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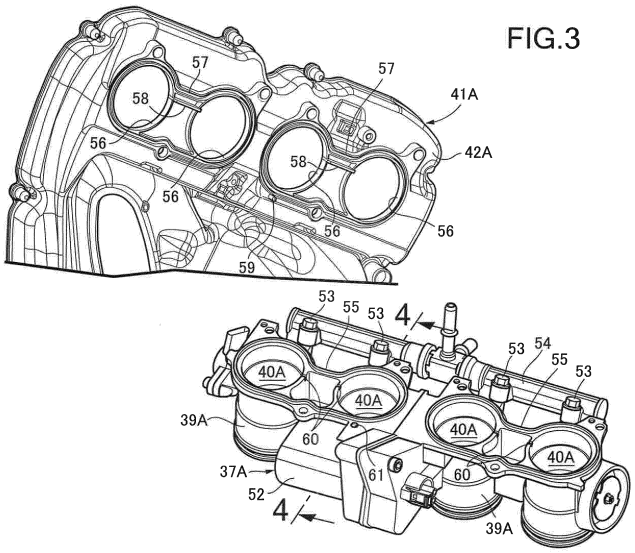
(54) INTAKE COMPONENT ATTACHMENT STRUCTURE FOR VEHICULAR INTERNAL COMBUSTION ENGINE

(57) An intake component attachment structure for a vehicular internal combustion engine is provided, in which among a plurality of intake components forming an intake system of an internal combustion engine, a proper combination of intake components that are attached to each other is specifically set so that modification thereof is impossible, wherein in an area where a first intake component (37A) made of a metal and a second intake component (41A) made of a resin are joined, a projecting part (58, 59) is provided on one of the first and second intake components (37A, 41A), and a recess part (60, 61) is provided in the other of the first and second intake components (37A, 41A), the projecting part (58, 59) being fitted into the recess part (60, 61) at the time of the proper combination. This makes exchange of a combination impossible while ensuring a high degree of freedom in placement of a projecting part and a recess part and a high degree of freedom in the design thereof.

FIG.3



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Description

TECHNICAL FIELD

[0001] The present invention relates to an intake component attachment structure for a vehicular internal combustion engine, in which among a plurality of intake components forming an intake system of an internal combustion engine mounted on a vehicle, a proper combination of intake components that are attached to each other is specifically set so that modification thereof is impossible.

BACKGROUND ART

[0002] A technique that makes modification impossible by providing, among a plurality of components forming an exhaust system of an internal combustion engine, components attached to each other with a projecting part and a recess part that the projecting part is fitted into, thus making a combination of components attached to each other specific, is known from Patent Document 1.

RELATED ART DOCUMENTS

PATENT DOCUMENTS

[0003] Patent Document 1: Japanese Patent No. 5973294

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0004] A plurality of components forming an exhaust system are formed from a heat resistant metal since they are exposed to exhaust gas. Because of this, the projecting part and the recess part disclosed by Patent Document 1 are formed as part of a metal component since it is necessary for them to be provided integrally with a component of the exhaust system, and the site where the projecting part and the recess part are disposed is limited. Those that influence the performance of an internal combustion engine are not limited to the exhaust system as described above, and an intake system can also influence the performance of an internal combustion engine, but since the intake system has a greater number of constituent components than does the exhaust system, there is a desire for a technique that makes exchange of a combination impossible in an arrangement where the degree of freedom in placement of a projecting part and a recess part and the degree of freedom in the design thereof are high.

[0005] The present invention has been accomplished in light of such circumstances, and it is an object thereof to provide an intake component attachment structure for a vehicular internal combustion engine that makes exchange of a combination impossible while ensuring a high degree of freedom in placement of a projecting part and a recess part and a high degree of freedom in the design thereof.

MEANS FOR SOLVING THE PROBLEMS

[0006] In order to attain the above object, according to a first aspect of the present invention, there is provided an intake component attachment structure for a vehicular internal combustion engine, in which among a plurality of intake components forming an intake system of an internal combustion engine mounted on a vehicle, a proper combination of intake components that are attached to each other is specifically set so that modification thereof is impossible, characterized in that in an area where a first intake component made of a metal and a second intake component made of a resin are joined, a projecting part is provided on one of the first and second intake components, and a recess part is provided in the other of the first and second intake components, the projecting part being fitted into the recess part at the time of the proper combination.

[0007] According to a second aspect of the present invention, in addition to the first aspect, the first intake component is a throttle device that regulates an amount of air taken in, the second intake component is an air cleaner case that is attached to the throttle device, and the projecting part is provided on the air cleaner case.

[0008] According to a third aspect of the present invention, in addition to the second aspect, a plurality of the projecting parts having a plurality of types of shape are provided on the air cleaner case, and a plurality of recess parts corresponding to these projecting parts are provided in the throttle device.

[0009] According to a fourth aspect of the present invention, in addition to the third aspect, the single air cleaner case, which is common to the plurality of intake passages, is attached to the throttle device, which have a plurality of intake passages disposed side by side, the projecting part, which is formed into a flat plate shape bridging between adjacent intake passages among the plurality of intake passages, is provided on the air cleaner case, and the recess part is provided in the throttle device with the projecting part fitted thereinto.

[0010] According to a fifth aspect of the present invention, in addition to the fourth aspect, a fitting member that is a member separate from the air cleaner case is nondetachably fitted and fixed to a selected fitting recess part among a plurality of fitting recess parts provided in the air cleaner case so that part of the fitting member projects toward the throttle device side as the projecting part.

[0011] According to a sixth aspect of the present invention, in addition to the fifth aspect, a plurality of the fitting members are nondetachably fitted and fixed to a plurality of selected fitting recess parts among the fitting recess parts provided in the air cleaner case in a larger number than there are the fitting members.

[0012] According to a seventh aspect of the present

invention, in addition to any one of the second to fourth aspects, a remaining projecting part, excluding a selected and specified projecting part among the plurality of projecting parts formed integrally with the air cleaner case, is cut off.

[0013] Moreover, according to an eighth aspect of the present invention, in addition to the first aspect, the first intake component is a throttle device that regulates the amount of air taken in, and the second intake component is a connecting member made of a resin that provides a connection between the throttle device and a cylinder head.

EFFECTS OF THE INVENTION

[0014] In accordance with the first aspect of the present invention, since the projecting part provided on one of the first intake component, which is made of a metal, and the second intake component, which is made of a resin, fits into the recess part provided in the other of the first and second intake components when they are in a properly combined state, compared with a case in which a projecting part and a recess part are disposed in joining parts of components made of a metal, it becomes possible to make exchange with an improper intake component impossible while ensuring a degree of freedom in the placement and a degree of freedom in the design of the projecting part or the recess part on the second component side, which is made of a resin.

[0015] Furthermore, in accordance with the second aspect of the present invention, since the recess part is provided in the throttle device, which is made of a metal, and the projecting part is provided on the air cleaner case, which is made of a resin, it is possible to make it easy to integrally form the projecting part when die molding the air cleaner case, which is made of a resin, thus enabling the recess part to be freely formed in the throttle device, which is made of a metal, by for example machining and thereby ensuring a degree of freedom in placement.

[0016] In accordance with the third aspect of the present invention, due to the plurality of projecting parts having a plurality of types of shapes being provided on the air cleaner case, it is possible to prevent erroneous assembly due to misalignment of assembly from occurring for example even when a plurality of recess parts are disposed so as to be adjacent to each other.

[0017] In accordance with the fourth aspect of the present invention, since the projecting part provided on the air cleaner case is formed into a flat plate shape that bridges between adjacent intake passages among the plurality of intake passages of the throttle device, it is possible to enhance the stiffness of the projecting part.

[0018] In accordance with the fifth aspect of the present invention, since the fitting member, which is separate from the air cleaner case, is nondetachably fitted and fixed to the fitting recess part selected from among the plurality of fitting recess parts provided in the air cleaner case so that part of the fitting member projects as the projecting part, it becomes easy to change the position of the projecting part according to the recess part on the throttle device side.

[0019] In accordance with the sixth aspect of the present invention, since the fitting members are nondetachably fitted and fixed to the plurality of fitting recess parts selected from the fitting recess parts provided in the air cleaner case at a larger number than there are fitting members, it is possible to easily change the shape and positioning pattern of the projecting portions.

[0020] In accordance with the seventh aspect of the present invention, since the remaining projecting part, excluding the specified projecting part among the plurality of projecting parts formed integrally with the air cleaner case, has been cut off, and the specified projecting part is fitted into the recess part on the throttle device side, when an air cleaner case is used in common for a plurality of types of throttle devices, it is possible to easily change the position of the projecting part so as to match the throttle device during a process of assembling the throttle device and the air cleaner case.

[0021] Furthermore, in accordance with the eighth aspect of the present invention, in addition to making exchange impossible by a combination of a recess part and a projecting part between the throttle device and the connecting member, which is made of a resin and provides a connection between the throttle device and the cylinder head, it is possible to easily form the recess part or the projecting part by utilizing the connecting member, which has a degree of freedom in shape.

BRIEF DESCRIPTION OF DRAWINGS

[0022]

FIG. 1 is a left side view of a two-wheeled motor vehicle of a first embodiment. (first embodiment)

FIG. 2 is an enlarged vertical sectional side view of an essential part of FIG. 1. (first embodiment)

FIG. 3 is a perspective view of an air cleaner case and a throttle device of a low output system. (first embodiment)

FIG. 4 is a sectional view showing the air cleaner case and the throttle device of the low output system along line 4-4 in FIG. 3. (first embodiment)

FIG. 5 is a perspective view of an air cleaner case and a throttle device of a high output system. (first embodiment)

FIG. 6 is a vertical sectional view of the throttle device shown to compare the low output system (a) and the high output system (b). (first embodiment)

FIG. 7 is a sectional view showing a throttle device and an air cleaner case of a second embodiment. (second embodiment)

FIG. 8 is a sectional view showing a throttle device and an air cleaner case of a third embodiment. (third embodiment)

FIG. 9 is a sectional view showing a throttle device

and an air cleaner case of a fourth embodiment. (fourth embodiment)

FIG. 10 is a perspective view showing a throttle body and an insulator of a fifth embodiment. (fifth embodiment)

EXPLANATION OF REFERENCE NUMERALS AND SYMBOLS

[0023]

33 Intake system
37A, 67, 72 Throttle device, which is first intake component
40A Intake passage
41A, 68, 80 Air cleaner case, which is second intake component
58, 59, 71a, 77a, 78a, 81, 87 Projecting part
60, 61, 70, 73, 74, 75, 76, 88 Recess part
69 Fitting recess part
71, 77, 78 Fitting member
86 Insulator, which is connecting member
85 Throttle body, which is throttle device
E Internal combustion engine

MODES FOR CARRYING OUT THE INVENTION

[0024] Embodiments of the present invention are explained by reference to the attached drawings. In the explanation below, the up-and-down, front-and-rear, and left-and-right are directions when viewed by an occupant riding a two-wheeled motor vehicle.

FIRST EMBODIMENT

[0025] First, a first embodiment of the present invention is explained by reference to FIG. 1 to FIG. 6; in FIG. 1, a vehicle body frame F of a two-wheeled motor vehicle includes a head pipe 13 steerably supporting a front fork 11 that axially supports a front wheel WF and handlebars 12 that are linked to the front fork 11, a pair of left and right main frames 14 extending downward to the rear from the head pipe 13, a pair of left and right pivot frames 15 connected integrally to a rear part of the main frame 14 and extending downward, and a pair of left and right seat rails 16 extending upward to the rear from the rear part of the main frame 14.

[0026] Supported on the vehicle body frame F is an engine main body 19 of an internal combustion engine E disposed beneath the main frame 14. Furthermore, a front end part of a swing arm 20 axially supporting, via its rear end part, a rear wheel WR driven by power exerted by the internal combustion engine E is supported on the pivot frame 15 so that it can swing in the up-and-down direction.

[0027] A fuel tank 21 is mounted on the main frame 14 above the internal combustion engine E, and a rider's front seat 22 disposed to the rear of the fuel tank 21 and a rider's rear seat 22 disposed further to the rear of the rider's front seat 22 are supported by means of the seat rail 16.

[0028] The head pipe 13 of a front end part of the vehicle body frame F is covered from the front by means of a front cowl 25 that is supported on the vehicle body frame F so as to be disposed directly above the front wheel WF, a pair of left and right center cowls 26 covering from the side a front part of the vehicle body frame F and part of the internal combustion engine E are connectedly provided on left and right sides of the front cowl 25, and a pair of left and right lower cowls 27 that cover a lower part of the internal combustion engine E from the side and below and are joined to each other are each connectedly provided on a lower part on the rear side of the center cowl 26. Furthermore, a pair of left and right side covers 28 covering the lower part on the rear side of the fuel tank 21 from opposite sides are provided between the fuel tank 21 and the rider's front seat 22, a portion, disposed beneath the rider's rear seat 23, of the seat rail 16 is covered by a rear cowl 29, and the fuel tank 21 is covered by a tank cover 30.

[0029] In FIG. 2, the internal combustion engine E is formed as a multicylinder engine with for example four cylinders, and the engine main body 19 of this internal combustion engine E is mounted on the vehicle body frame F with its cylinder axis C inclined forward. A rear wall 31a of a cylinder head 31 forming part of the engine main body 19 faces obliquely upward to the rear due to the cylinder axis C being inclined forward, and an air intake connecting pipe part 33 forming part of an air intake port 32 of each cylinder is formed integrally with the rear wall 31a so as to project obliquely upward to the rear.

[0030] An intake system 34 connected to the cylinder head 31 includes an air cleaner 36 covered by the fuel tank 21 and disposed above the head cover 31, a throttle device 37A having its upstream end connected to the air cleaner 36, and an insulator 38 joining the throttle device 37A and the connecting pipe part 33 on the air intake side.

[0031] Referring in addition to FIG. 3, the throttle device 37A has a pair of throttle bodies 39A, made of a metal, arranged side by side from the left side to the right side and fastened to each other in a state in which it is mounted on the two-wheeled motor vehicle. These throttle bodies 39A each have a pair of intake passages 40A, and the throttle device 37A has four intake passages 40A disposed side by side so as to correspond to the respective cylinders of the four-cylinder engine main body 19.

[0032] Referring to FIG. 2, an air cleaner case 41A of the air cleaner 36 includes a lower case 42A made of a resin and an upper case 43 made of a resin and joined to the lower case 42A so as to cover the lower case 42A from above, and a cleaner element 47 is disposed within the air cleaner 41A so as to partition the interior of the air cleaner case 41A into an uncleaned chamber 45 and a cleaned chamber 46.

[0033] Connected to the throttle device 37A is an air funnel 48 individually corresponding to the respective in-

take passage 40A. The lower case 42A in the air cleaner case 41A of the air cleaner 36 is fastened to the upper end of the throttle device 37A so that the air funnel 48 protrudes into the cleaned chamber 46.

[0034] Pivotably and axially supported on the throttle body 39A is a valve shaft 49 that transects the intake passage 40A and to which is secured a throttle valve 50A disposed within the intake passage 40A, and supported on the throttle device 37A is an actuator 52 containing an electric motor 51 that exerts power for pivoting the valve shaft 49. A fuel injection valve 53 individually corresponding to the respective intake passage 40A is attached to a side face, on the side opposite to the cylinder head 31, of the throttle device 37A, and the fuel injection valves 53 are connected in common to a fuel rail 54.

[0035] A fitting projection part 54 surrounding the upstream end, on the air cleaner 36 side, of a pair of the intake passages 40A is projectingly provided on the throttle body 39A in the throttle device 37A so as to face the lower case 42A side of the air cleaner case 41A. Formed in the lower case 42A are a circular opening 55 individually corresponding to the intake passage 40A and a fitting recess part 56 surrounding a pair of the openings 55 so that the fitting projection part 54 is fitted into the fitting recess part 56.

[0036] The throttle device 37A and the air cleaner case 41A are formed so as to correspond to a low output internal combustion engine E, and as shown in FIG. 5 a throttle device 37B and an air cleaner case 41B are used for a high output internal combustion engine E.

[0037] The throttle device 37B for high output has a pair of throttle bodies 39B that each have a pair of intake passages 40B and are fastened to each other, and the valve shaft 49, which transects the respective intake passage 40B and to which is secured the throttle valve 50B disposed within the respective intake passage 40B, is pivotably and axially supported on the throttle body 39B, the actuator 52 for pivoting the valve shaft 49 being supported on the throttle device 37B. Furthermore, the fuel injection valve 53 individually corresponding to the respective intake passage 40B is attached to a side face, on the side opposite to the cylinder head 31, of the throttle device 37B, and these fuel injection valves 53 are connected in common to the fuel rail 54.

[0038] Here, the throttle device 37A for low output is shown in FIG. 6 (a) and the throttle device 37B for high output is shown in FIG. 6 (b), the two being compared; a point of difference between the throttle device 37A for low output and the throttle device 37B for high output is that an internal diameter DA of the intake passage 40A in the throttle body 39A of the throttle device 37A for low output is set smaller than an internal diameter DB of the intake passage 40B in the throttle body 39B of the throttle device 37B for high output; with regard to the dimensions of a part of the air cleaner cases 41A and 41B that is attached to the lower cases 42A and 42B, that is, the fitting projection part 55, the dimensions and shape are identical between the throttle device 37A for low output and the throttle device 37B for high output. Therefore, in order to make impossible a modification in which the throttle device 37B for high output is attached to the air intake device 33 in place of the throttle device 37A for low output, in parts of the throttle device 37A, which is a first intake component made of a metal, and the air cleaner case 41A, which is a second intake component made of a resin, that are joined, projecting parts 58 and 59 are provided on one of the throttle device 37A and the air cleaner case 41A, and recess parts 60 and 61 are provided in the other of the throttle device 37A and the air cleaner case 41A, the projecting parts 58 and 59 being fitted into the recess parts 60 and 61 at the time of a proper combination.

[0039] A pair of the projecting parts 58 and the projecting part 59 are provided on the lower case 42A of the air cleaner case 41A, which is made of a resin. Moreover, a plurality of the projecting parts 58, 59 having a plurality of types, for example two types of shapes, are provided integrally with the lower case 42A, and a plurality of recess parts 60 and 61 corresponding to the projecting parts 58 and 59 are provided in the throttle device 37A.

[0040] The throttle device 37A has a plurality of, for example four, intake passages 40A disposed side by side, two of the projecting parts 58 formed into a flat plate shape so as to bridge between two adjacent intake passage 40A among the intake passages 40A are provided on the lower case 42A of the air cleaner case 41A, and four recess parts 60 formed into a groove shape so that these projecting parts 58 are fitted thereinto are formed in a face, opposing the lower case 42A, of the throttle body 39A of the throttle device 37A.

[0041] Furthermore, the projecting part 59 has a shape that is different from that of the projecting part 58; in this embodiment it is formed into a pin shape and is projectingly provided on the lower case 42A, and a circular recess part 61 into which the projecting part 59 is fitted is formed in a face, opposing the lower case 42A, of the throttle body 39A of the throttle device 37A.

[0042] On the other hand, as shown in FIG. 5, parts of the throttle device 37B for high output and the air cleaner case 41B that are joined are not provided with a structure in which a projecting part and a recess part are fittingly combined as described above.

[0043] The operation of this first embodiment is now explained; since in the parts of the throttle device 37A, which is the first intake component made of a metal, and the air cleaner case 41A, which is the second intake component made of a resin, that are joined, the projecting part 58, 59 is provided on one of the throttle device 37A and the air cleaner case 41A, and the recess part 60, 61 is provided in the other of the throttle device 37A and the air cleaner case 41A, the projecting part 58, 59 being fitted into the recess part 60, 61 at the time of a proper combination, compared with a case in which a projecting part and a recess part are disposed in joining parts of components made of a metal, it becomes possible to make exchange with an improper intake component im-

possible while ensuring a degree of freedom in the placement and a degree of freedom in the design of the projecting part 58, 59 or the recess part of the air cleaner case 41A, which is made of a resin.

[0044] Moreover, since the projecting part 58, 59 is provided on the air cleaner case 41A, it is possible to make it easy to integrally form the projecting part 58, 59 when die molding the air cleaner case 41A, thus enabling the recess part 59, 60 to be freely formed in the throttle device 37A, which is made of a metal, by for example machining and thereby ensuring a degree of freedom in placement.

[0045] Furthermore, since the plurality of the projecting parts 58 and 59 having the plurality of types of, for example two, shapes are provided on the air cleaner case 41A, and the plurality of recess parts 60 and 61 corresponding to the projecting parts 58 and 59 are provided in the throttle device 37A, it is possible to prevent erroneous assembly due to misalignment of assembly from occurring for example even when a plurality of recess parts 60 and 61 are disposed so as to be adjacent to each other.

[0046] Moreover, since the throttle device 37A has a plurality of, for example four, intake passages 40A disposed side by side, the two projecting parts 58 formed into a flat plate shape so as to bridge between the two adjacent intake passage 40A among the intake passages 40A are provided on the air cleaner case 41A, and the recess parts 60 formed into a groove shape so that these projecting parts 58 are fitted thereinto are formed in the throttle device 37A, it is possible to enhance the stiffness of the projecting part 59.

[0047] Furthermore, as shown by a chain line in FIG. 4, a projecting part 63 may be projectingly provided on an inner face of one of the lower case 42A of the air cleaner case 41A and the air funnel 48 for low output, for example the lower case 42A, and a plate 65 having a fitting hole 64 into which the projecting part 63 is fitted may be provided on the air funnel 48 for low output, and by so doing erroneous assembly of the air funnel for high output can be avoided.

SECOND EMBODIMENT

[0048] A second embodiment of the present invention is explained by reference to FIG. 7; a plurality of, for example four, fitting recess parts 69 are provided in an air cleaner case 68 made of a resin, a fitting member 71 that is a member separate from the air cleaner case 68 is nondetachably fitted and fixed to one of the four fitting recess parts 69 selected so as to correspond to a recess part 70 provided in a throttle device 67 made of a metal, part of the fitting member 71 protrudes from the air cleaner case 68 as a projecting portion 71a, and the projecting portion 71a is fitted into the recess part 70.

[0049] In accordance with the second embodiment, it becomes easy to change the position of the projecting portion 71a according to the recess part 70 on the throttle device 67 side.

THIRD EMBODIMENT

[0050] A third embodiment of the present invention is explained by reference to FIG. 8; with regard to an air cleaner case 68 made of a resin, a plurality of, for example two, fitting members 77, 78 are nondetachably fitted and fixed to two selected fitting recess parts 69 among the fitting recess parts 69 provided in the air cleaner case 68 in a larger number than there are fitting members 77, 78. On the other hand, as shown in FIG. 8 (a) to (d), fitting recess parts 73 to 76 may be provided in a throttle device 72 made of a metal at two locations selected from the four fitting recess parts 69 according to the number of fitting members 77, 78, and projecting portions 77a, 78a projecting from the air cleaner case 68 as part of the fitting members 77, 78 are fitted into two of the fitting recess parts 73 to 76.

[0051] In accordance with the third embodiment, since the fitting members 77, 78 are nondetachably fitted and fixed to the plurality of fitting recess parts 69 selected from the plurality of fitting recess parts 69 provided in the air cleaner case, it is possible to easily change the shape and positioning pattern of the projecting portions 77a, 78a.

FOURTH EMBODIMENT

[0052] A fourth embodiment of the present invention is explained by reference to FIG. 9; as shown in FIG. 9 (a), a plurality of, for example four, projecting parts 81 are formed integrally with an air cleaner case 80 made of a resin, and among the projecting parts 81 a remaining projecting part 81, excluding a specific projecting part 81 selected according to a recess part (not illustrated) provided in the throttle device (not illustrated), is cut off as shown in FIG. 9 (b).

[0053] In accordance with the fourth embodiment, when an air cleaner case 80 is used in common for a plurality of types of throttle devices, it is possible to easily change the position of the projecting part 81 so as to match the throttle device during a process of assembling the throttle device and the air cleaner case 80.

FIFTH EMBODIMENT

[0054] FIG. 10 shows a fifth embodiment of the present invention; in a part where a throttle body 85 made of a metal, which is a throttle device, and an insulator 86, which is a connecting member, made of a resin, providing a connection between cylinder heads, are joined, a projecting part 87 formed integrally with one of the throttle body 85 and the insulator 86, for example the throttle body 85, is fitted into a recess part 88 provided in an ear portion 86a formed integrally with for example the insulator 86 among the throttle body 85 and the insulator 86.

[0055] In accordance with fifth embodiment, in addition to making exchange impossible by a combination of a recess part and a projecting part between the throttle

body 85 and the insulator 86, which is made of a resin and provides a connection between the throttle body 85 and the cylinder head, it is possible to easily form the recess part 88 or the projecting part by utilizing the resin insulator 86, which has a degree of freedom in shape.

[0056] Embodiments of the present invention are explained above, but the present invention is not limited to the above embodiments and may be modified in a variety of ways as long as the modifications do not depart from the spirit and scope thereof.

Claims

1. An intake component attachment structure for a vehicular internal combustion engine, in which among a plurality of intake components forming an intake system (33) of an internal combustion engine (E) mounted on a vehicle, a proper combination of intake components that are attached to each other is specifically set so that modification thereof is impossible, **characterized in that** in an area where a first intake component (37A, 67, 72, 85) made of a metal and a second intake component (41A, 68, 80, 86) made of a resin are joined, a projecting part (58, 59, 71a, 77a, 78a, 81, 87) is provided on one of the first and second intake components (37A, 67, 72, 85; 41A, 68, 80, 86), and a recess part (60, 61, 70, 73, 74, 75, 76, 88) is provided in the other of the first and second intake components (37A, 67, 72, 85; 41A, 68, 80, 86), the projecting part (58, 59, 71a, 77a, 78a, 81, 87) being fitted into the recess part (60, 61, 70, 73, 74, 75, 76, 88) at the time of said proper combination.

2. The intake component attachment structure for a vehicular internal combustion engine according to Claim 1, wherein the first intake component is a throttle device (37A, 67, 72) that regulates an amount of air taken in, the second intake component is an air cleaner case (41A, 68, 80) that is attached to the throttle device (37A, 67, 72), and the projecting part (58, 59, 71a, 77a, 78a, 81) is provided on the air cleaner case (41A, 68, 80).

3. The intake component attachment structure for a vehicular internal combustion engine according to Claim 2, wherein a plurality of the projecting parts (58, 59) having a plurality of types of shape are provided on the air cleaner case (41A), and a plurality of recess parts (60, 61) corresponding to these projecting parts (58, 59) are provided in the throttle device (37A).

4. The intake component attachment structure for a vehicular internal combustion engine according to Claim 3, wherein the single air cleaner case (41A), which is common to the plurality of intake passages (40A), is attached to the throttle device (37A), which have a plurality of intake passages (40A) disposed side by side, the projecting part (58), which is formed into a flat plate shape bridging between adjacent intake passages (40A) among the plurality of intake passages (40A), is provided on the air cleaner case (41A), and the recess part (60) is provided in the throttle device (37A) with the projecting part (58) fitted thereinto.

5. The intake component attachment structure for a vehicular internal combustion engine according to Claim 4, wherein a fitting member (71, 77, 78) that is a member separate from the air cleaner case (68) is nondetachably fitted and fixed to a selected fitting recess part (69) among a plurality of fitting recess parts (69) provided in the air cleaner case (68) so that part of the fitting member (71, 77, 78) projects toward the throttle device (67, 72) side as said projecting part (71a, 77a, 78a).

6. The intake component attachment structure for a vehicular internal combustion engine according to Claim 5, wherein a plurality of the fitting members (77, 78) are nondetachably fitted and fixed to a plurality of selected fitting recess parts among the fitting recess parts (69) provided in the air cleaner case (68) in a larger number than there are said fitting members (77, 78).

7. The intake component attachment structure for a vehicular internal combustion engine according to any one of Claims 2 to 4, wherein a remaining projecting part (81), excluding a selected and specified projecting part (81) among the plurality of projecting parts (81) formed integrally with the air cleaner case (80), is cut off.

8. The intake component attachment structure for a vehicular internal combustion engine according to Claim 1, wherein the first intake component is a throttle device (85) that regulates the amount of air taken in, and the second intake component is a connecting member (86) made of a resin that provides a connection between the throttle device (85) and a cylinder head.

FIG.1

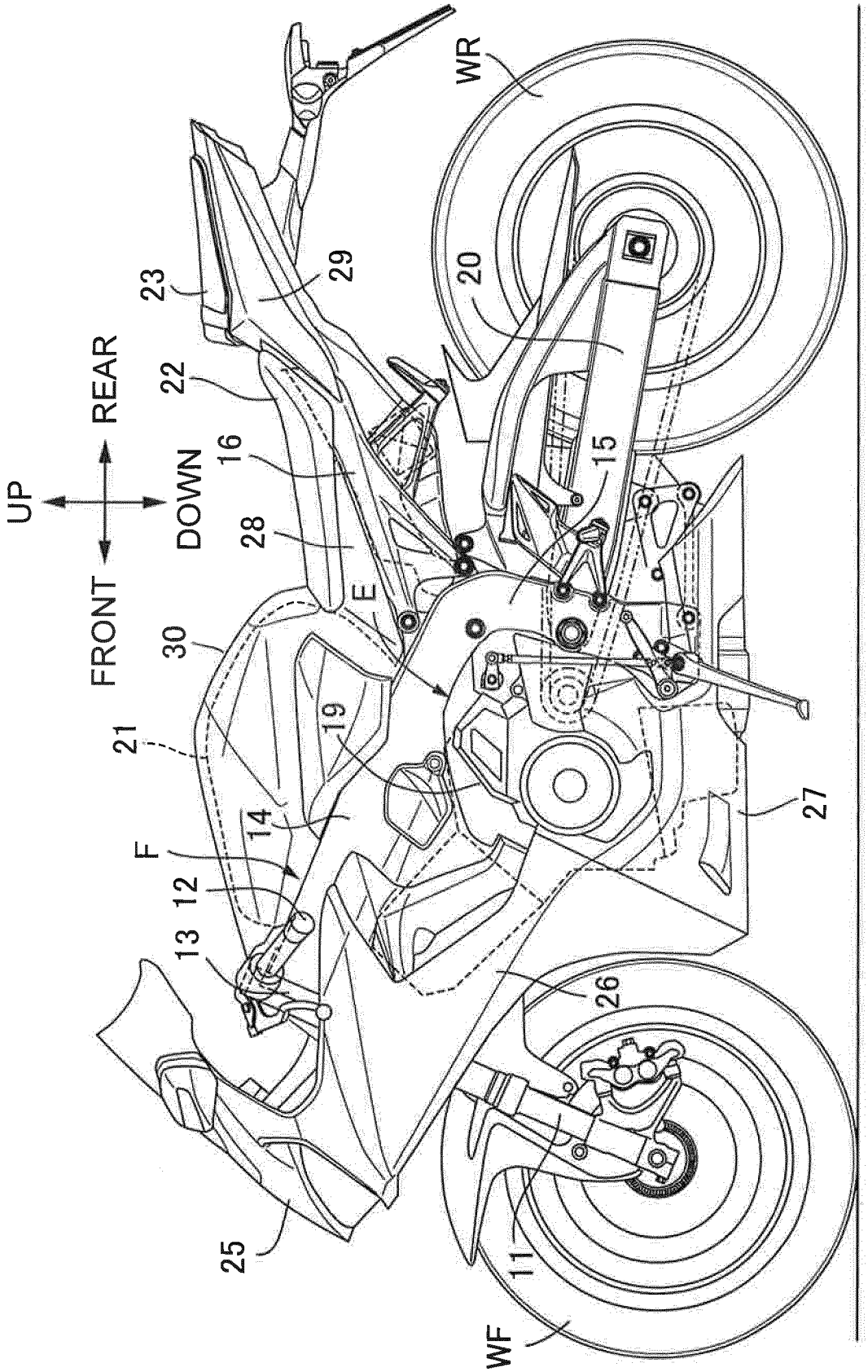
UP
REAR
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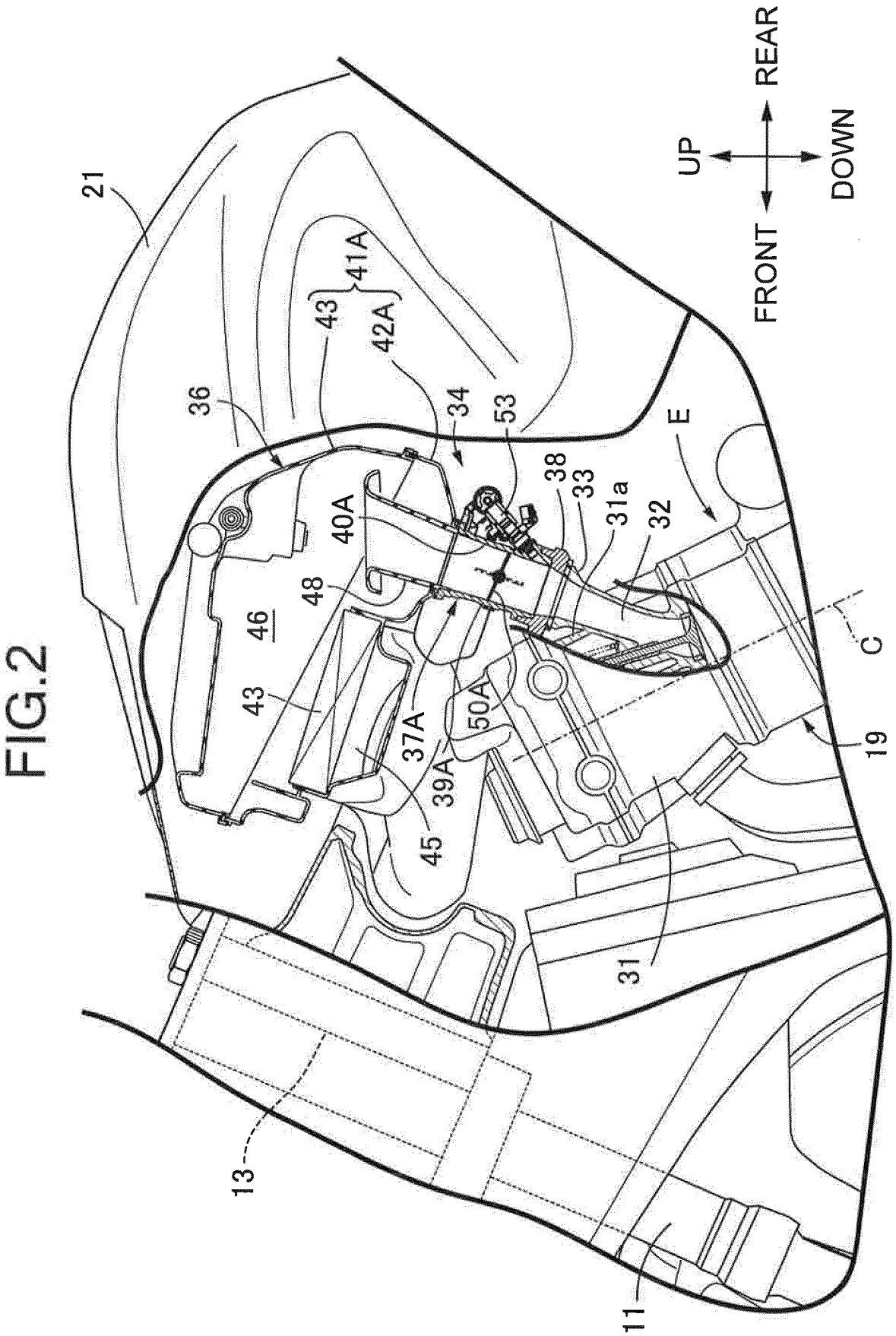
FIG.2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REAR
FRONT
DOWN
21
36
43
41A
42A
34
53
E
38
33
31a
32
40A
48
46
43
37A
50A
39A
45
C
19
31
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11

FIG.3

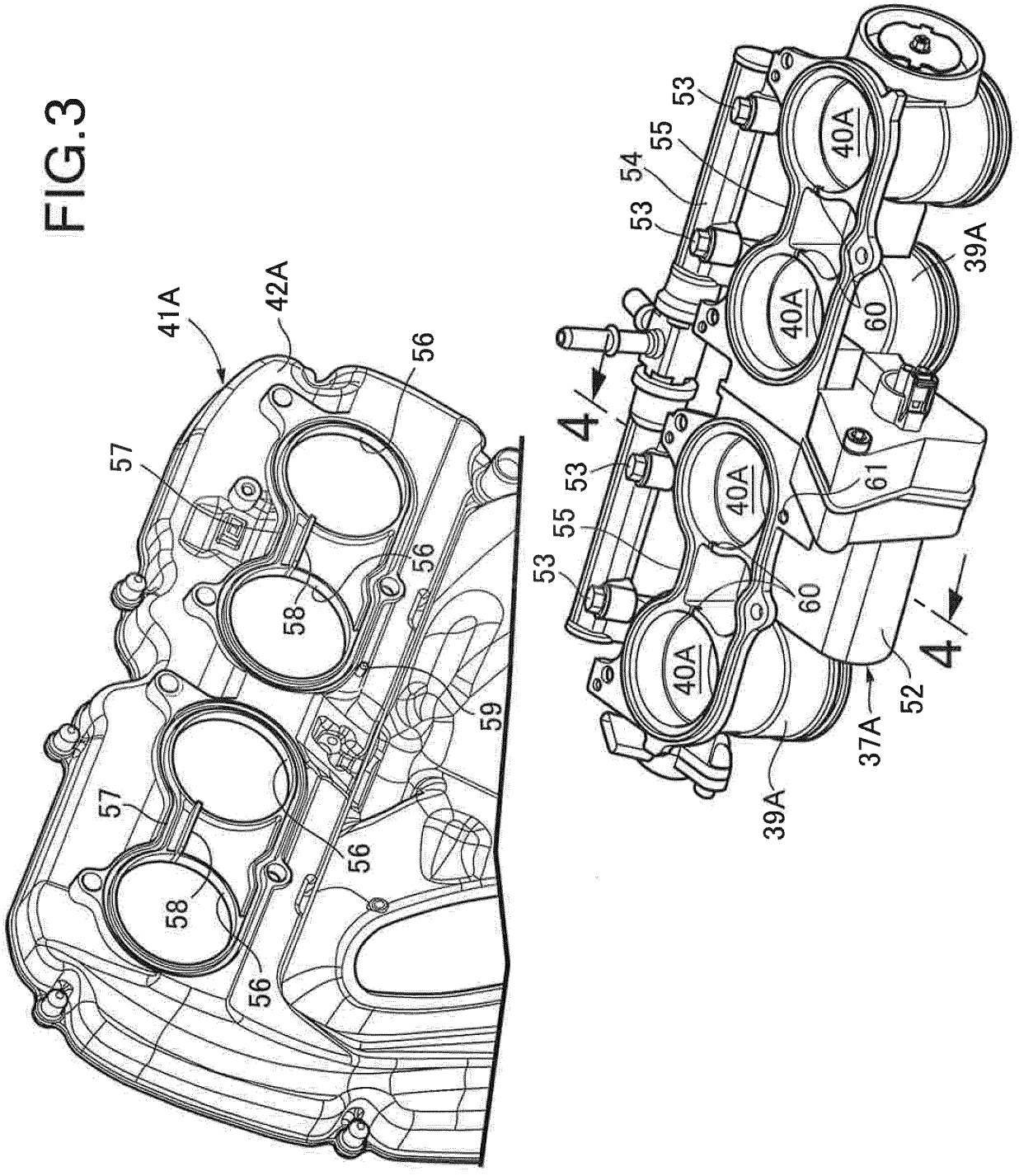


FIG.4

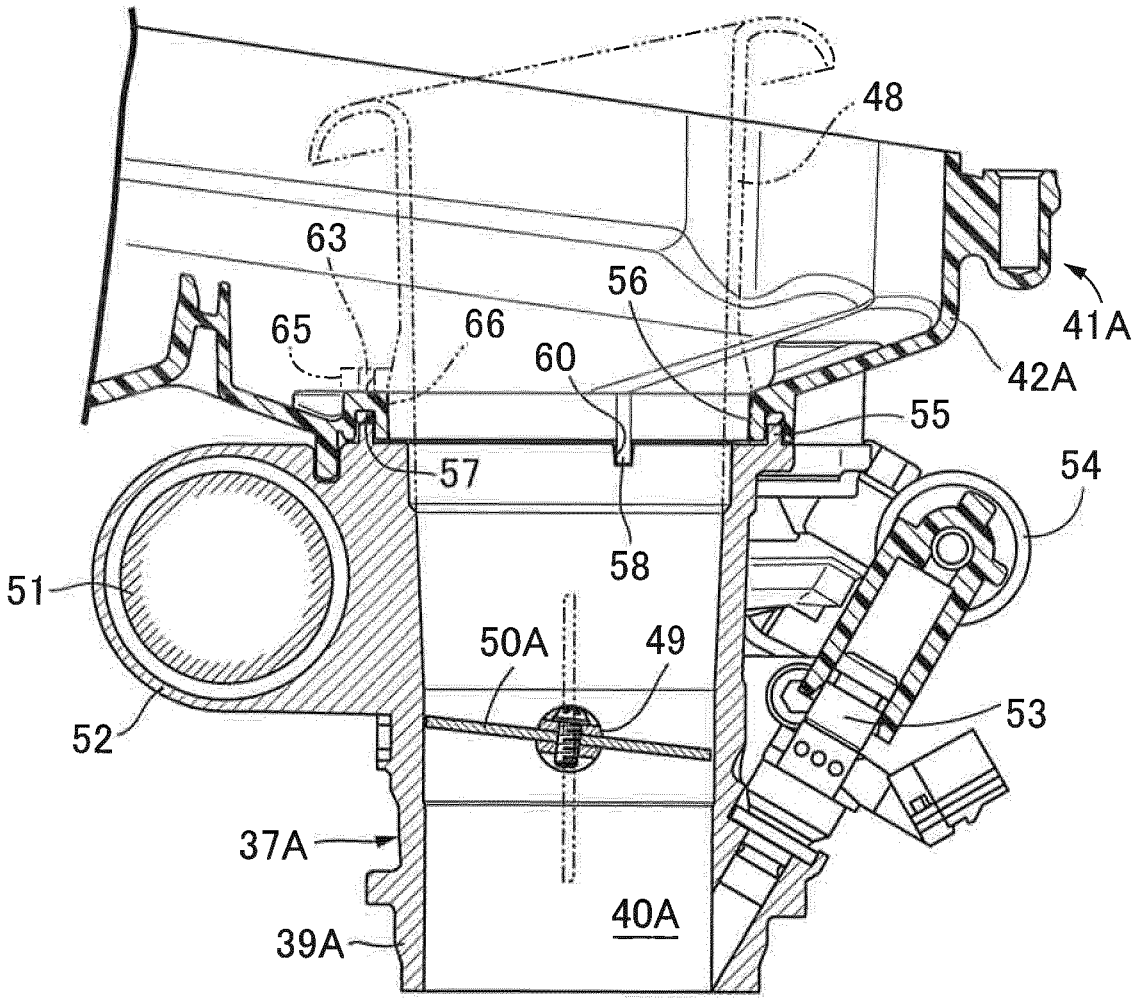
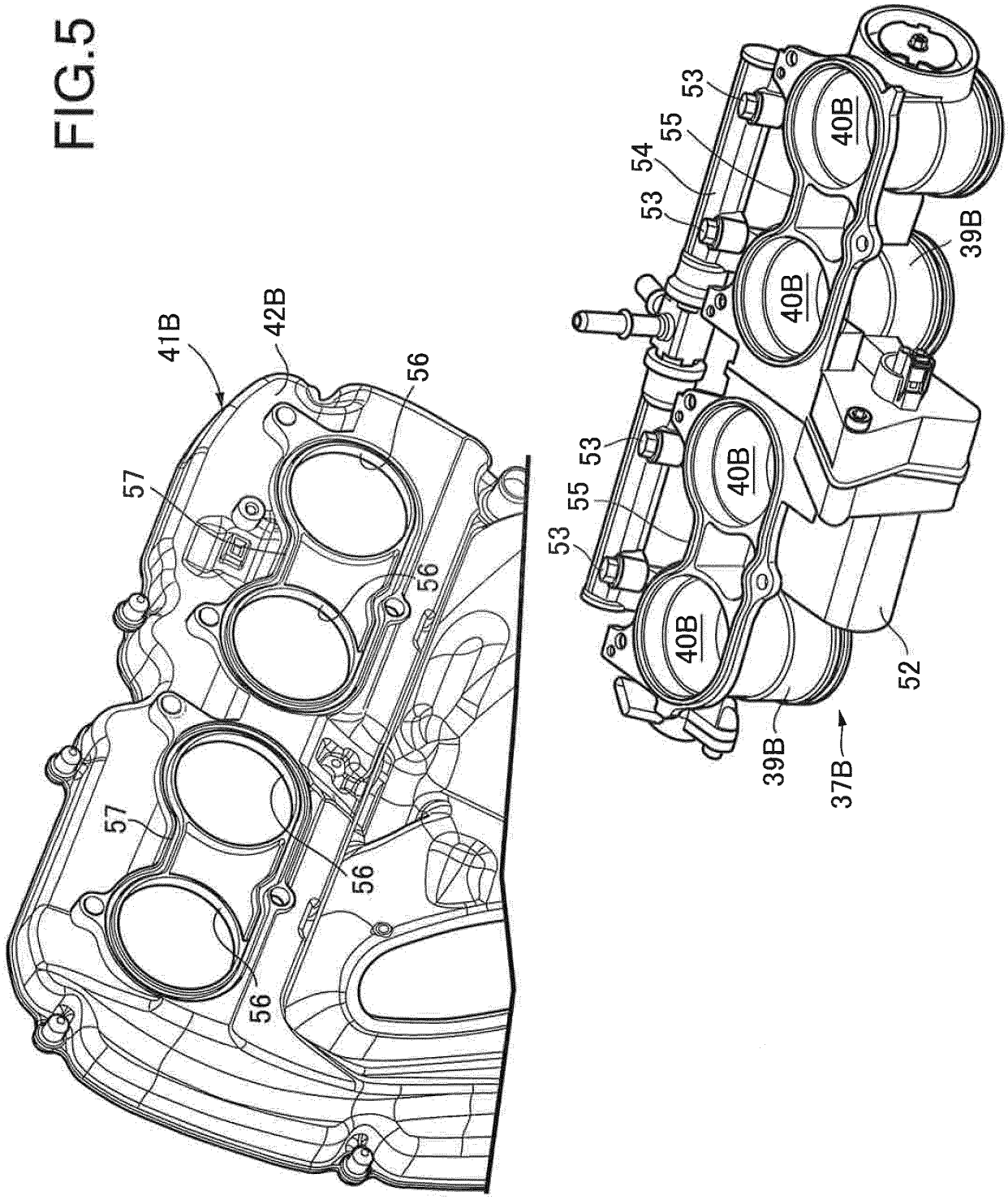


FIG.5


41B
42B
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40B
40B
39B
53
55
53
40B
40B
52
39B
37B

FIG.6

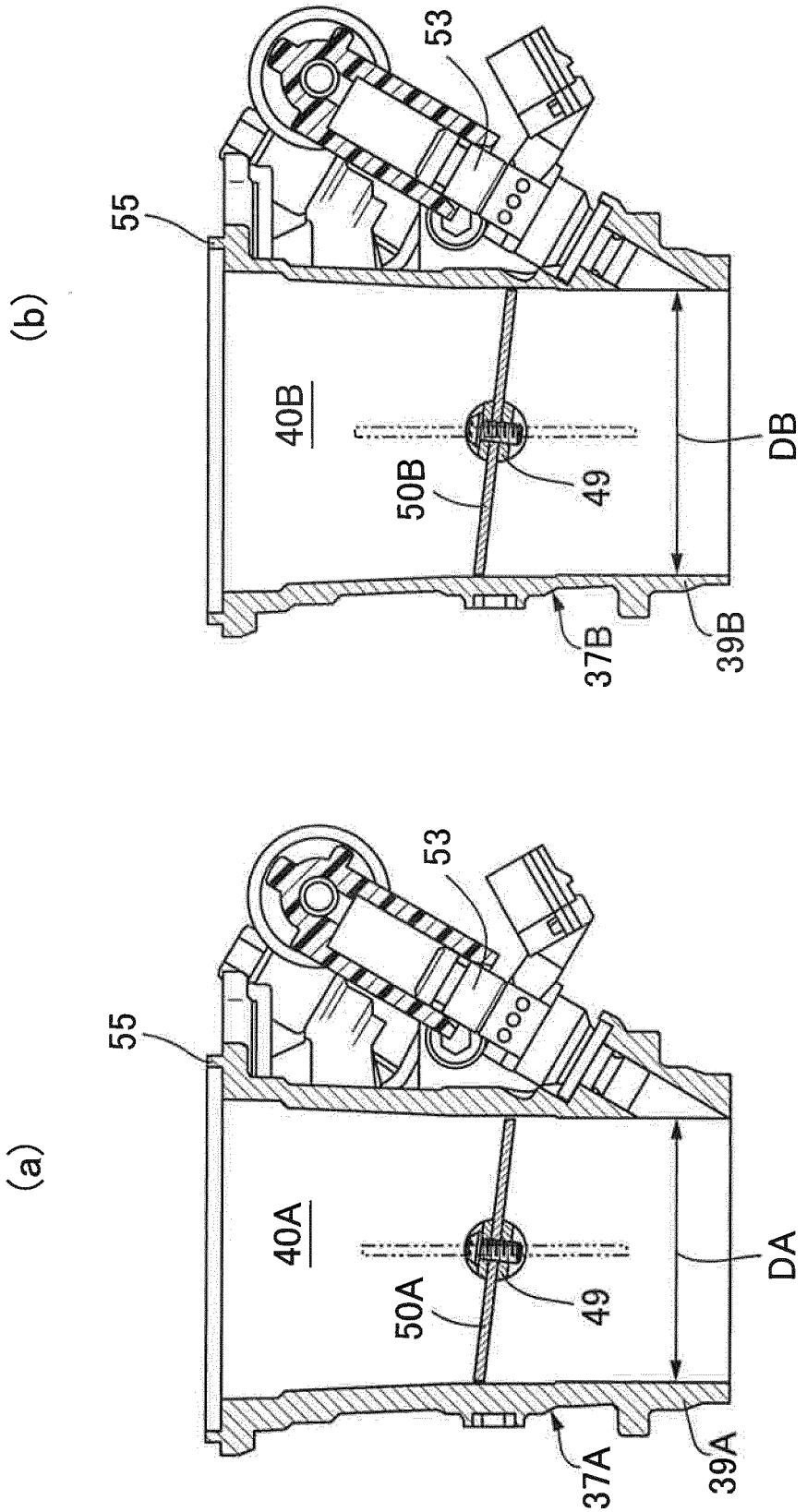


FIG.7

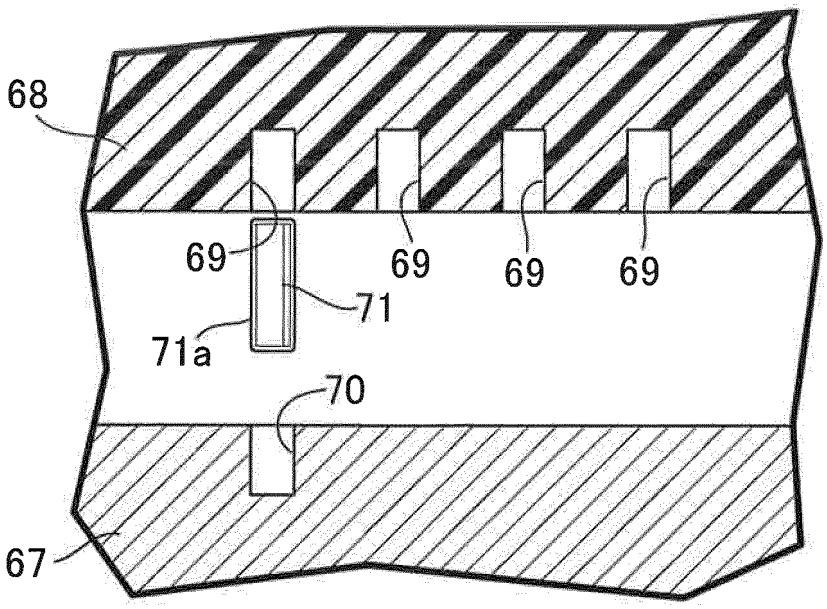
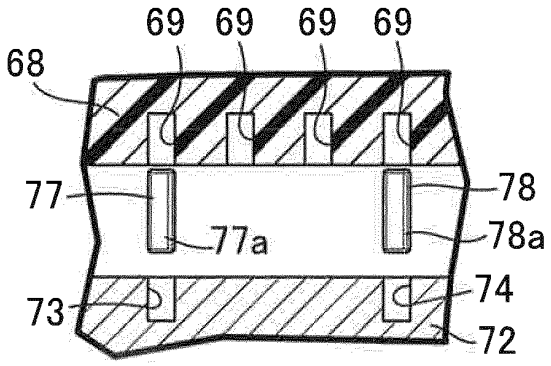


FIG.8

(a)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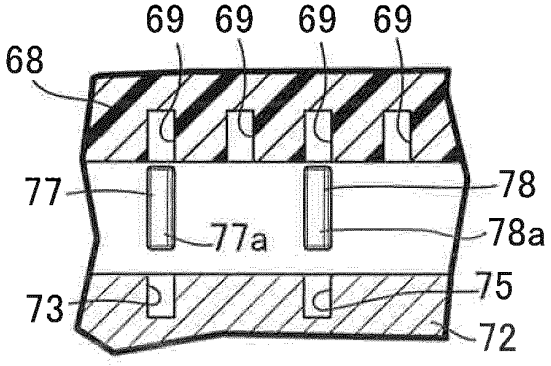
77a
78a
73
74
72

(b)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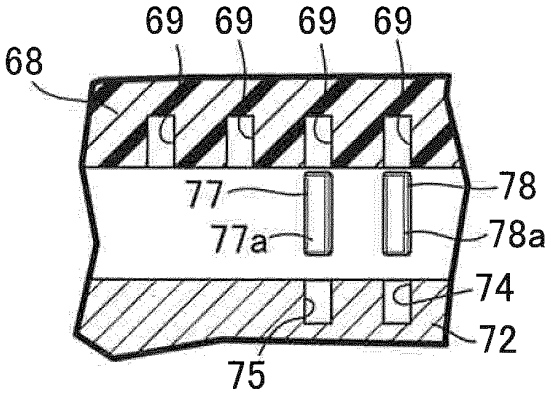
77a
78a
73
75
72

(c)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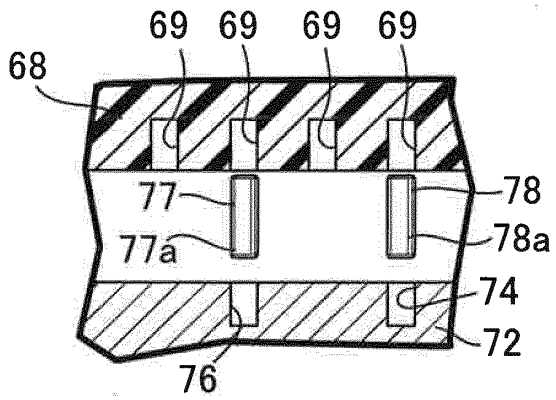
77a
78a
74
72
75

(d)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77a
78a
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72
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FIG.9

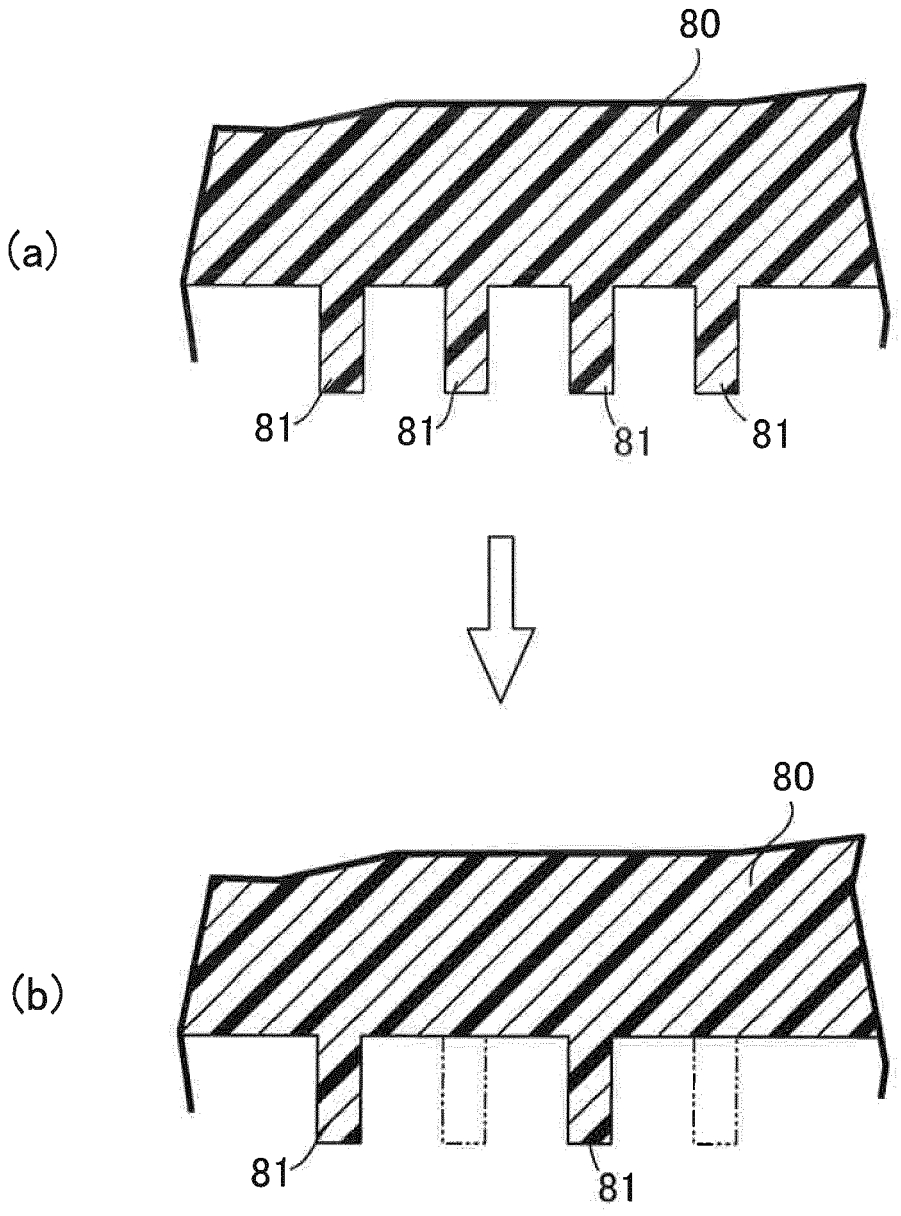
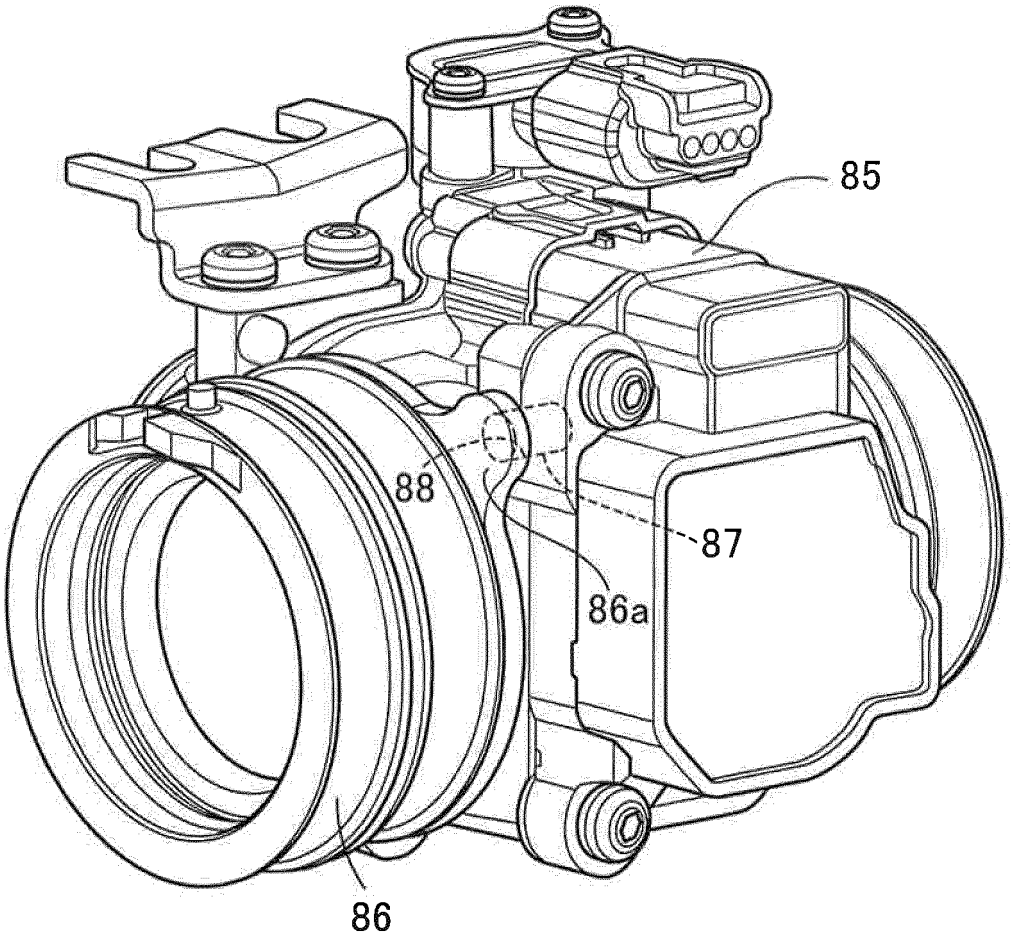


FIG.10



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2016/079025

A. CLASSIFICATION OF SUBJECT MATTER
F02M35/04(2006.01)i, *F02M35/10*(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F02M35/04, F02M35/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2016
Kokai Jitsuyo Shinan Koho	1971-2016	Toroku Jitsuyo Shinan Koho	1994-2016

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 11-173170 A (Denso Corp.), 29 June 1999 (29.06.1999), paragraphs [0014] to [0026], [0043] to [0045]; fig. 9 to 13 (Family: none)	1-3 4-8
Y A	JP 2012-177349 A (Mazda Motor Corp.), 13 September 2012 (13.09.2012), paragraphs [0020] to [0042]; fig. 2, 12, 14, 15 & DE 202012001824 U & CN 202545074 U	1-4,8 5-7
Y A	JP 2010-59894 A (Yamaha Motor Co., Ltd.), 18 March 2010 (18.03.2010), paragraphs [0010] to [0035]; fig. 1 to 13 (Family: none)	1-4 5-8

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
21 November 2016 (21.11.16)	06 December 2016 (06.12.16)

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3,Kasumigaseki,Chiyoda-ku, Tokyo 100-8915,Japan	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2016/079025

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2004-132233 A (Aisan Industry Co., Ltd.), 30 April 2004 (30.04.2004), paragraphs [0016] to [0040]; fig. 1 to 6 & US 2004-0123835 A1 paragraphs [0051] to [0081]; fig. 1 to 6 & EP 001408228 A1 & KR 10-2004-0032772 A	1,8
A	WO 2012/056650 A1 (Tanken Seal Seiko Co., Ltd.), 03 May 2012 (03.05.2012), paragraphs [0018] to [0052]; fig. 1, 5, 6 & KR 2013-0139885 A & CN 103201544 A	5
A	JP 2002-81589 A (NEC Kyushu Co., Ltd.), 22 March 2002 (22.03.2002), paragraphs [0007] to [0016]; fig. 1, 2 (Family: none)	6
A	JP 7-168430 A (Ricoh Co., Ltd.), 04 July 1995 (04.07.1995), paragraphs [0012] to [0024], [0031] to [0035]; fig. 1, 2, 13 (Family: none)	7

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Patent documents cited in the description

- JP 5973294 B **[0003]**