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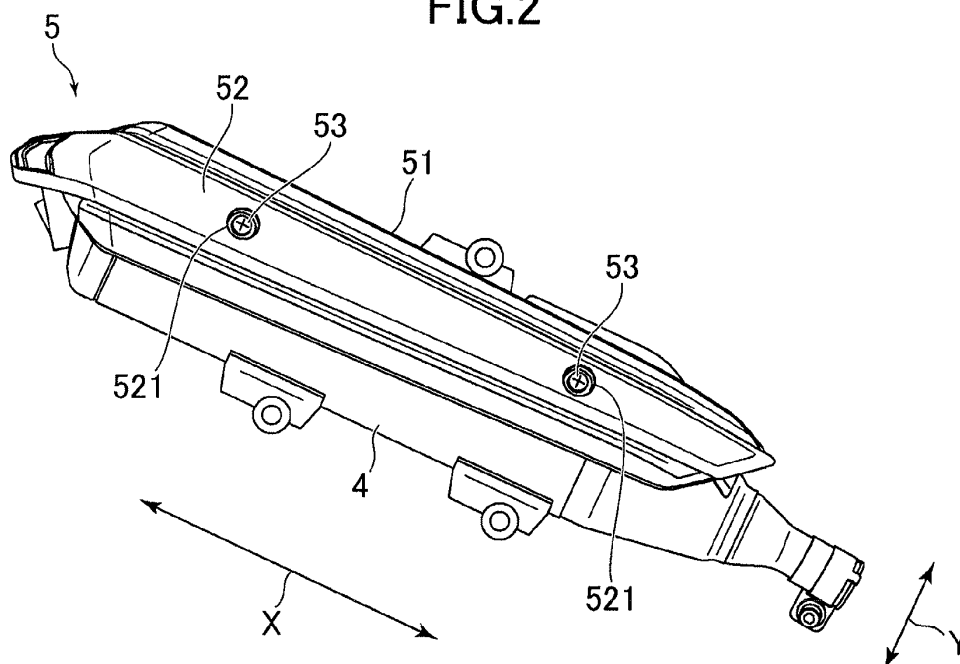
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(54) **Muffler protector and saddle-ride type vehicle**

(57) Provided is a muffler protector to be used for a muffler of a saddle-ride type vehicle, which includes a protector member made of a metal and a protector member made of a synthetic resin, which are used in combination, and in which unevenness in surface temperature of the protector member made of a synthetic resin are eliminated and wide design freedom is attained. A muffler protector (5) for covering at least a part of an outer side

surface of a muffler (4) of the saddle-ride type vehicle includes: a metal protector member (51) fixed to the muffler (4) by a metal protector member fixing portion (53); and a synthetic-resin protector member (52) fixed to the metal protector member (51) by a synthetic-resin protector member fixing portion, the synthetic-resin protector member (52) including an opening (521) for exposing the metal protector member fixing portion (53).

FIG.2



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a muffler protector and a saddle-ride type vehicle.

2. Description of the Related Art

[0002] A muffler of a saddle-ride type vehicle such as a motorcycle is sometimes provided with a muffler protector for covering a surface of the muffler, for example, a side surface thereof. Japanese Patent Application Laid-open No. 2008-95509 describes, as a well-designed muffler protector having both heat releasing property and heat insulating property, a muffler protector including a protector member made of a metal and a protector member made of a synthetic resin, which are used in combination.

[0003] Generally, the muffler protector is designed while considering not to, even when the temperature of the muffler protector itself increases due to heat from the muffler that reaches a high temperature, burn a rider or passerby even when the rider or passerby touches the muffler protector.

[0004] It is conceived that the muffler protector of Japanese Patent Application Laid-open No. 2008-95509 decreases the surface temperature of the muffler protector through use of the protector member made of a synthetic resin, which is excellent in heat insulating property. However, in the above-mentioned muffler protector, the protector member made of a metal and the protector member made of a synthetic resin are fastened together to, and fixed to, a bracket of the muffler with bolts. Therefore, the vicinity of this fixing portion may be higher in surface temperature as compared to other parts in some cases.

[0005] Further, in the case of a method in which the protector member made of a metal and the protector member made of a synthetic resin are fastened together to, and fixed to, a bracket of the muffler as in the above-mentioned muffler protector, a fixing position cannot be freely selected. Therefore, the shape of, in particular, the protector member made of a synthetic resin is restricted, and the muffler protector cannot be freely designed.

SUMMARY OF THE INVENTION

[0006] The present invention has been made in view of the above-mentioned points, and has an object to provide a muffler protector to be used for a muffler of a saddle-ride type vehicle, which includes a protector member made of a metal and a protector member made of a synthetic resin which are used in combination, and in which unevenness in surface temperature of the protector member made of a synthetic resin are eliminated and wide design freedom is attained.

[0007] In order to solve the above-mentioned object, according to an exemplary embodiment of the present invention, there is provided a muffler protector for covering at least a part of an outer side surface of a muffler of a saddle-ride type vehicle, the muffler protector including: a metal protector member fixed to the muffler by a metal protector member fixing portion; and a synthetic-resin protector member fixed to the metal protector member by a synthetic-resin protector member fixing portion, the synthetic-resin protector member including an opening for exposing the metal protector member fixing portion.

[0008] According to the present invention, it is possible to provide the muffler protector to be used for the muffler of the saddle-ride type vehicle, which includes the protector member made of a metal and the protector member made of a synthetic resin, which are used in combination, and in which unevenness in surface temperature of the protector member made of a synthetic resin are eliminated and wide design freedom is attained.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] In the accompanying drawings:

FIG. 1 is a right side view of a saddle-ride type vehicle including a muffler protector according to an embodiment of the present invention;

FIG. 2 is a right side view of a muffler and the muffler protector illustrated in FIG. 1;

FIG. 3 is a right side view of the muffler;

FIG. 4 is a view of a metal protector member when viewed from a front surface side thereof;

FIG. 5A is a view of a synthetic-resin protector member when viewed from a front surface side thereof;

FIG. 5B is a view of the synthetic-resin protector member when viewed from a rear surface side thereof;

FIG. 6 is a view illustrating a state in which the muffler protector is assembled to the muffler, when viewed from an axially rear side of the muffler;

FIG. 7 is a view illustrating a cross section including a metal protector member fixing portion illustrated in FIG. 2, which is orthogonal to an axis of the muffler;

FIG. 8 is a partial enlarged exploded perspective view illustrating a structure of a synthetic-resin protector member fixing portion at part VIII of FIG. 5B; and

FIG. 9 is a partial enlarged perspective view of the synthetic-resin protector member at part IX of FIG. 5B.

DETAILED DESCRIPTION OF THE INVENTION

[0010] Hereinafter, an embodiment of the present invention is described with reference to the drawings.

[0011] FIG. 1 is a right side view of a saddle-ride type vehicle 1 including a muffler protector 5 according to the embodiment of the present invention. The saddle-ride

type vehicle herein refers to a vehicle that is operated under a state in which a rider sits so as to straddle a saddle or a seat, and includes a motorcycle including a so-called scooter or moped, a 4-wheel or 3-wheel buggy called an all-terrain vehicle (ATV), and a snowmobile. Further, in this embodiment, the saddle-ride type vehicle 1 is a so-called underbone motorcycle, but the saddle-ride type vehicle is not limited thereto.

[0012] An engine 2 of the saddle-ride type vehicle 1 is a 2-stroke or 4-stroke internal combustion engine. Exhaust air generated by combustion inside the engine 2 is guided to a muffler 4 through an exhaust pipe 3. The muffler protector 5 is provided so as to cover at least a part of an outer side surface of the muffler 4, in the example described here, a right side surface in a width direction of the vehicle.

[0013] Note that, in the example described here, the saddle-ride type vehicle 1 is a so-called unit swing type motorcycle, in which the engine 2 and a rear wheel 6 are suspended by a swing arm 7. Further, the muffler 4 is directly fixed to the swing arm 7 with bolts 8. With this, the engine 2, the exhaust pipe 3, the muffler 4, and the rear wheel 6 integrally move together with the swing arm 7. Note that, in this embodiment, the muffler 4 is fixed to the swing arm 7, but may be fixed to the engine 2 instead. In this case, the muffler 4 is preferred to be fixed to a crankcase of the engine 2 with the bolts 8.

[0014] FIG. 2 is a right side view of the muffler 4 and the muffler protector 5 illustrated in FIG. 1. The muffler protector 5 includes, as illustrated in FIG. 2, two protector members made of different materials, which cover the right side surface of the muffler 4 and have an elongated shape extending in an axial direction of the muffler 4, that is, a metal protector member 51 and a synthetic-resin protector member 52. The metal protector member 51 and the synthetic-resin protector member 52 are arranged and overlapped one on top of another in the stated order toward the outer side in the width direction of the vehicle (that is, in a front direction of the drawing sheet). Therefore, the metal protector member 51 is arranged at a position closer to the muffler 4 with respect to the synthetic-resin protector member 52.

[0015] The "protector member" herein refers to a plate-like member of members forming the muffler protector 5, which covers at least one side surface of the muffler 4. The material for the metal protector member 51 and surface treatment to be performed on the metal protector member 51 are not particularly limited as long as the material is a metal. Here, a steel plate being subjected to chromium plating is used, and the surface thereof has a metallic luster. Further, the material for the synthetic-resin protector member 52 is not particularly limited as long as the material is a synthetic resin. Here, black glass fiber reinforced nylon is used. Note that, the "synthetic resin" herein includes a material in which a reinforcing material for improving mechanical properties, such as glass fiber, is added to various synthetic resins.

[0016] Note that, in the following description of the muf-

fler 4 and the muffler protector 5, the axial direction of the muffler 4 (direction indicated by the arrow X in FIG. 2) is referred to as a long-side direction, and a direction orthogonal to the long-side direction and along a peripheral surface of the muffler 4 (direction indicated by the arrow Y in FIG. 2) is referred to as a short-side direction. Further, a surface directed outside from an axial line of the muffler 4 is referred to as a front surface, and a surface on a side opposite to the front surface is referred to as a rear surface. A front-rear direction is referred to as a thickness direction. The front surface of the muffler protector 5 is visible in FIG. 2. Further, when merely described as front and rear, or right and left, the direction is represented assuming that the traveling direction of the saddle-ride type vehicle 1 illustrated in FIG. 1 is front. Further, when described as inner side and outer side, a positional relationship relative to a center axis of the saddle-ride type vehicle 1 illustrated in FIG. 1 is represented.

[0017] The width of the synthetic-resin protector member 52 in the short-side direction is smaller than the width of the metal protector member 51 in the short-side direction, and an upper portion and a lower portion of the synthetic-resin protector member 52 are exposed without being covered with the metal protector member 51. Further, as described in detail later, the synthetic-resin protector member 52 is fixed to the metal protector member 51, and is not directly fixed to the muffler 4. The metal protector member 51 is fixed to the muffler 4 by metal protector member fixing portions 53 provided at two positions in this example. A fixing method at the metal protector member fixing portion 53 is not particularly limited. In this embodiment, a fixing method employing screws is used. In the synthetic-resin protector member 52, at positions corresponding to the metal protector member fixing portions 53, openings 521 for exposing the metal protector member fixing portions 53 are provided. Therefore, while maintaining a state in which the synthetic-resin protector member 52 and the metal protector member 51 are integrally fixed to each other, the muffler protector 5 is fixable to the muffler 4 by the metal protector member fixing portions 53. Note that, in the example of this embodiment, the opening 521 is a through hole provided in the synthetic-resin protector member 52, but the present invention is not limited thereto. That is, the opening 521 may be a cutout provided in the outer periphery of the synthetic-resin protector member 52 as long as the opening 521 can expose the metal protector member fixing portion 53. Further, the cutout may be formed into any shape, for example, a semicircular shape or a rectangular shape.

[0018] FIG. 3 is a right side view of the muffler 4. On an outer peripheral surface of the muffler 4, mounting portions 41 for fixing the muffler 4 to the swing arm 7 are provided. The mounting portion 41 is a member obtained by welding, to the muffler 4, a bushing through which a screw shaft of the bolt 8 (see FIG. 1) for fixing the muffler 4 passes. Further, on the right side surface which is the outer side surface of the muffler 4, brackets 42 for mount-

ing the muffler protector 5 are provided at two positions. The bracket 42 is a member forming the metal protector member fixing portion 53 illustrated in FIG. 2, and is obtained by welding a nut with which a screw is threadably engaged.

[0019] FIG. 4 is a view of the metal protector member 51 when viewed from the front surface side thereof. FIG. 4 illustrates metal protector member mounting holes 511 provided at two positions and insertion holes 512 provided at six positions. The metal protector member mounting hole 511 is a hole through which a screw bolt forming the above-mentioned metal protector member fixing portion 53 passes. As described later, the insertion hole 512 is a hole for fixing the synthetic-resin protector member 52 to the metal protector member 51. Note that, the numbers of the metal protector member mounting holes 511 and the insertion holes 512 represented here are merely an example, and the present invention is not limited thereto.

[0020] Further, in the vicinity of the center of the metal protector member 51 in the short-side direction, a concave portion 513 extending in the long-side direction is formed. The concave portion 513 houses the synthetic-resin protector member 52 to enhance the sense of unity of both the metal protector member 51 and the synthetic-resin protector member 52 in terms of design, and has a function of enhancing the rigidity of the metal protector member 51. Further, the metal protector member 51 is provided with opening portions 514 as appropriate, thereby reducing the weight thereof. The peripheral edge of the opening portion 514 is preferred to be formed into a rib which projects on the front side or the rear side of the metal protector member 51. Also in this case, the rigidity of the metal protector member 51 is enhanced. Further, as illustrated in FIG. 4, recesses and protrusions may be provided as appropriate to respective portions of the metal protector member 51, to thereby enhance the rigidity of the metal protector member 51.

[0021] FIG. 5A is a view of the synthetic-resin protector member 52 when viewed from the front surface side thereof. In FIG. 5A, the openings 521 are visible, which are provided at two positions so as to correspond to the metal protector member fixing portions 53 (see FIG. 2). Further, the right side of FIG. 5A is the front side, and the left side thereof is the rear side. At the rear end of the synthetic-resin protector member 52, there is provided a bent portion 522 that is bent toward the muffler 4. The bent portion 522 is provided with an opening, but the opening is merely provided in terms of design, and hence the presence/absence of the opening is arbitrary.

[0022] FIG. 5B is a view of the synthetic-resin protector member 52 when viewed from a rear surface side thereof. FIG. 5B illustrates, in addition to the openings 521 and the bent portion 522, protrusion shafts 523 each forming a synthetic-resin protector member fixing portion, reinforcement ribs 524 each extending from the protrusion shaft 523, support ribs 525 each provided around the protrusion shaft 523 and independently from the rein-

forcement rib 524, and support surfaces 526 each provided around the protrusion shaft 523. The protrusion shaft 523 is protruded from the rear surface of the synthetic-resin protector member 52, and corresponds to a part to be inserted through the insertion hole 512 (see FIG. 4) when the synthetic-resin protector member 52 is fixed to the metal protector member 51. The protrusion shaft 523 inserted through the insertion hole 512 is held and fixed by an appropriate holder so as to prevent drop-out. In this manner, the synthetic-resin protector member fixing portion is formed, and the synthetic-resin protector member 52 is fixed to the metal protector member 51. The reinforcement rib 524, the support rib 525, and the support surface 526 are parts that abut against the front surface of the metal protector member 51 when the synthetic-resin protector member 52 is fixed to the metal protector member 51, and through the abutment, the synthetic-resin protector member 52 can be positioned with respect to the metal protector member 51 in the thickness direction. Further, the reinforcement rib 524 has a function of enhancing the rigidity of the synthetic-resin protector member 52.

[0023] Subsequently, a positional relationship when the muffler protector 5 is assembled to the muffler 4, and a method of fixing the respective members are described in detail.

[0024] FIG. 6 is a view illustrating a state in which the muffler protector 5 is assembled to the muffler 4, when viewed from an axially rear side of the muffler 4. As illustrated in FIG. 6, the metal protector member 51 is provided so as to cover the right side surface of the muffler 4, and the synthetic-resin protector member 52 further covers the outer side of the metal protector member 51. The bent portion 522 at the rear end of the synthetic-resin protector member 52 is greatly bent and protruded toward the center of the muffler 4. Therefore, the rear end of the synthetic-resin protector member 52 (A in FIG. 6) is positioned closer to the center of the muffler 4 with respect to the rear end of the metal protector member 51 (B in FIG. 6).

[0025] The reason why this structure is employed is as follows. That is, from an exhaust end portion 43 of the muffler 4, high-temperature air is exhausted, and hence the temperature of the exhaust end portion 43 itself becomes high. In order to protect the exhaust end portion 43, depending on the saddle-ride type vehicle 1, a component called a muffler end cap is mounted in some cases. In contrast, in this embodiment, the bent portion 522 plays a role of protecting the exhaust end portion 43, and hence the muffler end cap is unnecessary. Therefore, the number of components may be reduced, and in addition, the entire muffler 4 may be shaped in a simplified manner to have a good design. Note that, the reason why the bent portion 522 is provided to the synthetic-resin protector member 52 and not to the metal protector member 51 is that the synthetic-resin protector member 52 has more excellent heat insulating property.

[0026] FIG. 7 is a view illustrating a cross section in-

cluding the metal protector member fixing portion 53 illustrated in FIG. 2, which is orthogonal to an axis of the muffler 4. Note that, FIG. 7 omits the illustration of the inner structure of the muffler 4. Further, for easy understanding of the bracket 42, a part that does not appear in the cross section is represented by a broken line.

[0027] In this embodiment, the metal protector member fixing portion 53 has a structure in which the metal protector member 51 is fastened to the bracket 42 with a screw bolt 531. A nut is welded on the rear side of the bracket 42, which is to be threadably engaged with the screw bolt 531. Further, washers 532 are sandwiched between the bracket 42 and the metal protector member 51, and between the metal protector member 51 and the screw bolt 531. The washer 532 is preferred to be made of a material having a larger heat-transfer resistance as compared to a simple washer made of a metal so that heat generated in the muffler 4 is less liable to transmit to the metal protector member 51 via the bracket 42 and the screw bolt 531. The washer 532 used in this embodiment is a mesh washer formed by compressing a wire mesh made of stainless steel. The mesh washer has voids formed therein, and hence has higher heat insulating property as compared to a normal washer made of a metal.

[0028] Further, FIG. 7 illustrates a state in which the synthetic-resin protector member 52 is housed in the concave portion 513 of the metal protector member 51. As illustrated in FIG. 7, the concave portion 513 has a sectional shape that is recessed on the front side. On the other hand, the synthetic-resin protector member 52 has a sectional shape that is protruded on the front side. Further, both ends 527 of the synthetic-resin protector member 52 are positioned inside the concave portion 513. That is, both the ends 527 are positioned closer to the center of the muffler 4 with respect to the straight line C (indicated by the dashed-dotted line in FIG. 7) obtained by connecting convex ends 514A and 514B on both sides of the concave portion 513. With this structure, it is visually recognized that the metal protector member 51 and the synthetic-resin protector member 52 are formed to have the sense of unity, and the design of the muffler protector 5 is improved.

[0029] Further, an outermost end 528 of the synthetic-resin protector member 52 in the width direction of the vehicle is positioned on the outer side with respect to the convex end 514A which is the outermost end of the metal protector member 51 in the width direction of the vehicle. With this structure, the synthetic-resin protector member 52 having excellent heat insulating property is positioned on the outermost side in the width direction of the vehicle, and hence a person who touches the muffler protector 5 is less liable to feel strangeness. Further, the metal protector member fixing portion 53 is positioned closer to the center of the muffler 4 with respect to a position of the front surface of the synthetic-resin protector member 52 at the opening 521. That is, when viewed from the front surface side of the synthetic-resin protector member

52, the metal protector member fixing portion 53 is arranged at a position that is retreated on the inner side with respect to the opening 521. Therefore, even when the rider or passerby touches the muffler protector 5, the rider or passerby never touches the metal protector member fixing portion 53, in particular, the screw bolt 531, at which the temperature increase is anticipated. The "position of the front surface of the synthetic-resin protector member 52 at the opening 521" herein means a position of a plane D (indicated by the dashed-two dotted line in FIG. 7) surrounded by an outer circumference of the opening 521 in the front surface of the synthetic-resin protector member 52. Note that, in this example, the metal protector member fixing portion 53 is positioned still closer to the center of the muffler 4 with respect to a position of the rear surface of the synthetic-resin protector member 52 at the opening 521.

[0030] FIG. 8 is a partial enlarged exploded perspective view illustrating a structure of a synthetic-resin protector member fixing portion 54 at part VIII of FIG. 5B. In the synthetic-resin protector member fixing portion 54, the protrusion shaft 523 protruded from the rear surface of the synthetic-resin protector member 52 is inserted through the insertion hole 512 of the metal protector member 51, and the protrusion shaft 523 protruded from the rear surface of the metal protector member 51 is held by an appropriate holding unit, to thereby fix the metal protector member 51 and the synthetic-resin protector member 52 to each other. In this embodiment, the holding unit includes a first holder 541 and a second holder 542, and the first holder 541 and the second holder 542 are mounted in the stated order.

[0031] Here, the first holder 541 is formed of a plate spring, and owing to the elastic action of the plate spring, the protrusion shaft 523 is biased in a direction in which the synthetic-resin protector member 52 and the metal protector member 51 are pressed against each other. The first holder 541 is an illustrated holder that is available as "speed nut" in Japan, or a holder similar to the illustrated holder. Further, the second holder 542 is a circular member having an opening, and includes a plurality of (six in FIG. 8) claws on the inner surface thereof. The protrusion shaft 523 is engaged into the claws so that the position thereof is fixed. The second holder 542 is an illustrated holder that is available as "push nut" in Japan, or a holder similar to the illustrated holder.

[0032] The holding unit may have any structure as long as the holding unit can hold and fix the protrusion shaft 523 so that the metal protector member 51 and the synthetic-resin protector member 52 are fixed to each other. The reason why the above-mentioned first holder 541 and second holder 542 are used in an overlapping manner in this embodiment is described. That is, in a case of holding a static member, the synthetic-resin protector member 52 can be satisfactorily held merely by the first holder 541. However, the muffler protector 5 is subjected to vibrations from various directions due to engine vibrations and vibrations from the road surface generated dur-

ing driving of the saddle-ride type vehicle 1. At this time, due to the elastic action of the plate spring, the holder for fixing has directionality in holding force of the spring. For example, in the case of the illustrated first holder 541, the elastic action of the plate spring acts in the short-side direction, but the elastic action does not act in the long-side direction. Therefore, in a case where the vibrations act from various directions, when the first holder 541 is used alone, there is a possibility that the first holder 541 may gradually slip out from the protrusion shaft 523 to weaken the fastening force. As a countermeasure, the second holder 542 having no directionality in holding force is mounted to the first holder 541 in an overlapped manner. Thus, the second holder 542 supports the first holder 541, to thereby enable holding without weakening the fastening force even when various vibrations occur.

[0033] Subsequently, with reference to FIG. 8, the support for the metal protector member 51 is described. As described above, the reinforcement rib 524 extends from the protrusion shaft 523 of the synthetic-resin protector member 52. The reinforcement rib 524 has a function of increasing the rigidity of the synthetic-resin protector member 52, and simultaneously, plays a role of determining the positions of the metal protector member 51 and the synthetic-resin protector member 52 in the thickness direction by causing an edge thereof to abut against the front surface of the metal protector member 51 when the protrusion shaft 523 is inserted through the insertion hole 512 of the metal protector member 51. The support rib 525 is a structure provided as necessary, and the support rib 525 also plays a role of determining the positions of the metal protector member 51 and the synthetic-resin protector member 52 in the thickness direction by causing an edge thereof to abut against the front surface of the metal protector member 51.

[0034] The reason why the support rib 525 is provided in addition to the reinforcement rib 524 in this embodiment is as follows. That is, as described above, the muffler protector 5 is subjected to various vibrations. At this time, at a part at which the reinforcement rib 524 and the metal protector member 51 are brought into contact with each other, fine foreign matters such as sand may enter. Further, when the reinforcement rib 524, that is, the synthetic-resin protector member 52 itself contains a reinforcing material such as glass fiber, and the hard part abuts against the metal protector member 51, the metal protector member 51 may be worn and abraded. Therefore, the support rib 525 is provided as appropriate, and contact pressures at the contact portion between the edge of the reinforcement rib 524 and the metal protector member 51 and at the contact portion between the edge of the support rib 525 and the metal protector member 51 are decreased. In this manner, the wear of the metal protector member 51 is reduced. Therefore, whether or not to provide the support rib 525, and the shape and number of the support ribs 525 may be set as appropriate depending on the degree of the wear of the metal protector member 51.

[0035] FIG. 9 is a partial enlarged perspective view of the synthetic-resin protector member 52 at part IX of FIG. 5B. At this part, the support surface 526 is provided around the protrusion shaft 523. The support surface 526 also plays a role of determining the positions of the metal protector member 51 and the synthetic-resin protector member 52 in the thickness direction by abutting against the front surface of the metal protector member 51. The support surface 526 has an area larger than that of the above-mentioned edge of the reinforcement rib 524 or edge of the support rib 525. Therefore, the contact pressure at the contact portion with respect to the metal protector member 51 can be significantly decreased, and the wear of the metal protector member 51 can be significantly reduced. Note that, the support surface 526 may have any structure, but in this embodiment, a vertical wall 529 is provided on three sides of the substantially rectangular support surface 526 to support the support surface 526. Therefore, the support surface 526 constitutes one surface of a hollow box-shaped structure.

[0036] It is understood when referring back to FIG. 5B that, in the synthetic-resin protector member 52 of this embodiment, the support surfaces 526 are provided at the vicinity of both ends and the vicinity of the center in the long-side direction, and the support ribs 525 are provided at the other parts. This is because the vicinity of both the ends and the center of the synthetic-resin protector member 52 in the long-side direction are parts that correspond to antinodes in the vibration, at which the wear of the metal protector member 51 is severe, and the wear does not become a problem so much in parts other than the above-mentioned parts. Further, the support surface 526 is merely provided around some of the protrusion shafts 523. This is because the forming of the support surface 526 is a little difficult, and when the support surface 526 is provided even at unnecessary places, the manufacturing cost of the synthetic-resin protector member 52 increases.

[0037] Further, when paying attention to the position of the protrusion shaft 523 and the position of the opening 521 in FIG. 5B, it is understood that, in the muffler protector 5 of this embodiment, the metal protector member fixing portion 53 (see FIG. 7) and the synthetic-resin protector member fixing portion 54 (see FIG. 8) are positioned offset in the long-side direction, and are provided at different positions. With such a structure, the heat from the muffler 4 does not directly transmit to the synthetic-resin protector member 52, and the temperature increase of the synthetic-resin protector member 52 can be reduced.

[0038] In the muffler protector according to another aspect of the embodiment of the present invention described above, the metal protector member fixing portion and the synthetic-resin protector member fixing portion are provided at different positions. With this, the temperature increase of the synthetic-resin protector member can be reduced.

[0039] Further, in the muffler protector according to yet

another aspect of the embodiment of the present invention, the metal protector member fixing portion is positioned closer to the center of the muffler with respect to the position of the front surface of the synthetic-resin protector member at the opening. With this, even when the rider or passerby touches the muffler protector, the rider or passerby never touches the metal protector member fixing portion.

[0040] In the muffler protector according to still another aspect of the embodiment of the present invention described above, in side view, the metal protector member is exposed at the upper portion and the lower portion of the synthetic-resin protector member. With this, sufficient heat releasing property is secured at the exposed portion at the upper portion of the metal protector member. Further, at the exposed portion at the lower portion thereof, foreign matters such as pebbles scattering from the road surface are received by the metal protector member. In this manner, the synthetic-resin protector member is prevented from being broken.

[0041] Further, in the muffler protector according to still another aspect of the embodiment of the present invention, the synthetic-resin protector member has the outermost end in the width direction of the saddle-ride type vehicle, the outermost end being positioned on the outer side with respect to the outermost end of the metal protector member in the width direction of the saddle-ride type vehicle. With this, a feeling of strangeness when touching the muffler protector is suppressed.

[0042] Further, in the muffler protector according to still another aspect of the embodiment of the present invention, in axial view of the muffler, the synthetic-resin protector member has the rear end in the front-rear direction of the saddle-ride type vehicle, the rear end being positioned closer to the center of the muffler with respect to the rear end of the metal protector member in the front-rear direction of the saddle-ride type vehicle. With this, the muffler end cap can be omitted.

[0043] Further, in the muffler protector according to still another aspect of the embodiment of the present invention, in the cross section that is orthogonal to the axis of the muffler, the metal protector member includes the concave portion for housing the synthetic-resin protector member, and the synthetic-resin protector member has both the ends positioned inside the concave portion. With this, it is recognized that the metal protector member and the synthetic-resin protector member are formed to have the sense of unity, and the design of the muffler protector is improved.

[0044] Further, in the muffler protector according to still another aspect of the embodiment of the present invention, in the cross section that is orthogonal to the axis of the muffler, both the ends of the synthetic-resin protector member are positioned closer to the center of the muffler with respect to the straight line obtained by connecting the convex ends on both the sides of the concave portion. With this, it is recognized that the metal protector member and the synthetic-resin protector member are formed to

have the sense of unity, and the design of the muffler protector is improved.

[0045] Further, in the muffler protector according to still another aspect of the embodiment of the present invention, the synthetic-resin protector member fixing portion includes: the protrusion shaft protruding from the rear surface of the synthetic-resin protector member; the insertion hole provided in the metal protector member, through which the protrusion shaft is inserted; and the holding unit for holding the protrusion shaft from the rear surface of the metal protector member. With this, the synthetic-resin protector member fixing portion cannot be visually observed from the front surface of the muffler protector.

[0046] Further, in the muffler protector according to still another aspect of the embodiment of the present invention, the holding unit includes: the first holder including the plate spring, for biasing, owing to the elastic action of the plate spring, the protrusion shaft in the direction in which the synthetic-resin protector member and the metal protector member are pressed against each other; and the second holder which is engaged with the protrusion shaft so that the position thereof is fixed. With this, the loosening of the holding unit due to vibrations is prevented.

[0047] Further, the muffler protector according to still another aspect of the embodiment of the present invention further includes the reinforcement rib which extends from the protrusion shaft, for supporting the metal protector member. With this, the rigidity of the synthetic-resin protector member is increased, and the metal protector member is positioned in the thickness direction.

[0048] Further, the muffler protector according to still another aspect of the embodiment of the present invention further includes the support rib provided around the protrusion shaft, for supporting the metal protector member. With this, the wear of the metal protector member can be reduced.

[0049] Further, the muffler protector according to still another aspect of the embodiment of the present invention further includes the support surface provided around the protrusion shaft, for supporting the metal protector member. With this, the wear of the metal protector member can be significantly reduced.

[0050] Further, the saddle-ride type vehicle according to still another aspect of the embodiment of the present invention includes the above-mentioned muffler protector. With this, there is provided the saddle-ride type vehicle including the muffler protector including the metal protector member and the synthetic-resin protector member, which are used in combination, and in which unevenness in surface temperature of the synthetic-resin protector member are eliminated and great design freedom is attained.

[0051] Further, the saddle-ride type vehicle according to still another aspect of the embodiment of the present invention further includes: the rear wheel; the swing arm for suspending the rear wheel; and the engine connected

to the muffler. The muffler is fixed to one of the swing arm and the engine. With this, it is unnecessary to add components for fixing the muffler, and the number of components is reduced.

[0052] Note that, the embodiment described above is an example for realizing the present invention, and the shape and configuration can be changed appropriately by a person skilled in the art.

Claims

1. A muffler protector (5) for covering at least a part of an outer side surface of a muffler (4) of a saddle-ride type vehicle (1), the muffler protector (5) comprising:
 - a metal protector member (51) fixed to the muffler (4) by a metal protector member fixing portion (53); and
 - a synthetic-resin protector member (52) fixed to the metal protector member (51) by a synthetic-resin protector member fixing portion (54), the synthetic-resin protector member (52) comprising an opening (521) for exposing the metal protector member fixing portion (53).
2. The muffler protector (5) according to claim 1, wherein the metal protector member fixing portion (53) and the synthetic-resin protector member fixing portion (54) are provided at different positions.
3. The muffler protector (5) according to claim 1 or 2, wherein the metal protector member fixing portion (53) is positioned closer to a center of the muffler (4) with respect to a position of a front surface of the synthetic-resin protector member (52) at the opening (521).
4. The muffler protector (5) according to any one of claims 1 to 3, wherein, in side view, the metal protector member (51) is exposed at an upper portion and a lower portion of the synthetic-resin protector member (52).
5. The muffler protector (5) according to any one of claims 1 to 4, wherein the synthetic-resin protector member (52) has an outermost end in a width direction of the saddle-ride type vehicle (1), the outermost end being positioned on an outer side with respect to an outermost end of the metal protector member (51) in the width direction of the saddle-ride type vehicle (1).
6. The muffler protector (5) according to any one of claims 1 to 5, wherein, in axial view of the muffler (4), the synthetic-resin protector member (52) has a rear end in a front-rear direction of the saddle-ride type vehicle (1), the rear end being positioned closer
7. The muffler protector (5) according to any one of claims 1 to 6, wherein in a cross section that is orthogonal to an axis of the muffler (4), the metal protector member (51) comprises a concave portion (513) for housing the synthetic-resin protector member (52), and wherein the synthetic-resin protector member (52) has both ends positioned inside the concave portion (513).
8. The muffler protector (5) according to claim 7, wherein in the cross section that is orthogonal to the axis of the muffler (4), both the ends of the synthetic-resin protector member (52) are positioned closer to a center of the muffler (4) with respect to a straight line obtained by connecting convex ends on both sides of the concave portion (513).
9. The muffler protector (5) according to any one of claims 1 to 8, wherein the synthetic-resin protector member fixing portion (54) comprises:
 - a protrusion shaft (523) protruding from a rear surface of the synthetic-resin protector member (52);
 - an insertion hole (512) provided in the metal protector member (51), through which the protrusion shaft (523) is inserted; and
 - a holding unit for holding the protrusion shaft (523) from a rear surface of the metal protector member (51).
10. The muffler protector (5) according to claim 9, wherein the holding unit comprises:
 - a first holder (541) comprising a plate spring, for biasing, owing to an elastic action of the plate spring, the protrusion shaft (523) in a direction in which the synthetic-resin protector member (52) and the metal protector member (51) are pressed against each other; and
 - a second holder (542) which is engaged with the protrusion shaft (523) so that a position thereof is fixed.
11. The muffler protector (5) according to claim 9 or 10, further comprising a reinforcement rib (524), which extends from the protrusion shaft (523), for supporting the metal protector member (51).
12. The muffler protector (5) according to claim 11, further comprising a support rib (525), provided around the protrusion shaft (523), for supporting the metal protector member (51).

13. The muffler protector (5) according to claim 11 or 12, further comprising a support surface (526), provided around the protrusion shaft (523), for supporting the metal protector member (51).

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14. A saddle-ride type vehicle (1), comprising the muffler protector (5) according to any one of claims 1 to 13.

15. The saddle-ride type vehicle (1) according to claim 14, further comprising:

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a rear wheel (6);

a swing arm (7) for suspending the rear wheel (6); and

an engine (2) connected to the muffler (4), wherein the muffler (4) is fixed to one of the swing arm (7) and the engine (2).

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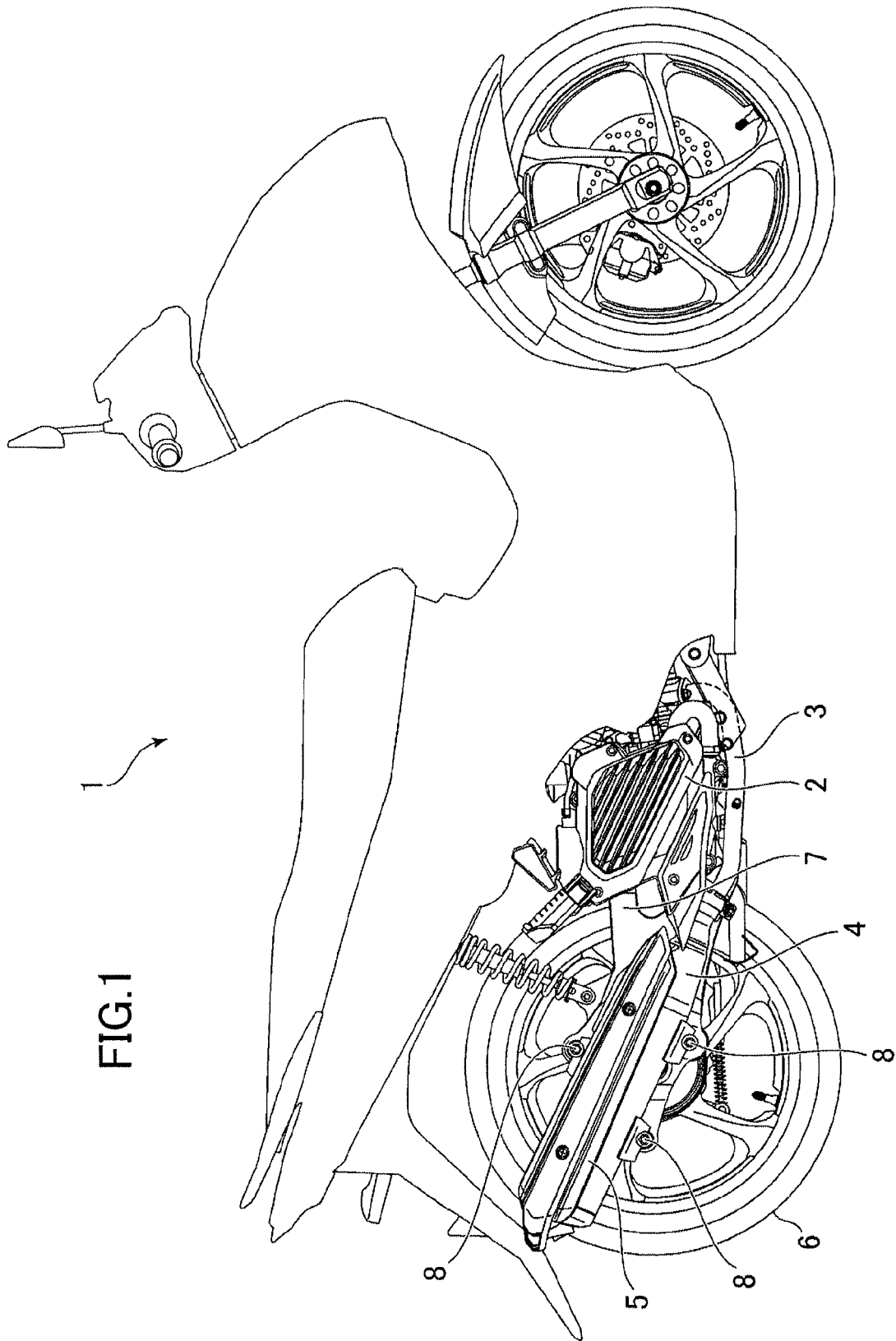


FIG.2

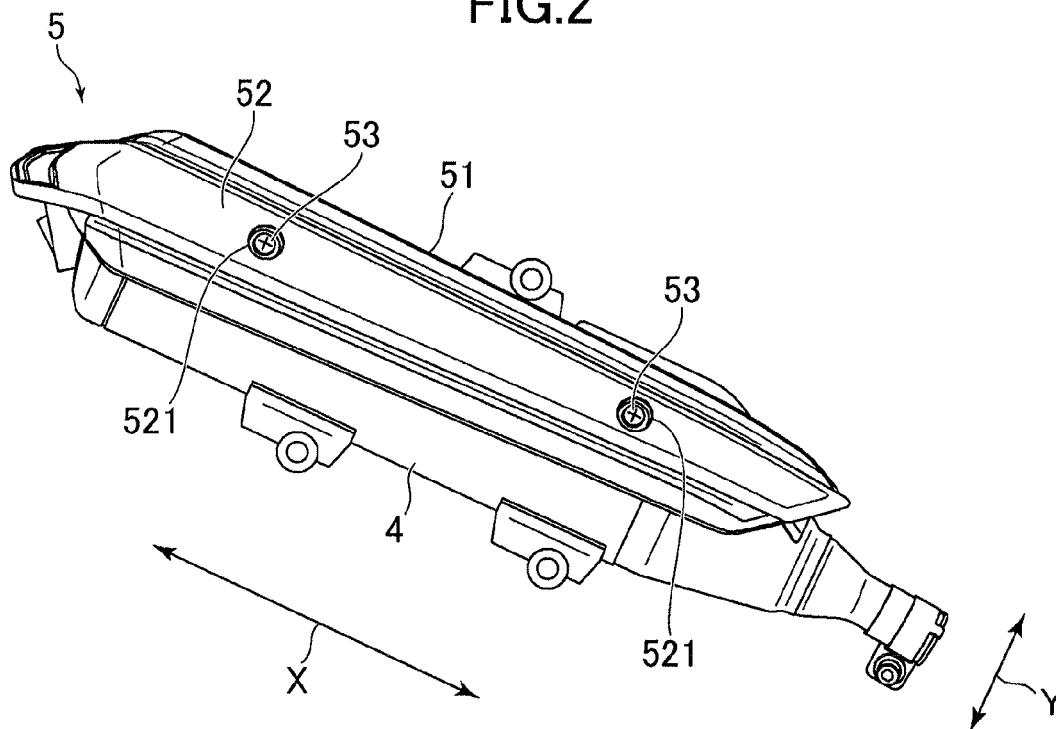


FIG.3

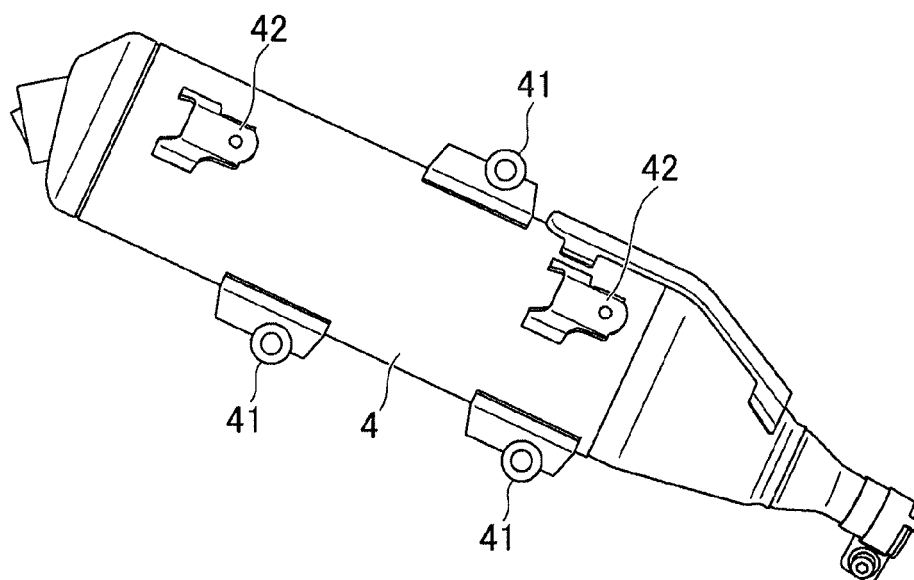


FIG.4

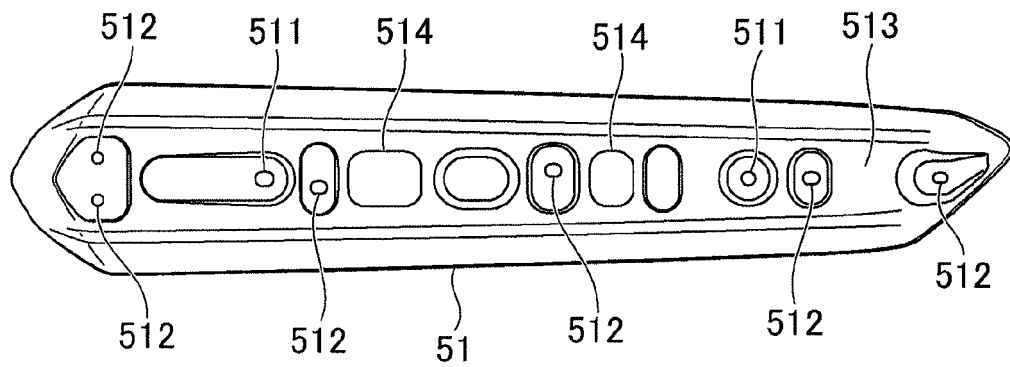


FIG.5A

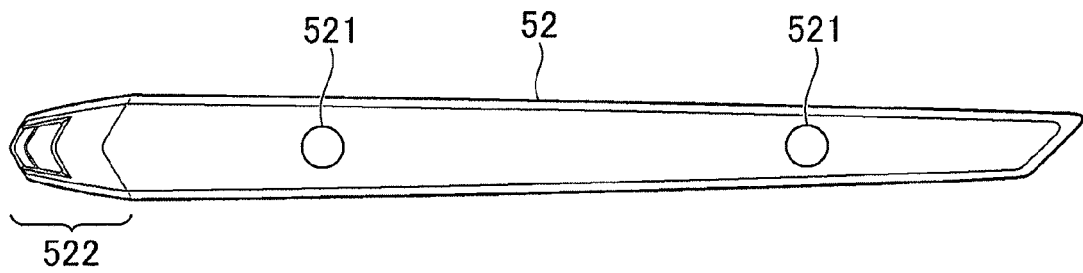


FIG.5B

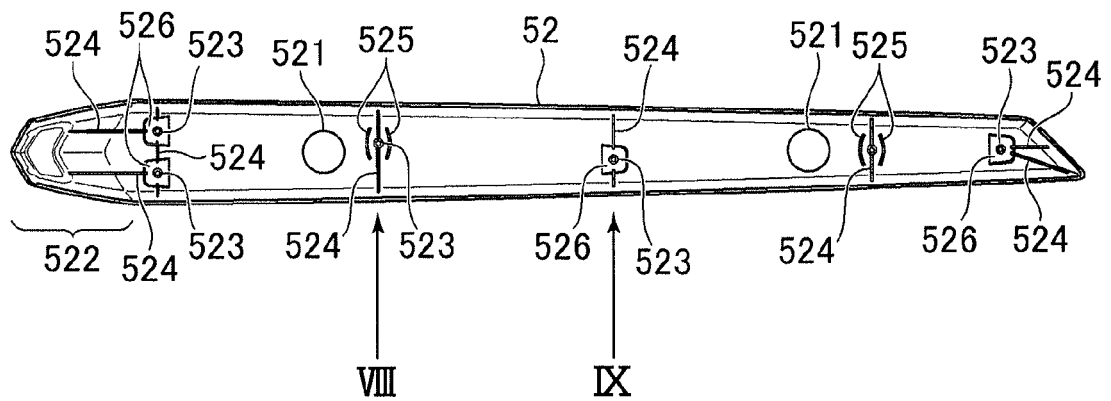


FIG.6

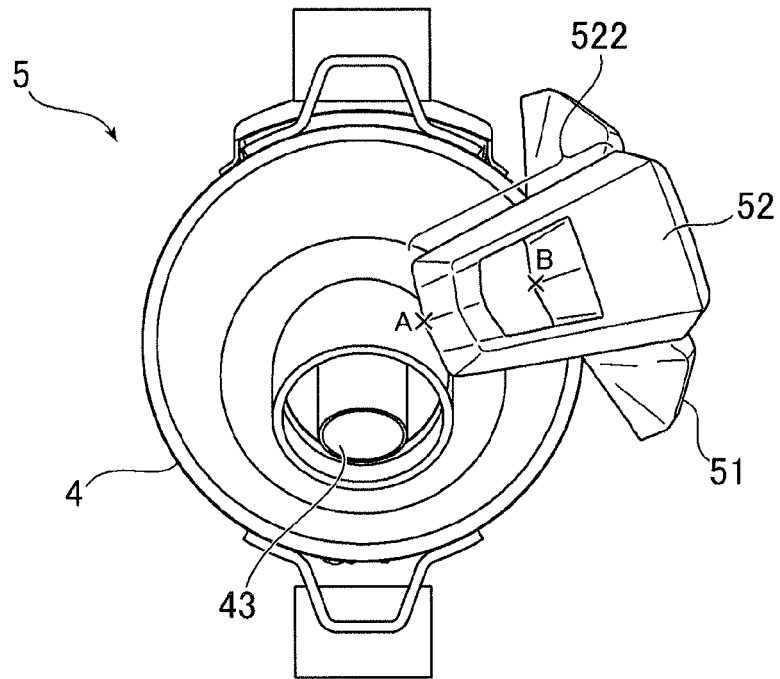


FIG.7

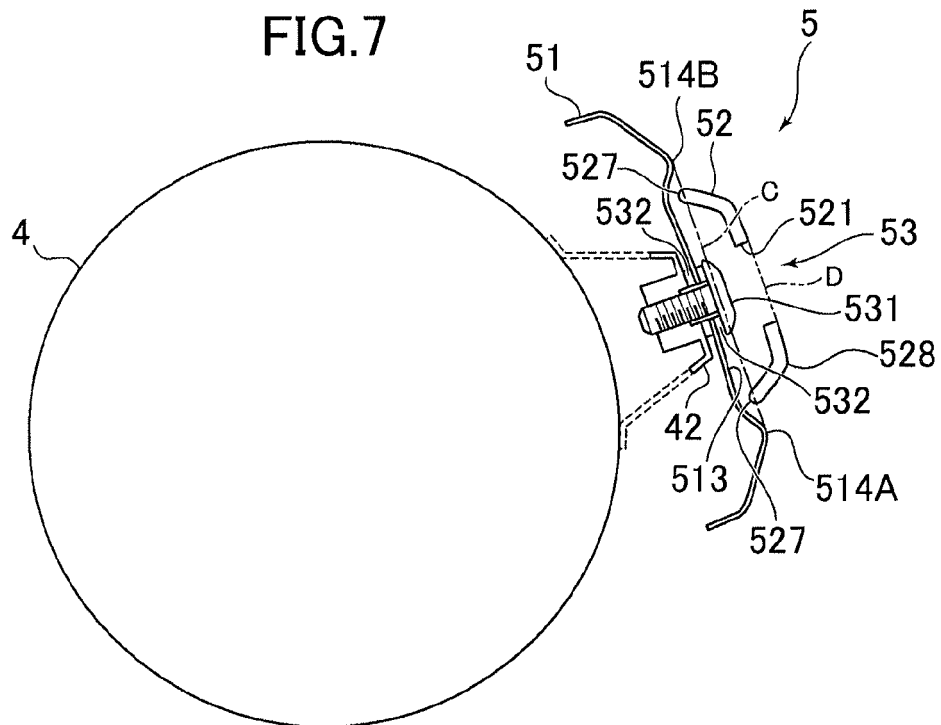


FIG.8

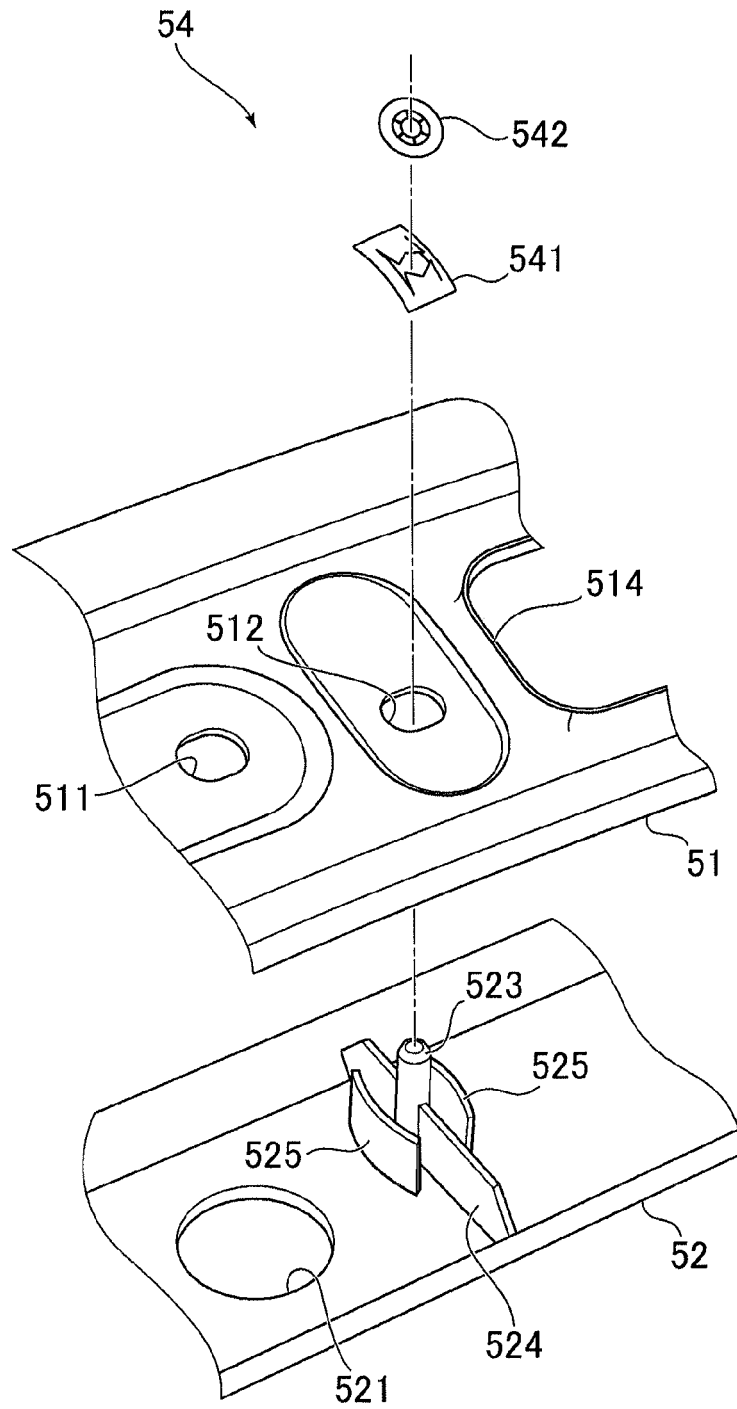
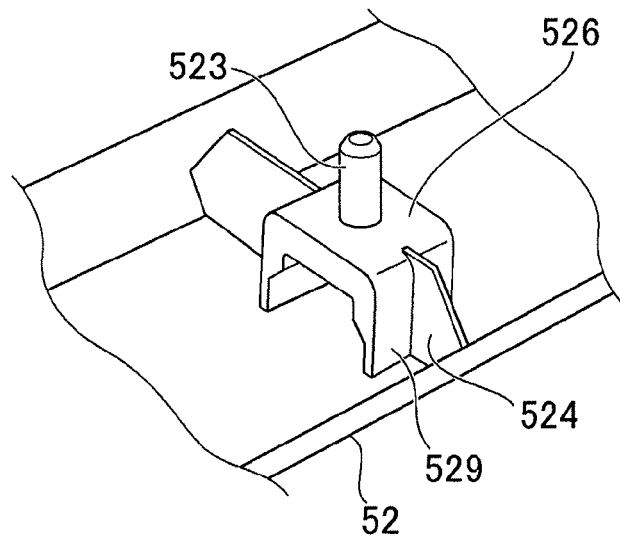


FIG.9





EUROPEAN SEARCH REPORT

Application Number
EP 12 17 0871

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			F01N
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 September 2012	Examiner Blanc, Sébastien
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 O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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27-09-2012

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