in a close contact state. The liquid tank may be constituted by the tank body portion **33** and the portion of the trunk **20** that closes the opening **39**. The tank body portion **33** may be made of a transparent resin material.
[0080] According to this modification, the liquid stored in the liquid tank can be seen through the tank body portion **33**. Therefore, it is easy to check the amount (content) of the liquid stored in the storage chamber **32**.
[0081] As in the above embodiment, in a case where the tank body portion **33** is disposed only on one side of the accommodation portion **25** in the left-right direction, at least one of the notch **28** in the flange portion **27** and the extension portion **26** may be omitted on the side where the tank body portion **33** is not disposed.
[0082] The same tank body portion **33** may be disposed at a location on a side (right side) opposite to the tank body portion **33** of the above embodiment with the accommodation portion **25** interposed therebetween in the left-right direction, and may be attached to the trunk **20**.
[0083] In other words, the tank body portions **33** may be disposed on both sides of the accommodation portion **25** in the left-right direction. In this case, the added tank body portion **33** is disposed below the flange portion **27**. The injection pipe portion **41** protruding upward from the upper wall portion **35** of the tank body portion **33** penetrates the flange portion **27** at the notch **28** in the upper-lower direction. The same type of liquid is stored in both the storage chambers **32**.
[0084] According to this modification, the total capacity of a liquid that can be stored in the vehicle **10** can be increased as compared with a case where the tank body portion **33** is disposed on one side.
[0085] A liquid tank for storing a liquid of a type different from that of the washer fluid **31** may be provided at a location on a side (right side) opposite to the tank body portion **33** of the above embodiment with the accommodation portion **25** interposed therebetween in the left-right direction.
[0086] The tank body portion **33** may have an opening **39** in an upper portion instead of an inner portion of a wall portion.
[0087] In this case, the tank body portion **33** is disposed, for example, below the flange portion **27**. The injection pipe portion **41** is provided at a location on the wall portion of the tank body portion **33** that is different from the upper wall portion **35**. In a state in which the opening **39** is closed by a part of the flange portion **27**, the wall portion of the tank body portion **33** may be joined to the flange portion **27** at a peripheral edge portion of the opening **39** in a close contact state.
[0088] The tank body portion **33** and the portion of the flange portion **27** that closes the opening **39** constitute a liquid tank.
[0089] The tank body portion **33** may have an opening **39** in the upper portion instead of the inner portion of the wall portion. In this case, the tank body portion **33** is disposed, for example, below the flange portion **27**. The injection pipe portion **41** is provided at a location on the wall portion of the tank body portion **33** that is different from the upper wall portion **35**. In a state in which a portion of the opening **39** located at an inner portion of a wall portion is closed by the side wall portion **24** and the extension portion **26**, the wall portion of the tank body portion **33** is joined to the side wall portion **24** and the extension portion **26** at a peripheral edge portion of the opening **39** in a close contact state. In addition, a portion of the opening **39** located at an upper portion of the wall portion may be joined to the flange portion **27** in a close contact state. The tank body portion **33** and a portion of the trunk **20** that closes the opening **39** constitute a liquid tank.
Attachment Structure of Tank Body Portion **33**
[0090] The tank body portion **33** may be attached to the trunk **20** by a joining method different from welding, for example, by adhesion.

Others

[0091] The liquid storage structure can also be applied to a vehicle **10** in which the power source room **12** is provided at the rear of the vehicle interior **15** and the trunk **20** and the liquid tank are disposed in the power source room **12**.

[0092] In the above embodiment, the trunk **20** including the flange portion **27** is made of a resin material colored in black or the like, and does not transmit or hardly transmits visible light. Therefore, in the power source room **12**, a component disposed around the trunk **20** may be disposed below the flange portion **27**. Further, the component may be attached to the trunk **20** below the flange portion **27**. Examples of the corresponding component include a wire harness. When the injection pipe portion **41** is disposed below the flange portion **27**, the piping member connected to the injection pipe portion **41** is the corresponding component.

[0093] According to the above modification, when the power source room **12** of the vehicle **10** is viewed from above with the bonnet hood **13** open, the above component is hidden by the trunk **20**. Therefore, the appearance around the trunk **20** in the power source room **12** is improved.

[0094] A seal member such as a weather strip may be attached to a portion of the flange portion **27** that includes at least a portion between the injection pipe portion **41** and the accommodation portion **25**. The seal member may be attached to the flange portion **27** while surrounding the injection pipe portion **41**.

[0095] In this case, when the washer fluid **31** is poured from the injection pipe portion **41** into the washer tank **30** for replenishment of the washer fluid **31**, even if the washer fluid **31** spills out of the injection pipe portion **41**, the washer fluid **31** can be blocked by the seal member.

[0096] The seal member can restrict a spilled liquid from flowing into the accommodation portion **25** along the flange portion **27**.

[0097] In general, in a vehicle on which a pop-up hood is mounted, when an impact is applied due to a collision or the like, a rod protrudes upward from an actuator to push up a front end portion of a bonnet hood. The above liquid storage structure may be applied to a vehicle of such a type. In this case, for example, a rod passage hole is formed in the flange portion **27**. The actuator may be disposed below the flange portion **27** in the trunk **20**.

[0098] According to this modification, when an impact is applied to the vehicle **10**, the rod rises through the hole of the flange portion **27** and pushes up a front end portion of the bonnet hood **13**. When the actuator is not in operation, the actuator is hidden by the trunk **20** when the power source room **12** of the vehicle **10** is viewed from above with the bonnet hood **13** open. Therefore, the appearance around the trunk **20** in the power source room **12** is improved.

[0099] The vehicle interior outer chamber may be configured by a room different from the power source room **12**, or in other words, a room in which a power source such as an engine or a motor is not accommodated, on condition that the room is provided outside the vehicle interior **15** of the vehicle **10**.

Claims

1. A liquid storage structure for a vehicle, the liquid storage structure being applied to a vehicle in which a vehicle interior outer chamber is provided outside a vehicle interior, and a trunk and a liquid tank having a liquid storage chamber are disposed in the vehicle interior outer chamber, wherein a framework portion of the liquid tank is configured by a tank body portion, the tank body portion having a wall portion forming an outer shell portion, the tank body portion has an opening in a part of the wall portion, in a state in which the opening is closed by a part of the trunk, the wall portion of the tank body portion is attached to the trunk at a peripheral edge portion of the opening in a close contact state, and the liquid tank is constituted by the tank body portion and the part of the trunk that closes the opening.

2. The liquid storage structure for a vehicle according to claim 1, wherein a liquid stored in the

storage chamber is a washer fluid, and the trunk and the tank body portion are each made of a resin material.

3. The liquid storage structure for a vehicle according to claim 1, wherein the trunk and the tank body portion are made of a resin material or a composite material obtained by reinforcing a resin material with a reinforcing material, and the wall portion of the tank body portion is joined to the trunk at the peripheral edge portion of the opening by welding.