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- **Hara, Hirokazu**
Saitama 351-0193 (JP)
- **Funayama, Yoshihiro**
Saitama 351-0193 (JP)
- **Sakane, Taiki**
Saitama 351-0193 (JP)

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(71) Applicant: **Honda Motor Co., Ltd.**
Tokyo 107-8556 (JP)

(72) Inventors:
• **Kamemizu, Fuminori**
Saitama 351-0193 (JP)

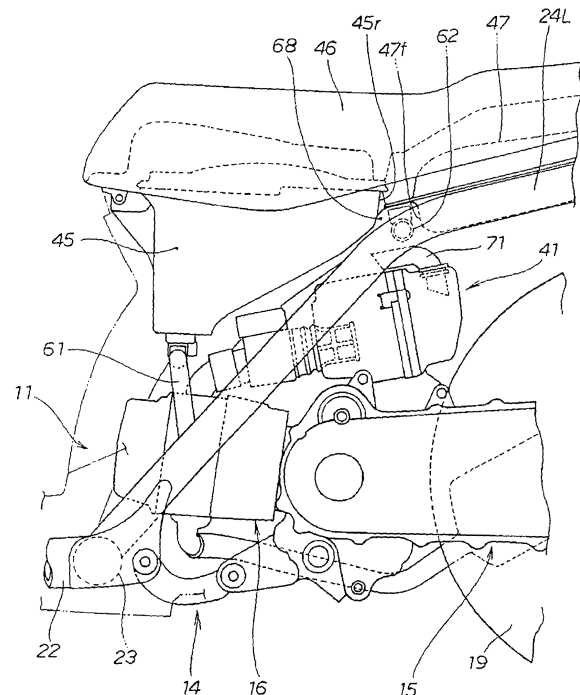
(74) Representative: **Rupp, Christian**
Mitscherlich & Partner
Patent- und Rechtsanwälte
Sonnenstrasse 33
80331 München (DE)

(54) **Scooter-type vehicle**

(57) An object of the present invention is to provide a scooter-type vehicle which ensures that the air cleaner (41) has a required and sufficient intake performance, and also ensures that the storage box (45) has a sufficient storage capacity.

A scooter-type vehicle includes an air cleaner (41) that is arranged between a power unit (15) and a storage box (45) as seen from the lateral side and is supported on the power unit (15). A fuel tank (47) is arranged in rear of the storage box (45). A gap (68) is provided between the rear side surface of the storage box (45) and the front side surface of the fuel tank (47). When the power unit (15) swings and the air cleaner (41) approaches the storage box (45), a duct (71) is located near the gap (68).

FIG. 7



Description

[0001] The present invention relates to a scooter-type vehicle having an air cleaner provided above a power unit.

[0002] There is known a scooter-type vehicle which includes a power unit swingably supported on a body frame, an air cleaner provided above the power unit, and a storage box provided above the air cleaner and below a seat (see, for example, Patent Document 1).

JP-A No. H6-117338 (Figs. 1 and 4)

[0003] In Fig. 1 of Patent Document 1, a power unit 13 including an engine 14 is swingably provided to a body frame 2 (Reference numerals used in the same publication will be used. The same applies hereinafter.) . In an upper portion of the power unit 13, an air cleaner 20 is connected to the rear via a carburetor 19. The air cleaner 20 is arranged from the front to above a rear wheel 16, on the rear side of an item storage member 7 (hereinafter, also referred to as the storage box 7) arranged below a sitting seat 8 (hereinafter, also referred to as the seat 8).

[0004] In Fig. 4 of Patent Document 1, the air cleaner 20 is integrally provided above a fender portion 21 of the rear wheel.

The upper portion of the air cleaner 20 is covered by a cleaner case cover portion 25. A step is provided in the rear portion of the cleaner case cover portion 25, and an opening is provided in this step. That is, the cleaner case cover portion 25 is provided with an air reservoir in which sucked air is accumulated.

[0005] It is necessary to secure an air reservoir (dirty chamber) within the cleaner case cover portion 25 in order to secure a predetermined intake performance. To increase the volume of the air reservoir, the cleaner case cover portion 25 has to be enlarged naturally. As the size of the cleaner case cover portion 25 becomes larger, so do the height of the cleaner case cover portion 25 and the height of the air cleaner 20.

[0006] However, as the height of the air cleaner 20 becomes larger, it may become impossible to secure a sufficient volume of the storage box 7, considering the necessity of avoiding interference between the air cleaner 20 and the storage box 7 on the body side at the time when the power unit 13 swings.

Thus, there is a demand for a scooter-type vehicle which ensures that the air cleaner has a required and sufficient intake performance and can secure a sufficient capacity of the storage box.

Also, since the intake port for sucking outside air into the dirty chamber opens facing toward the rear of the vehicle body, the vehicle is greatly affected by water or dust from the rear wheel. This problem needs to be addressed as well.

[0007] It is an object of the present invention to provide a scooter-type vehicle which ensures that the air cleaner has a required and sufficient intake performance, and also ensures that the storage box has a sufficient storage capacity.

[0008] In an aspect of the invention in Claim 1, there is provided a scooter-type vehicle including a body frame, a power unit swingably supported on the body frame, a storage box arranged above the power unit and below a seat on which an occupant sits, and an air cleaner that is arranged so as to overlap a rear portion of the storage box as seen from above and between the power unit and the storage box as seen from a lateral side and that is supported on the power unit, in which: the air cleaner includes an element that divides an inner portion of the air cleaner into a front side and a rear side to define a cleaner chamber on the front side and a dirty chamber on the rear side and filters outside air, an intake port that opens at an upper surface of the dirty chamber and sucks outside air into the dirty chamber, and a duct that is mounted to the intake port and extended toward the front of the vehicle to introduce outside air to the intake port; and a distal end portion of the duct is arranged in rear of a rear end portion of the storage box.

[0009] In an aspect of the invention in Claim 2, the fuel tank is arranged in rear of the storage box, and a gap is provided between a rear side surface of the storage box and a front side surface of the fuel tank, and when the power unit swings and the air cleaner approaches the storage box, the duct is located near the gap.

[0010] In an aspect of the invention in Claim 3, the body frame includes a secondary air supply device that supplies air to exhaust parts of an engine, and the air cleaner integrally includes on its lateral side a secondary air cleaner as a component of the secondary air supply device.

[0011] In an aspect of the invention in Claim 4, a secondary air control unit that controls a quantity of secondary air includes an air introduction pipe, and the air introduction pipe is fitted and supported on a front surface of the secondary air cleaner.

[0012] In an aspect of the invention in Claim 5, the secondary air control unit is supported on the air cleaner via a support stay that is a separate member mounted to a front surface of the air cleaner.

[0013] In the aspect of the invention in Claim 1, the air cleaner includes an element that divides the inner portion of the air cleaner into a clean chamber on the front side and a dirty chamber on the rear side, and filters outside air. Therefore, as compared with a case where the dirty chamber is formed above the element, the volume required of the upper portion of the air cleaner can be made small. It is thus possible to ensure that the air cleaner has a required and sufficient intake performance, while making the volume required of the upper portion of the air cleaner small.

[0014] In addition, an intake port that opens at the upper surface of the dirty chamber and sucks outside air into the dirty chamber, and a duct that is mounted to the intake port and extended toward the front of the vehicle to introduce outside air to the intake port are provided. Therefore, as compared with a case where the opening of the duct faces toward the rear of the vehicle, it is pos-

sible to significantly reduce intrusion of dust.

[0015] Further, the distal end portion of the duct is arranged in rear of the rear end portion of the storage box. A sufficiently large space is thus obtained between the air cleaner and the storage box, thereby making it possible to secure a sufficient volume of the storage box. Therefore, it is possible to ensure that the air cleaner has a required and sufficient intake performance, and also ensure that the storage box has a sufficient storage capacity.

[0016] In the aspect of the invention in Claim 2, a gap is provided between a rear side surface of the storage box and a front side surface of the fuel tank, and when the air cleaner approaches the storage box, the duct is located near the gap.

[0017] By providing the gap in the case where the duct is arranged on the upper surface of the air cleaner, it is possible to secure a larger swing stroke of the power unit. Since a sufficient swing stroke can be secured, it is possible to further enhance the running performance of the vehicle.

[0018] In the aspect of the invention in Claim 3, in a case where the secondary air cleaner is provided, the secondary air cleaner is provided on the lateral side of the air cleaner, so its influence on the arrangement of the storage box can be reduced.

[0019] In the aspect of the invention in Claim 4, an air introduction pipe is provided between the secondary air cleaner and the second air control unit, and the air introduction pipe is fitted and supported on the front surface of the secondary air cleaner.

[0020] The secondary air control unit is not arranged above the air cleaner and is hence less likely to affect the size, arrangement, and the like of the storage box. In addition, it is possible to secure a sufficiently large volume of the storage box.

Since the secondary air control unit is fitted and supported on the front surface of the secondary air cleaner via the air introduction pipe, the secondary air control unit can be supported in place by means of a simple structure.

[0021] In the aspect of the invention in Claim 5, the secondary air control unit is supported in place via a support stay mounted to the air cleaner, so its influence on the size, arrangement, and the like of the storage box can be further reduced. In addition, the secondary air control unit can be supported in place with greater reliability.

Fig. 1 is a left side view of a scooter-type vehicle according to the present invention.

Fig. 2 is a main-portion left side view of the scooter-type vehicle according to the present invention.

Fig. 3 is a plan view illustrating the positional relationship between the storage box and air cleaner of the scooter-type vehicle according to the present invention.

Fig. 4 is a plan view of the air cleaner and secondary air supply device of the scooter-type vehicle accord-

ing to the present invention.

Fig. 5 is a view as seen from the arrow 5 of Fig. 4. Fig. 6 is a main-portion sectional view of the air cleaner and secondary air supply device of the scooter-type vehicle according to the present invention.

Fig. 7 is an operational view of Fig. 2.

Fig. 8 is a left side view of a rear stop lamp unit of the scooter-type vehicle according to the present invention.

Fig. 9 is a view as seen from the arrow 9 of Fig. 8.

[0022] The best mode for carrying out the present invention will be described with reference to the attached drawings. In the drawings, the terms "front", "rear", "left", "right", "upper", and "lower" are directions as seen from the rider. It should be noted that the drawings are to be viewed in the direction of reference numerals.

Fig. 1 is a left side view of a scooter-type vehicle according to the present invention. A motorcycle 10 as the scooter-type vehicle is a vehicle having a power unit 15 swingably mounted on a body frame 11 via a link mechanism 14 including a pivot shaft 12 in a rear portion of the body frame 11.

[0023] The power unit 15 includes an engine 16 as a drive source, and a transmission case 17 provided in rear of the engine 16. A belt-type continuously variable transmission 18 for transmitting the drive force of the engine 16 to a rear wheel 19 is built in the transmission case 17. The transmission case 17 is swingably provided at the rear end portion of the body frame 11 so as to transmit the power of the engine 16 to the rear wheel 19.

[0024] The motorcycle 10 has a front fork 26 steerably mounted to a head pipe 21, a front wheel 28 mounted to the lower end of the front fork 26, and a steering handlebar 29 mounted to the upper portion of the front fork 26.

[0025] The rear wheel 19 is mounted to the rear end of the power unit 15 which doubles as a rear swing arm. A rear cushion unit 31 is suspended between the rear portion of the power unit 15 and a frame 24L.

[0026] The link mechanism 14 interposed between the power unit 15 and a cross member 23 includes a support shaft 32 provided near the cross member 23, a link member 33 extending rearward from the support shaft 32, and the pivot shaft 12 provided at the rear end portion of the link member 33.

[0027] An intake device 38 and an exhaust device 39 are connected to a cylinder block 37 of the engine 16 which constitutes the front portion of the power unit 15. The intake device 38 includes an air cleaner 41, and a fuel supply device 42 connected to the air cleaner 41 via a coupling member 40.

The exhaust device 39 includes an exhaust pipe 43 connected to the engine 16 and extended rearward, and a muffler 44 connected to the exhaust pipe 43 and extended rearward.

[0028] A storage box 45 that opens upward is provided to seat frames 24L, 24R. A seat 46 on which an occupant sits straddling is provided above the storage box 45. A

fuel tank 47 is arranged in rear of the storage box 45. The seat 46 is mounted from above the storage box 45 and the fuel tank 47 so as to be capable of opening and closing.

[0029] Reference numeral 48 denotes a step floor support frame that supports a step floor 49, 51 a passenger footrest support frame, 53 a grab rail, 54 a front brake unit, 55 a front fender, 56 a cowl member, 57 a rear fender, and 58 a side stand.

[0030] That is, the motorcycle 10 as a scooter-type vehicle includes the body frame 11, the steering handlebar 29 and the seat 46 for the occupant to sit on, which are supported on the vehicle frame 11, and the step floor 49 provided between the steering handlebar 29 and the seat 46 and on which the occupants places his/her feet.

[0031] Fig. 2 is a main-portion left side view of the scooter-type vehicle according to the present invention, and Fig. 3 is a plan view illustrating the positional relationship between the storage box and air cleaner of the scooter-type vehicle according to the present invention. In the following description, reference will be made to Figs. 2 and 3.

[0032] The body frame 11 includes the cross member 23 mounted to the rear end portion of a down frame 22 in the width direction of the vehicle, the left and right seat frames 24L, 24R that rise obliquely rearward from the left and right ends of the cross member 23, a cross frame 61 that is suspended intermediate between the left and right seat frames 24L, 24R to support the storage box 45, a seat cross frame 62 arranged in rear of the cross frame 61 and suspended intermediate between the left and right seat frames 24L, 24R to support the seat 46, and a rear cross member 63 suspended between the rear end portions of the left and right seat frames 24L, 24R.

[0033] A stop lamp unit 65 is mounted to the rear end portions of the seat frames 24L, 24R. A detailed description of the stop lamp unit 65 will be given later.

[0034] The motorcycle 10 as the scooter-type vehicle includes the body frame 11, the power unit 15 swingably supported on the body frame 11 via the link mechanism 14, the storage box 45 arranged above the power unit 15 and below the seat 46 on which the occupant sits, and the air cleaner 41 that is arranged so as to overlap a rear portion 45c of the storage box 45 as seen from above and located between the power unit 15 and the storage box 45 as seen from the lateral side. The air cleaner 41 is supported by a bracket 66 provided on the upper surface of the power unit 15. That is, the air cleaner 41 is a member that swings following the swing motion of the power unit 15.

[0035] The fuel tank 47 is arranged in rear of the storage box 45. A gap 68 is provided between a rear side surface 45r of the storage box 45 and a front side surface 47f of the fuel tank 47.

A distal end portion 71f of a duct 71 for admitting outside air to the air cleaner 41 is arranged in rear of a rear end portion 45b of the storage box 45.

[0036] Referring to Fig. 3, the body frame 11 includes

a secondary air supply device 72.

The secondary air supply device 72 has a function of, for example, supplying air to exhaust parts of the engine 16 such as the exhaust pipe 43 and the muffler 44, and burning the combustible components in an exhaust gas to purify the exhaust gas.

[0037] The secondary air supply device 72 includes, as its main components, a secondary air cleaner 73 for filtering sucked air, and a secondary air control unit 74 as a valve for supplying the air sucked in through the air cleaner 73 to the exhaust parts according to predetermined conditions.

The secondary air cleaner 73 is provided on the lateral side of the air cleaner 41, so its influence on the arrangement of the storage box 45 can be reduced.

[0038] Fig. 4 is a plan view of the air cleaner and second air supply device of the scooter-type vehicle according to the present invention. Fig. 5 is a view as seen from the arrow 5 of Fig. 4, and Fig. 6 is a main-portion sectional view of the air cleaner and second air supply device of the scooter-type vehicle according to the present invention. In the following description, reference will be made to Figs. 4 to 6.

[0039] The air cleaner 41 includes a front case 76 and a rear case 77, and an element 78 that is arranged between the front case 76 and the rear case 77 and filters outside air.

A front sub-case 81 as a component of the secondary air cleaner 73 described later is integrally formed in the front case 76. A rear sub-case 82 as a component of the secondary air cleaner 73 is integrally formed in the rear case 77. A subelement 83 for filtering outside air is arranged between the front sub-case 81 and the rear sub-case 82. The front case 76 and the rear case 77 are butted together at flange portions 84, 85. The flange portions 84, 85 are fixed in place with a plurality of mounting bolts 86.

[0040] The inner portion of the air cleaner 41 is divided into the front and rear sides by the element 78, with a clean chamber 87 and a dirty chamber 88 formed on the front and rear sides of the air cleaner 41, respectively. The air cleaner 41 has an intake port 89 that opens at the upper surface of the dirty chamber 88 and sucks outside air into the dirty chamber 88. Mounted to the intake port 89 is the duct 71 that is extended toward the front of the vehicle and introduces outside air to the intake port 89.

[0041] An air introduction pipe 91 is coupled to the front portion of the front sub-case 81. The secondary air control unit 74 for controlling the quantity of secondary air is mounted to the air introduction pipe 91.

The air introduction pipe 91 is equipped to the secondary air control unit 74. The air introduction pipe 91 is fitted and supported on the front surface of the secondary air cleaner 73.

[0042] The secondary air control unit 74 is not arranged above the air cleaner 41 and is hence less likely to affect the size, arrangement, and the like of the storage box (indicated by reference numeral 45 in Fig. 2). In ad-

dition, it is possible to secure a sufficiently large volume of the storage box 45.

[0043] Since the secondary air control unit 74 is fitted and supported on the front surface of the secondary air cleaner 73 via the air introduction pipe 91, the secondary air control unit 74 can be supported in place by means of a simple structure.

[0044] In addition, one end of a support stay 92 having a platelike shape is mounted to a front surface 41f of the air cleaner 41 via bolts 93. The other end of the support stay 92 is mounted to the secondary air control unit 74 via the bolts 93. That is, the secondary air control unit 74 is supported on the air cleaner 41 via the support stay 92 that is a separate member mounted to the front surface 41f of the air cleaner 41.

[0045] The secondary air control unit 74 is supported on the air cleaner 41 via the support stay 92 formed in the shape of a mounting plate. Since the support stay 92 occupies only a limited space, its influence on the size, arrangement, and the like of the storage box 45 can be further reduced. In addition, the secondary air control unit 74 can be supported in place with greater reliability.

[0046] Operation of the scooter-type vehicle mentioned above will be described below.

Referring to Figs. 2, 5, and 6, the dirty chamber 88 is formed in rear of the element 78. Therefore, as compared with a case where the dirty chamber 88 is formed above the element 78, the volume required of the upper portion of the air cleaner 41 can be made small. It is thus possible to ensure that the air cleaner 41 has a required and sufficient intake performance, while making the volume required of the upper portion of the air cleaner 41 small.

[0047] In addition, the intake port 89 that opens at the upper surface of the dirty chamber 88 and sucks outside air into the dirty chamber 88, and the duct 71 that is mounted to the intake port 89 and extended toward the front of the vehicle to introduce outside air to the intake port 89 are provided. Therefore, as compared with a case where the opening of the duct 71 faces toward the rear of the vehicle, it is possible to significantly reduce intrusion of dust.

[0048] Further, the distal end portion 71t of the duct is arranged in rear of the rear end portion 45b of the storage box. A sufficiently large space is thus obtained between the air cleaner 41 and the storage box 45, thereby making it possible to secure a sufficient volume of the storage box 45.

Therefore, it is possible to ensure that the air cleaner 41 has a required and sufficient intake performance, and also ensure that the storage box 45 has a sufficient storage capacity.

[0049] Since a sufficiently large space is secured between the air cleaner 41 and the storage box 45, the freedom in terms of the structure and arrangement of the air cleaner 41 can be enhanced. As for the structure of the air cleaner 41, for example, it is possible to ensure that the dirty chamber 88 of the air cleaner 41 has a sufficient volume. In addition, it is possible to secure a suf-

ficient volume of the storage box 45.

[0050] Therefore, it is possible to enhance the freedom in terms of the structure and arrangement of the air cleaner 41, and secure a sufficient capacity of the storage box 45.

If a sufficient volume is attained for the dirty chamber 88 of the air cleaner 41, it is possible to achieve enhanced intake efficiently and significantly reduced intake noise.

[0051] Fig. 7 is an operational view of Fig. 2. When the power unit 15 swings and the air cleaner 41 approaches the storage box 45, the duct 71 is located near the gap 68. Also, the gap 68 is provided between the rear side surface 45r of the storage box 45 and the front side surface 47f of the fuel tank 47, and when the air cleaner 41 approaches the storage box 45, the duct 71 is located near the gap 68.

[0052] By providing the above-mentioned gap 68 in the case where the duct 71 is arranged on the upper surface of the air cleaner 41, it is possible to secure a larger swing stroke of the power unit 15. Since a sufficient swing stroke can be secured, it is possible to further enhance the running performance of the vehicle.

Since the duct is mounted with its opening facing forward, as compared with a case where the duct is mounted with its opening facing rearward, intrusion of foreign matter such as dust can be further reduced.

[0053] Fig. 8 is a left side view of a rear stop lamp unit of the scooter-type vehicle according to the present invention, and Fig. 9 is a view as seen from the arrow 9 of Fig. 8. In the following description, reference will be made to Figs. 8 and 9.

A rear stop lamp unit 65 is a member that constitutes the appearance of the rear end portion of the vehicle. The rear stop lamp unit 65 includes a main body portion 96, an upper portion 97 that covers the top of the main body portion 96, and a rear portion 98 that covers the rear of the main body portion 96.

[0054] The rear portion 98 has a tail lamp 99 arranged at its center, and left and right winker lamps 101L, 101R arranged on the left and right of the tail lamp 99, with the tail lamp 99 and the winker lamps 101L, 101R covered by lenses 102, 103L, 103R, respectively.

[0055] Returning to Fig. 3, the rear stop lamp unit 65 is mounted to the left and right seat frames 24L, 24R via bolts 104.

The upper portion 97 included in the rear stop lamp unit 65 is exposed outward and constitutes a part of the appearance design of the vehicle.

[0056] Rather than covering the rear end portion of the vehicle by a dedicated rear cowl or the like, the upper portion 97 of the rear stop lamp unit 65 is used such that the upper portion 97 is exposed as a part of the appearance design. Therefore, it is possible to reduce the number of parts while enhancing the appearance of the vehicle.

[0057] It should be noted that in Claim 1, the gap provided between the rear side surface of the storage box and the front side surface of the fuel tank may be omitted.

Also, in the scooter-type vehicle, the secondary air supply device may be omitted.

[0058] The present invention is suitably applicable to a scooter-type vehicle.

[0059]

11	Body frame
15	Power unit
16	Engine
41	Air cleaner
41f	Front surface of air cleaner
45	Storage box
45b	Rear end portion of storage box
45c	Rear portion of storage box
45r	Rear side surface of storage box
46	Seat
47	Fuel tank
47f	Front side surface of fuel tank
68	Gap
71	Duct
71t	Distal end portion of duct
72	Secondary air supply device
73	Secondary air cleaner
74	Secondary air control unit
78	Element
87	Clean chamber
88	Dirty chamber
89	Intake port
91	Air introduction pipe
92	Support stay

2. The scooter-type vehicle according to Claim 1, wherein: the fuel tank (47) is arranged in rear of the storage box (45), and a gap (68) is provided between a rear side surface of the storage box (45r) and a front side surface of the fuel tank (47f); and when the power unit (15) swings and the air cleaner (41) approaches the storage box (45), the duct (71) is located near the gap (68).
3. The scooter-type vehicle according to Claim 1 or 2, wherein the body frame (11) includes a secondary air supply device (72) that supplies air to exhaust parts of an engine (16), and the air cleaner (41) integrally includes on its lateral side a secondary air cleaner (73) as a component of the secondary air supply device (72).
4. The scooter-type vehicle according to any of the preceding claims, wherein a secondary air control unit (74) that controls a quantity of secondary air includes an air introduction pipe (91), and the air introduction pipe (91) is fitted and supported on a front surface of the secondary air cleaner (73).
5. The scooter-type vehicle according to any of the preceding claims, wherein the secondary air control unit (74) is supported on the air cleaner (41) via a support stay (92) that is a separate member mounted to a front surface of the air cleaner (41f).

Claims

1. A scooter-type vehicle comprising: a body frame (11); a power unit (15) swingably supported on the body frame (11); a storage box (45) arranged above the power unit (15) and below a seat (46) on which an occupant sits; and an air cleaner (41) that is arranged so as to overlap a rear portion of the storage box (45c) as seen from above and between the power unit (15) and the storage box (45) as seen from a lateral side and that is supported on the power unit (15), wherein: the air cleaner (41) includes an element (78) that divides an inner portion of the air cleaner (41) into a front side and a rear side to define a cleaner chamber (87) on the front side and a dirty chamber (88) on the rear side and filters outside air, an intake port (89) that opens at an upper surface of the dirty chamber (88) and sucks outside air into the dirty chamber (88), and a duct (71) that is mounted to the intake port (89) and extended toward the front of the vehicle to introduce outside air to the intake port (89); and a distal end portion of the duct (71t) is arranged in rear of a rear end portion of the storage box (45b).

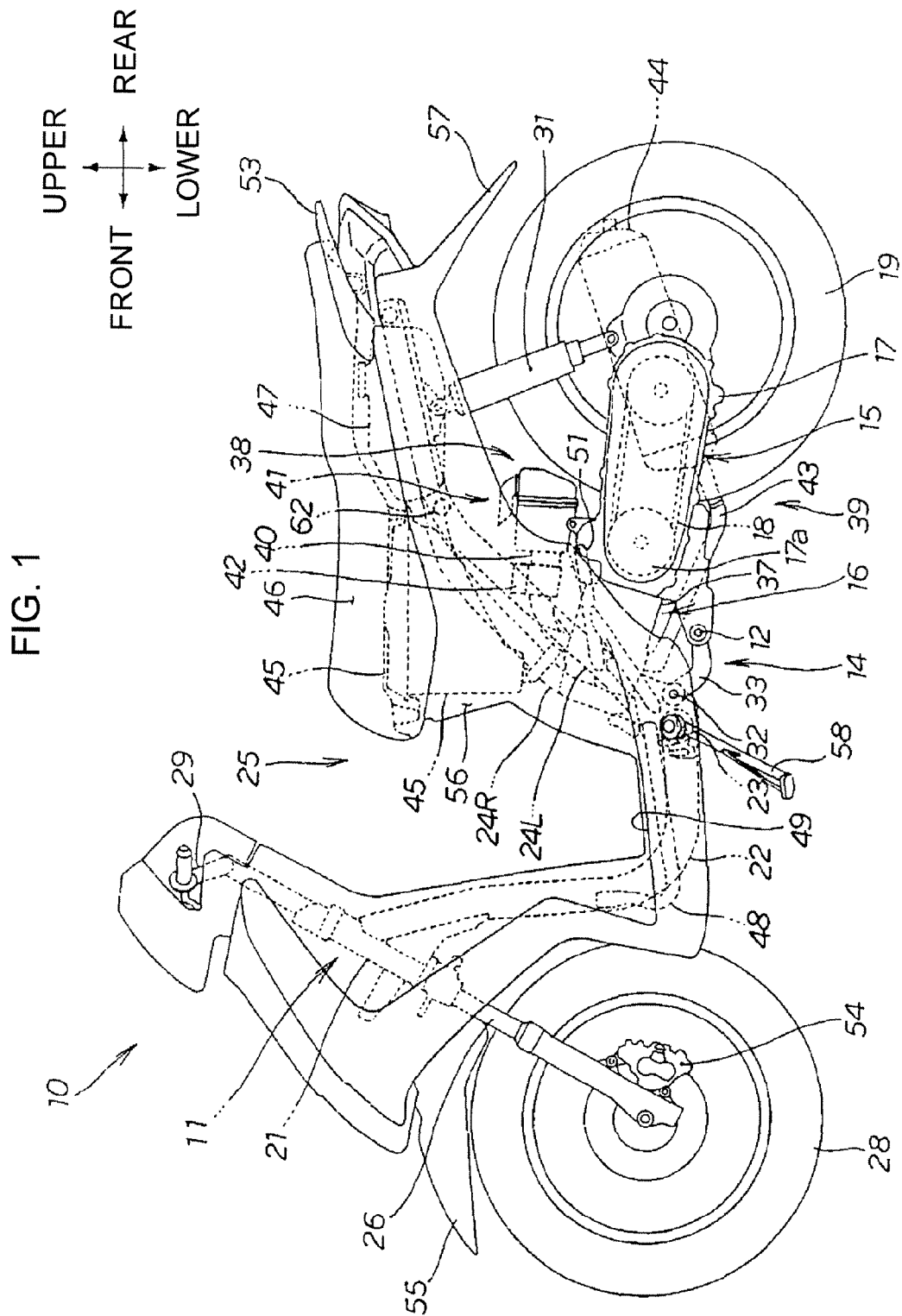


FIG. 2

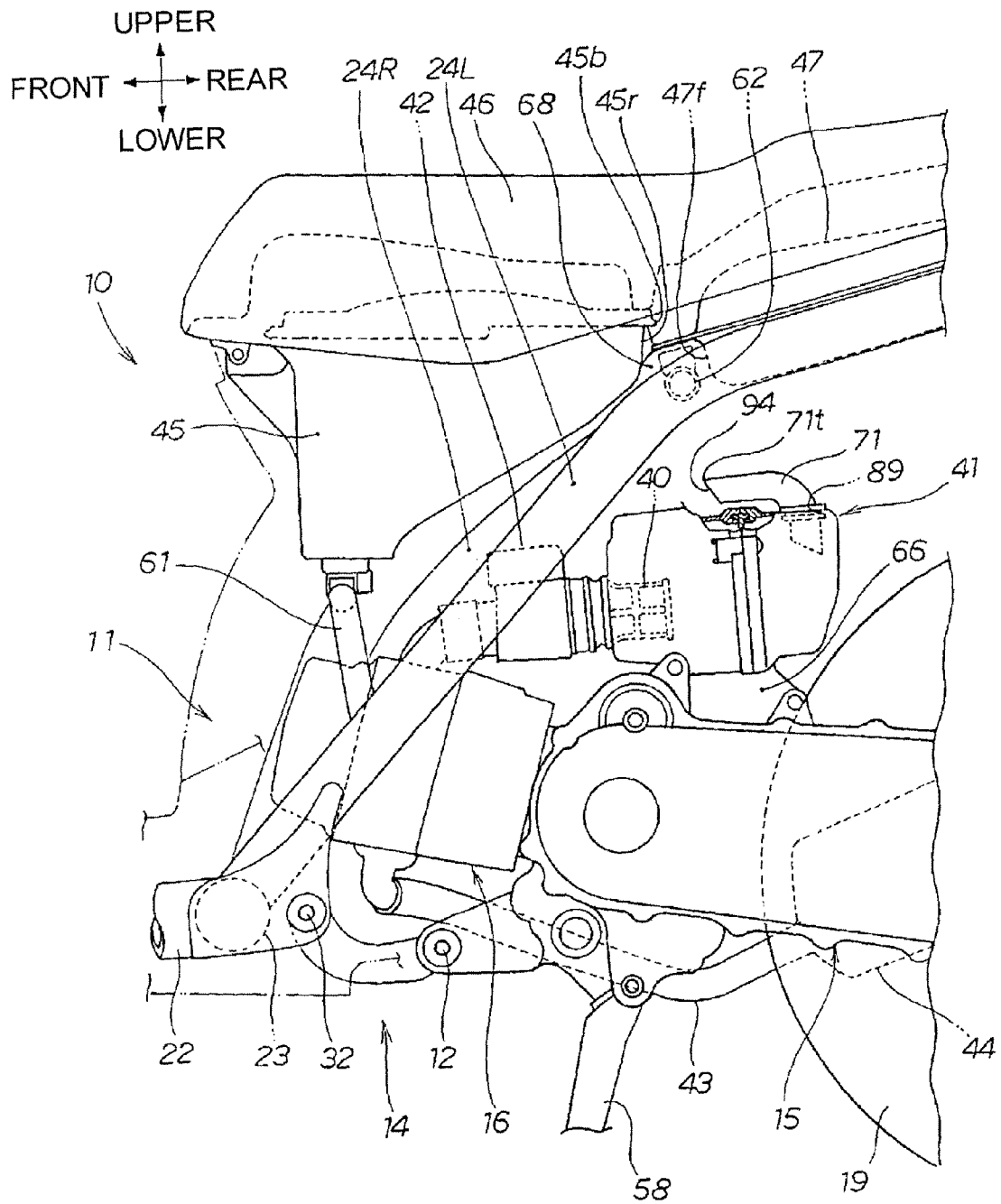


FIG. 3

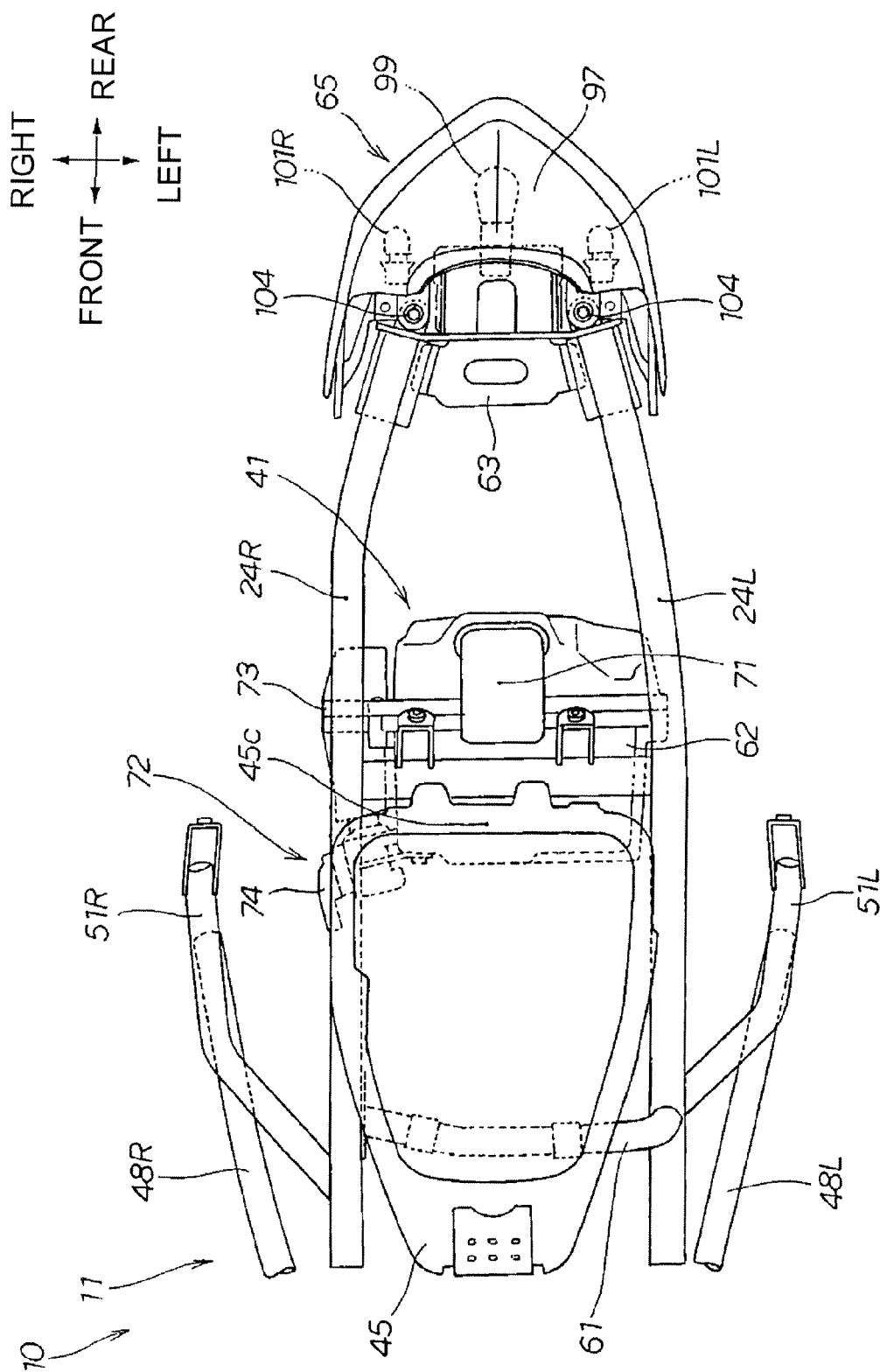
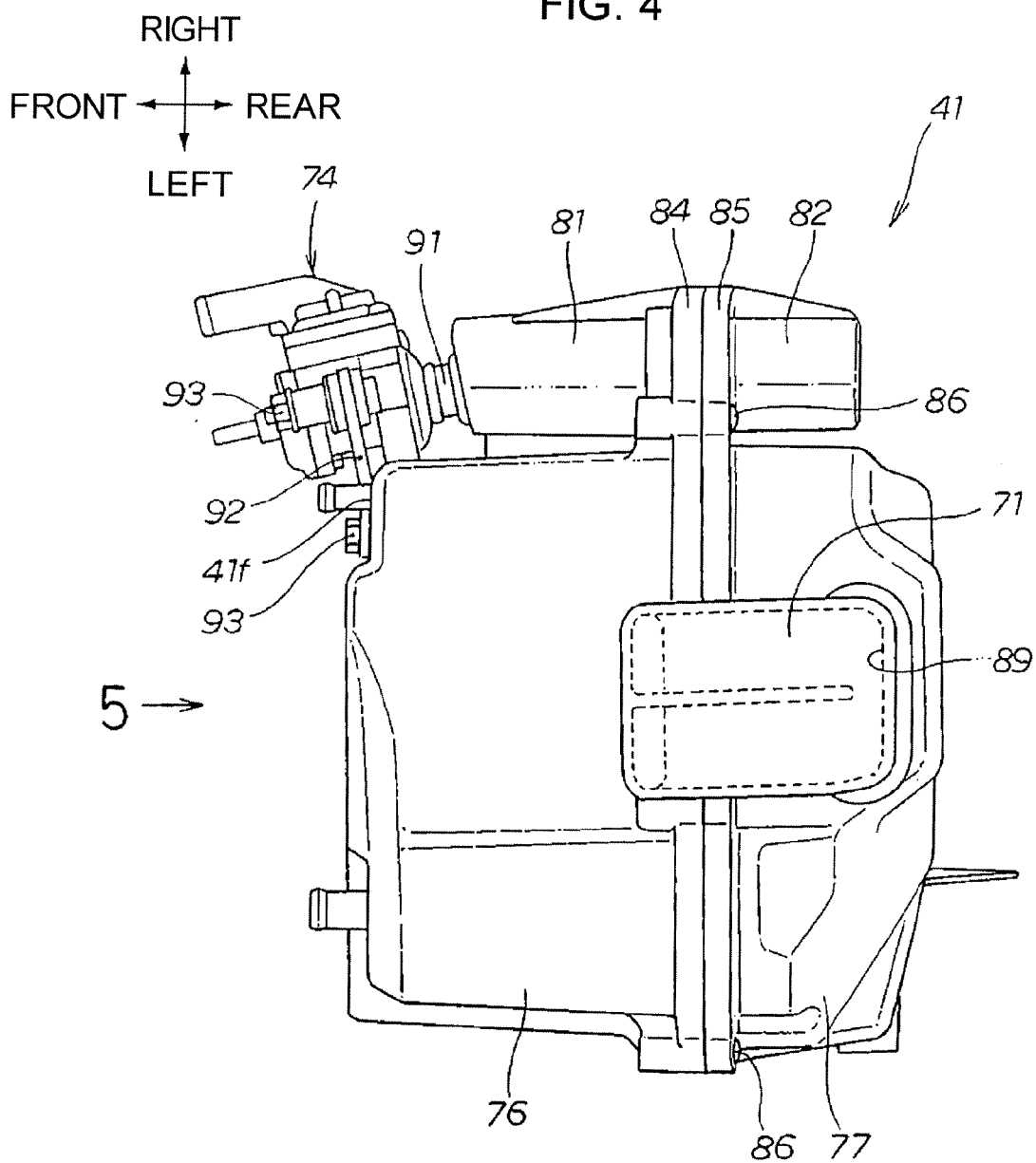


FIG. 4



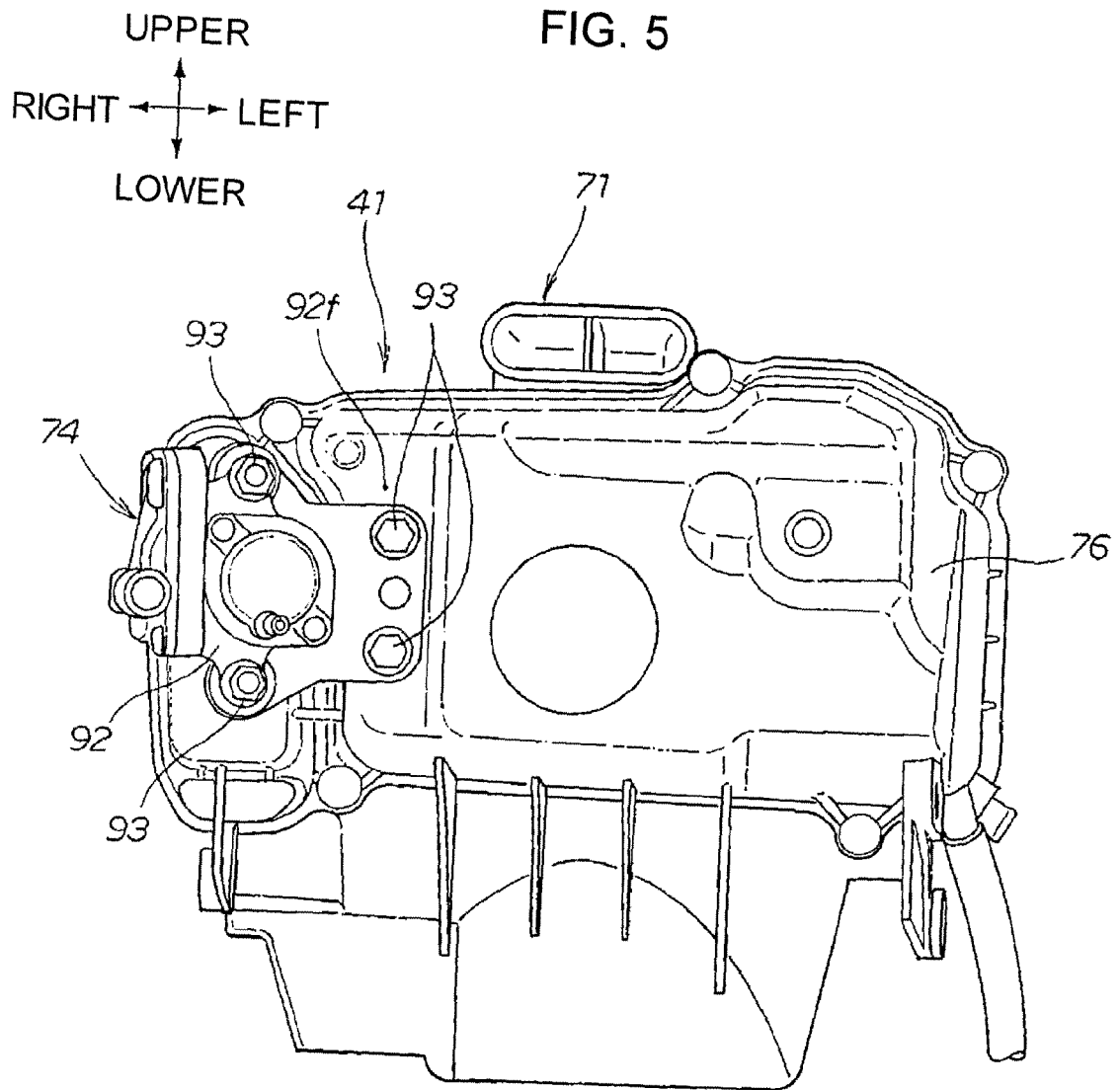


FIG. 6

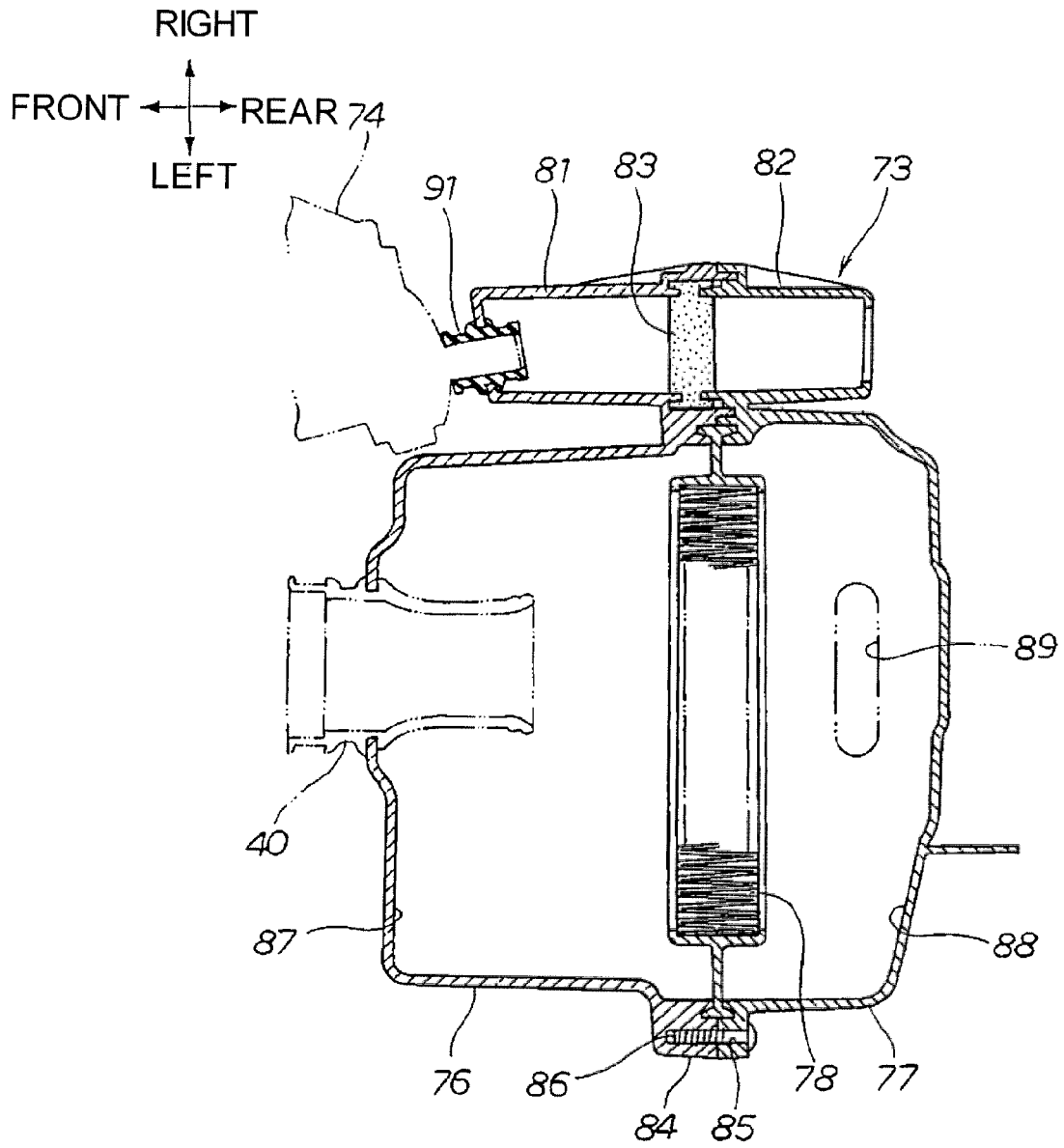


FIG. 7

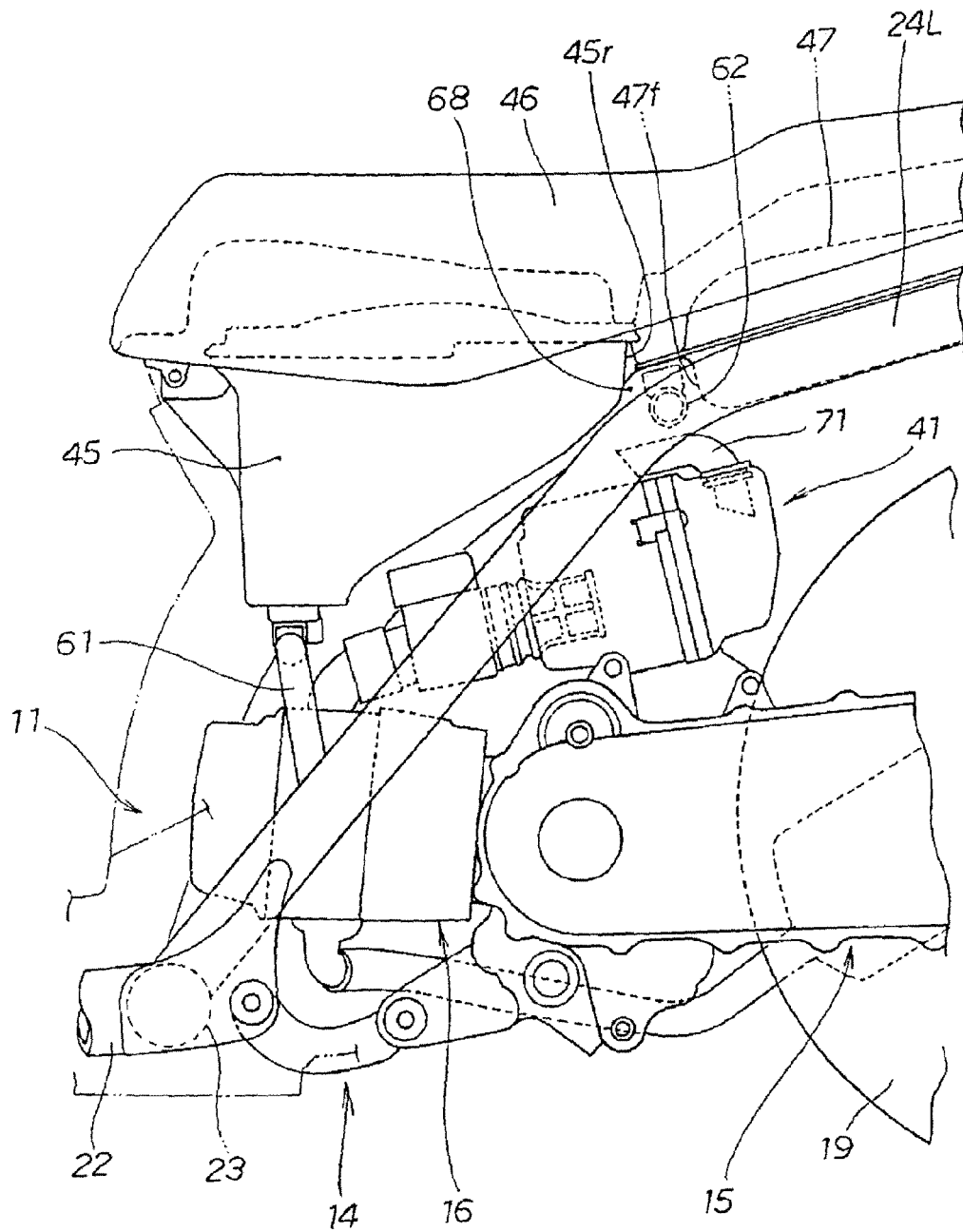


FIG. 8

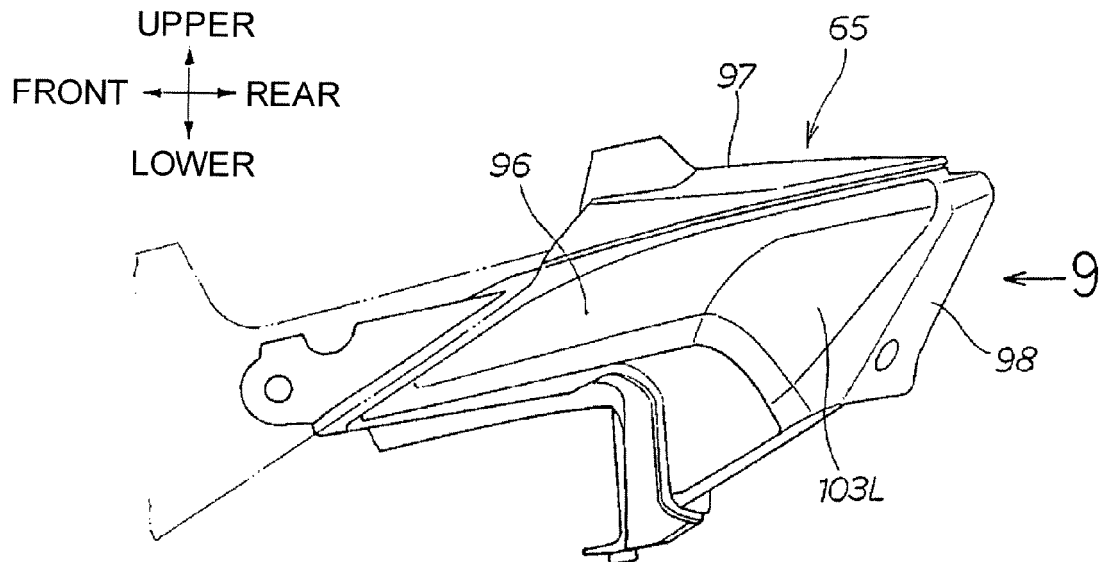
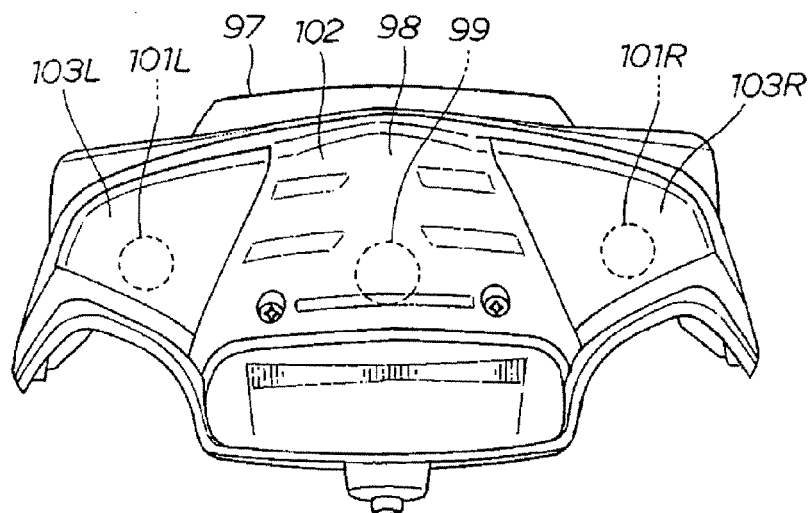


FIG. 9





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 15 4012

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) F02M
Place of search Munich		Date of completion of the search 24 July 2008	Examiner Marsano, Flavio
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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 15 4012

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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24-07-2008

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REFERENCES CITED IN THE DESCRIPTION

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