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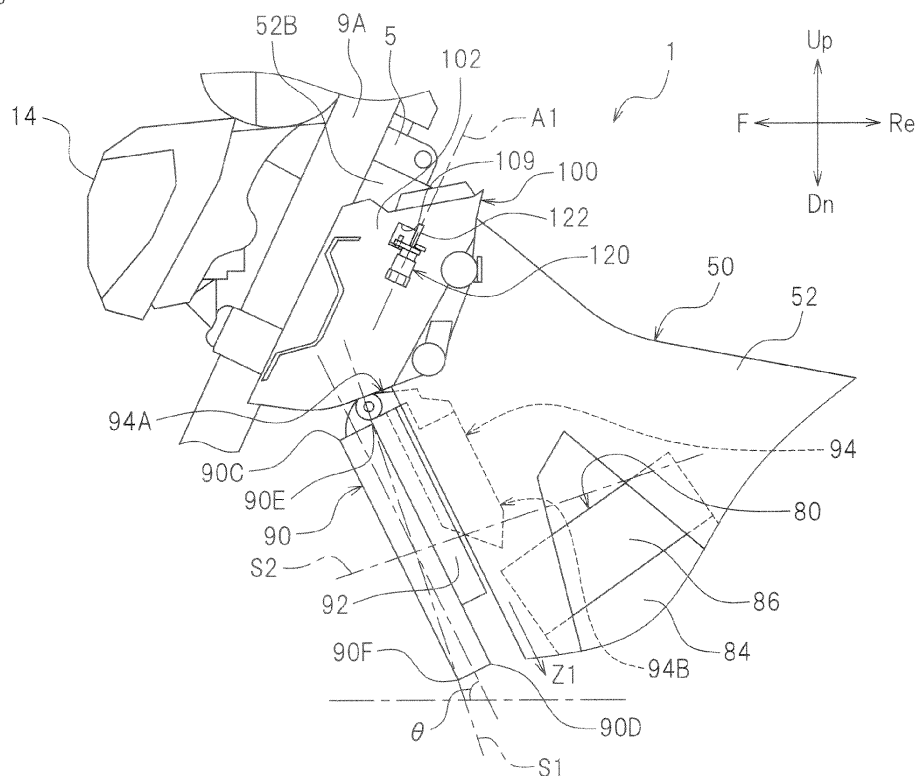
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(54) **Motorcycle**

(57) A motorcycle (1) has a body frame (50), a left frame cover (100) mounted to the body frame (50), and an intake air temperature sensor (120) having a rod-shaped sensor main unit (122) configured to measure the temperature of air. The left frame cover (100) has a

cover main body (102) having a surface. The intake air temperature sensor (120) is mounted to the left frame cover (100) so that the sensor main unit (122) is substantially parallel to the surface of the cover main body (102).

FIG.3



Description

[0001] The present invention relates to motorcycles.

[0002] In the field of motorcycles, it has been a common practice to detect the temperature of the air to be sucked into the engine, i.e., intake air temperature, by an intake air temperature sensor that is mounted to the vehicle body, as described in Patent Documents 1 and 2, for example.

[0003] The intake air temperature sensor at least has a rod-shaped sensor main unit for measuring the temperature of air. According to Patent Documents 1 and 2, the intake air temperature sensor is mounted to a vehicle body cover disposed in a front portion of the vehicle so that the sensor main unit is perpendicular to the surface of the vehicle body cover, and a portion of the sensor main unit is exposed outside of the vehicle body cover. A case for protecting the sensor main unit is secured to the vehicle body cover using a fastener element, such as a screw, to mount the intake air temperature sensor to the vehicle body cover. Patent Literature

[Patent Document 1] JP H11(1999)-165680 A

[Patent Document 2] JP 2003-72633 A

[0004] However, according to the techniques described in Patent Documents 1 and 2, the intake air temperature sensor is mounted substantially perpendicularly to the surface of the vehicle body cover, so the vehicle body cover needs to have a space therein for accommodating a rear portion of the intake air temperature sensor. When the axial length of the intake air temperature sensor is made longer, the location at which the intake air temperature sensor can be mounted will be limited, which means that the component layout is greatly restricted.

[0005] The present invention has been accomplished in view of the foregoing and other problems, and it is an object of the invention to provide a motorcycle having a higher degree of freedom in mounting the intake air temperature sensor to the vehicle body cover. Such an object is achieved by a motorcycle having the features of independent claim 1. Preferred embodiments are set out in the dependent claims.

[0006] The present invention provides a motorcycle comprising: a body frame; a frame cover mounted to the body frame; and an intake air temperature sensor comprising a rod-shaped sensor main unit configured to measure the temperature of air, wherein: the frame cover has a cover main body having a surface; and the intake air temperature sensor is mounted to the frame cover so that the sensor main unit is substantially parallel to the surface of the cover main body.

[0007] In a motorcycle according to the present invention, the intake air temperature sensor is disposed substantially parallel to the surface of the cover main body of the frame cover. As a result, the intake air temperature sensor can be disposed in a more compact manner than the case where the intake air temperature sensor is dis-

posed substantially perpendicular to the surface of the cover main body of the frame cover. Therefore, the limited space can be utilized effectively.

[0008] In one preferred embodiment of the present invention, the intake air temperature sensor has a flange extending in a direction substantially perpendicular to the sensor main unit, the flange has a first engaging portion, the frame cover has a second engaging portion engageable with the first engaging portion, and the first engaging portion and the second engaging portion are engaged with each other, whereby the intake air temperature sensor is mounted to the frame cover so that the sensor main unit is substantially parallel to the surface of the cover main body.

[0009] Thus, the intake air temperature sensor can be disposed substantially parallel to the surface of the cover main body of the frame cover by such a simple structure, in which the first engaging portion and the second engaging portion are engaged with each other.

[0010] In another preferred embodiment of the present invention, the first engaging portion comprises a hole having an axis line extending substantially parallel to the sensor main unit, and the second engaging portion comprises a rod-shaped body extending substantially parallel to the surface of the cover main body.

[0011] Thus, the intake air temperature sensor can be disposed substantially parallel to the surface of the cover main body of the frame cover by such a simple structure, in which the rod-shaped body, which is the second engaging portion, is inserted in the hole, which is the first engaging portion.

[0012] In another preferred embodiment of the present invention, the frame cover has a coupling portion interposed between the cover main body and the rod-shaped body and configured to couple the cover main body and the rod-shaped body to each other, one end of the rod-shaped body is preferably continuous with the coupling portion, and the other end of the rod-shaped body is preferably spaced apart from the cover main body so that a gap is formed between the rod-shaped body and the cover main body.

[0013] Thus, the intake air temperature sensor can be disposed substantially parallel to the surface of the cover main body of the frame cover easily by inserting the other end of the rod-shaped body, which is the second engaging portion, in the hole, which is the first engaging portion, to cause the first engaging portion and the second engaging portion to engage with each other.

[0014] In another preferred embodiment of the present invention, the other end of the rod-shaped body is positioned higher than the one end of the rod-shaped body.

[0015] Thus, the intake air temperature sensor can be mounted to the surface of the cover main body of the frame cover easily by fitting the hole formed on the flange onto the rod-shaped body from above the other end of the rod-shaped body.

[0016] In another preferred embodiment of the present invention, the frame cover has a stop part positioned

nearer to the other end of the rod-shaped body than the flange, the stop part preferably protruding from the surface of the cover main body and preferably being configured to restrict movement of the flange toward the other end of the rod-shaped body.

[0017] This serves to prevent the intake air temperature sensor from falling off because the stop part restricts the flange from moving toward the other end of the rod-shaped body. Moreover, because the intake air temperature sensor is prevented from falling off by the stop part, it is unnecessary to use another component, such as a bolt, for mounting the intake air temperature sensor to the surface of the cover main body of the frame cover.

[0018] In another preferred embodiment of the present invention, the flange has a contact portion coming in contact with the stop part, and the sensor main unit is preferably disposed between the contact portion and the hole of the flange.

[0019] Thus, the contact portion and the hole of the flange are disposed at the opposite sides across the sensor main unit. Therefore, the intake air temperature sensor can be mounted more reliably and prevented from falling off more reliably than the case where both the contact portion and the hole are disposed together at the same side.

[0020] In another preferred embodiment of the present invention, the frame cover has an opening formed in a portion of the cover main body facing the rod-shaped body.

[0021] This can reduce the weight of the frame cover.

[0022] In another preferred embodiment of the present invention, the first engaging portion comprises a rod-shaped body extending substantially parallel to the sensor main unit, and the second engaging portion comprises a hole having an axis line extending substantially parallel to the sensor main unit.

[0023] Thus, the intake air temperature sensor can be disposed substantially parallel to the surface of the cover main body of the frame cover by such a simple structure, in which the rod-shaped body, which is the first engaging portion, is inserted in the hole, which is the second engaging portion.

[0024] In another preferred embodiment of the present invention, the second engaging portion is formed integrally with the cover main body.

[0025] Thus, the parts count can be reduced.

[0026] In another preferred embodiment of the present invention, the intake air temperature sensor has a case to which the sensor main unit is mounted, and the frame cover preferably has a securing portion formed on the cover main body and configured to secure the case.

[0027] Thus, the case of the intake air temperature sensor is secured by the securing portion. As a result, the intake air temperature sensor can be secured more reliably to the surface of the cover main body of the frame cover. Moreover, because the intake air temperature sensor is secured more reliably to the surface of the cover main body of the frame cover by the securing portion, it

is unnecessary to use another component, such as a bolt, for mounting the intake air temperature sensor to the surface of the cover main body of the frame cover.

[0028] In another preferred embodiment of the present invention, the first engaging portion and the second engaging portion engage with each other so that the intake air temperature sensor is pivotable relative to the frame cover, and the securing portion is preferably formed on a traveling path of the case, the traveling path formed when the intake air temperature sensor is pivoted.

[0029] This allows the intake air temperature sensor to be secured to the securing portion formed on the cover main body by pivoting the intake air temperature sensor relative to the frame cover.

[0030] In another preferred embodiment of the present invention, the securing portion comprises a first hook member and a second hook member both protruding from the surface of the cover main body, and the case preferably has a first interlocking portion interlocking with the first hook member and a second interlocking portion interlocking with the second hook member.

[0031] Thus, the first hook member is interlocked with the first interlocking portion of the case, and the second hook member is interlocked with the second interlocking portion of the case. As a result, the intake air temperature sensor can be secured more reliably to the surface of the cover main body of the frame cover. Moreover, because the intake air temperature sensor is secured to the surface of the cover main body of the frame cover more reliably by the first hook member and the second hook member, it is unnecessary to use another component, such as a bolt, for mounting the intake air temperature sensor to the surface of the cover main body of the frame cover.

[0032] In another preferred embodiment of the present invention, the frame cover has an opening formed in a portion of the cover main body that is between the first hook member and the second hook member.

[0033] This can reduce the weight of the frame cover.

[0034] In another preferred embodiment of the present invention, the motorcycle further has an outer cover disposed outward of the frame cover, an air intake port, positioned in front of the intake air temperature sensor and formed in the outer cover, and an air cleaner positioned behind the intake air temperature sensor and configured to allow the air having passed through the air intake port to flow therein.

[0035] Since the intake air temperature sensor is disposed between the air intake port and the air cleaner in this way, the temperature of the air that flows into the air cleaner can be measured more accurately. Moreover, because the intake air temperature sensor is not exposed outside, the intake air temperature sensor is prevented from being smeared with dirt or the like, so the reliability can be improved. Furthermore, the appearance of the motorcycle is prevented from being spoiled.

[0036] In one embodiment of the present invention, the motorcycle further comprises a head pipe, and wherein

the body frame has a main frame extending rearward and obliquely downward from the head pipe, the frame cover is mounted to the main frame, and the intake air temperature sensor is disposed behind the head pipe.

[0037] The space behind the head pipe has relatively less restrictions on the component layout. Therefore, the degree of freedom in mounting the intake air temperature sensor can be increased.

[0038] In another preferred embodiment of the present invention, the surface of the cover main body is a substantially vertical face.

[0039] Thus, mounting work of the intake air temperature sensor can be carried out from a side of the cover main body. As a result, the intake air temperature sensor can be mounted to the surface of the cover main body easily.

[0040] As described above, the present invention makes it possible to provide a motorcycle having a higher degree of freedom in mounting the intake air temperature sensor to the vehicle body cover.

BRIEF DESCRIPTION OF DRAWINGS

[0041]

[Fig. 1] Fig. 1 is a left side view illustrating a motorcycle according to one embodiment of the present invention.

[Fig. 2] Fig. 2 is a front view illustrating a portion of the motorcycle according to one embodiment of the present invention.

[Fig. 3] Fig. 3 is a left side view illustrating a portion of the motorcycle according to one embodiment of the present invention.

[Fig. 4] Fig. 4 is a right side view illustrating a portion of the motorcycle according to one embodiment of the present invention.

[Fig. 5] Fig. 5 is a left side view illustrating an intake air temperature sensor and a cover main body according to one embodiment of the present invention.

[Fig. 6] Fig. 6 is a perspective view illustrating the intake air temperature sensor and the cover main body according to one embodiment of the present invention.

[Fig. 7] Fig. 7 is a bottom view illustrating how the intake air temperature sensor and the cover main body are fitted to each other according to one embodiment of the present invention.

[Fig. 8] Fig. 8 is a bottom view illustrating how the intake air temperature sensor and the cover main body are fitted to each other according to one embodiment of the present invention.

[Fig. 9] Fig. 9 is a left side view illustrating an intake air temperature sensor and a cover main body according to another embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

<FIRST PREFERRED EMBODIMENT>

[0042] Hereinbelow, preferred embodiments of the present invention will be described. As illustrated in Fig. 1, a motorcycle 1 according to the present preferred embodiment is an on-road type motorcycle 1. It should be noted, however, that the motorcycle according to the present invention is not limited to the on-road type motorcycle 1. The motorcycle according to the present invention may be any other type of motorcycle, such as a moped type motorcycle, an off-road type motorcycle, or a scooter type motorcycle.

[0043] In the following description, the terms "front," "rear," "left," and "right" respectively refer to front, rear, left, and right as defined based on the perspective of the rider of the motorcycle 1. Reference characters F, Re, L, and R in the drawings indicate front, rear, left, and right, respectively. The terms "above/up" and "below/down" respectively mean the relative positions above/up and below/down as used when the motorcycle 1 is stationary on a horizontal plane. Reference characters Up and Dn used in the drawings indicate vertically upward and vertically downward, respectively. Furthermore, regarding a radiator 90 and a radiator fan 92, the terms "left" and "right" respectively mean left and right as viewed from the front of the vehicle.

[0044] As illustrated in Fig. 1, the motorcycle 1 has a fuel tank 3, a seat 20, an engine 80 that is an internal combustion engine, and a body frame 50 for supporting the just-mentioned components. A head pipe 5 is provided at the front of the body frame 50. A headlight 14 is disposed more frontward than the head pipe 5. A steering shaft (not shown) is supported on the head pipe 5, and a handlebar 7 is provided on an upper portion of the steering shaft. A pair of front forks, a left front fork 9A and a right front fork 9B (see Fig. 2), are provided on a lower portion of the steering shaft. A front wheel 10 is supported rotatably at lower end portions of the front fork 9A and the front fork 9B.

[0045] The body frame 50 has a left main frame 52, a right main frame 72 (see Fig. 4), a left rear arm 54, a right rear arm (not shown), and a cross member (not shown). As illustrated in Fig. 1, the left main frame 52 extends rearward and obliquely downward from the head pipe 5. As illustrated in Fig. 4, the right main frame 72 extends rearward and obliquely downward from the head pipe 5. The right main frame 72 is positioned to the right of the left main frame 52. As illustrated in Fig. 1, the left main frame 52 and the left rear arm 54 are coupled to each other via a pivot shaft 51. The right main frame 72 and the right rear arm are coupled to each other via the pivot shaft 51. The cross member is disposed so as to span across the left main frame 52 and the right main frame 72. The left main frame 52 and the right main frame 72 are formed of aluminum.

[0046] As illustrated in Fig. 1, a rear wheel 12 is rotat-

ably supported at a rear end portion 54A of the left rear arm 54 and a rear end portion of the right rear arm. A rear fender 16 is disposed above a portion of the rear wheel 12. The rear fender 16 is supported by the left rear arm 54 and the right rear arm.

[0047] The engine 80 is disposed under the left main frame 52 and the right main frame 72. The engine 80 is supported non-swingably by the left main frame 52 and the right main frame 72. The engine 80 has a crankcase 82, a cylinder block 84 extending frontward and obliquely upward from the crankcase 82, a cylinder head 86 connected to an upper portion of the cylinder block 84, and a cylinder head cover (not shown) connected to an upper portion of the cylinder head 86.

[0048] As illustrated in Fig. 3, a rectangular-shaped radiator 90 is disposed in front of the engine 80. A radiator fan 92 is disposed between the engine 80 and the radiator 90. The radiator fan 92 causes the air to pass through the radiator 90 forcibly from the front of the radiator 90. A fan cover 94 is disposed between the radiator fan 92 and the engine 80. The radiator fan 92 and the fan cover 94 are mounted to the radiator 90.

[0049] As illustrated in Fig. 2, the headlight 14 is positioned lower than the radiator 90. The radiator 90 is positioned at the rear of the left front fork 9A and the right front fork 9B. As illustrated in Fig. 3, the radiator 90 is inclined frontward and obliquely upward. The front end 90C of the radiator 90 is positioned more frontward than the rear end 90D of the radiator 90. The inclination angle θ of the radiator 90 from a horizontal direction is greater than 45 degrees.

[0050] As illustrated in Fig. 2, the radiator fan 92 rotates clockwise as viewed from the vehicle front (in the direction indicated by arrow X1 in Fig. 2). Accordingly, the air having been heated by passing through the radiator 90 tends to flow left-upward from the radiator fan 92 as viewed from the vehicle front (i.e., in the direction indicated by arrow Y1 in Figs. 2 and 4) and right-downward from the radiator fan 92 as viewed from the vehicle front (i.e., in the direction indicated by arrow Z1 in Figs. 2 and 3).

[0051] As illustrated in Fig. 2, the fan cover 94 has an upper portion 94A positioned above the radiator fan 92, as viewed from the vehicle front, and a side portion 94B positioned leftward of the radiator fan 92, as viewed from the vehicle front. At least a portion of the upper portion 94A of the fan cover 94 is positioned above and behind the radiator fan 92. At least a portion of the side portion 94B of the fan cover 94 is positioned leftward of and behind the radiator fan 92, as viewed from the vehicle front. The fan cover 94 opens downward. Note that at least a portion of the fan cover 94 should be positioned above and behind a left portion 92B of the radiator fan 92. The left portion 92B of the radiator fan 92 means a portion of the radiator fan 92 that is located more leftward than the center 92A of the radiator fan 92, as viewed from the vehicle front. When viewed from the rider of the motorcycle 1, the left portion 92B of the radiator fan 92 is a

portion thereof that is located more rightward than the center 92A of the radiator fan 92.

[0052] As illustrated in Fig. 3, the motorcycle 1 has an intake air temperature sensor 120. The intake air temperature sensor 120 is mounted to a later-described left frame cover 100. As illustrated in Fig. 5, the intake air temperature sensor 120 has a rod-shaped sensor main unit 122 for measuring the temperature of air. The intake air temperature sensor 120 has a flange 124 extending in a direction substantially perpendicular to the sensor main unit 122. The intake air temperature sensor 120 has a closed-bottom case 126 to which the sensor main unit 122 is mounted. As illustrated in Fig. 7, a bottom portion 126A of the case 126 is formed in a substantially T-shape as viewed from the bottom. The bottom portion 126A is provided with a first interlocking portion 127A interlocking with a later-described first hook member 132A and a second interlocking portion 127B interlocking with a second hook member 132B. The flange 124 has a hole 128 serving as a first engaging portion and having an axis line A2 extending substantially parallel to an axis line A1 of the sensor main unit 122. The flange 124 has a contact portion 125 that comes in contact with a later-described stop part 108. The sensor main unit 122 is disposed between the contact portion 125 and the hole 128 of the flange 124.

[0053] It should be noted that the phrase "substantially perpendicular to" here is meant to include the case in which, for example, the inclination angle of the flange with respect to the sensor main unit is from 85 degrees to 95 degrees, in addition to the case in which the flange 124 extends perpendicularly to the sensor main unit 122. The phrase "substantially parallel to" here is meant to include the state in which, for example, the inclination angle of the axis line A1 with respect to the axis line A2 is less than 5 degrees, in addition to the state in which the axis line A1 is parallel to the axis line A2.

[0054] As illustrated in Fig. 3, the left frame cover 100 is mounted to a front end portion 52B of the left main frame 52. Note that a left outer cover 101 (see Fig. 1), which is disposed outward (leftward) of the left frame cover 100, is not shown in Fig. 3. As illustrated in Fig. 2, the left frame cover 100 is positioned above the right end 90A of the radiator 90 as viewed from the vehicle front. The left frame cover 100 has a cover main body 102 having a surface. The surface of the cover main body 102 is a substantially vertical face. Note that, when viewed from the rider of the motorcycle 1, the right end 90A of the radiator 90 is seen as the left end 90A of the radiator 90.

[0055] As illustrated in Fig. 4, a right frame cover 110 is mounted to a front end portion 72B of the right main frame 72. Note that a right outer cover, which is disposed outward (rightward) of the right frame cover 110, is not shown in Fig. 4. As illustrated in Fig. 2, the right frame cover 110 is positioned above the left end 90B of the radiator 90 as viewed from the vehicle front. The right frame cover 110 has a cover main body 112 having a

surface. The surface of the cover main body 112 is a substantially vertical face. Note that, when viewed from the rider of the motorcycle 1, the left end 90B of the radiator 90 is seen as the right end 90B of the radiator 90.

[0056] As illustrated in Fig. 5, the left frame cover 100 has a rod-shaped body 104 serving as the second engaging portion and extending substantially parallel to the surface of the cover main body 102. The rod-shaped body 104 is configured so as to be engagable with the hole 128 of the flange 124. The rod-shaped body 104 is formed integrally with the cover main body 102. The rod-shaped body 104 and the hole 128 engage with each other so that the intake air temperature sensor 120 can be pivoted relative to the left frame cover 100.

[0057] The phrase "substantially parallel to" here is meant to include the state in which, for example, the inclination angle of the rod-shaped body 104 with respect to the surface of the cover main body 102 is less than 5 degrees, in addition to the state in which the rod-shaped body 104 extends parallel to the surface of the cover main body 102.

[0058] As illustrated in Fig. 5, the left frame cover 100 has a coupling portion 106 for coupling to the cover main body 102 and the rod-shaped body 104 to each other. The coupling portion 106 is interposed between the cover main body 102 and the rod-shaped body 104. One end 104A of the rod-shaped body 104 is continuous with the coupling portion 106. The other end 104B of the rod-shaped body 104 is spaced apart from the cover main body 102. A gap is formed between the cover main body 102 and the other end 104B of the rod-shaped body 104. As illustrated in Fig. 5, the other end 104B of the rod-shaped body 104 is positioned higher than the one end 104A of the rod-shaped body 104.

[0059] As illustrated in Fig. 5, the left frame cover 100 has a stop part 108 for restricting movement of the flange 124 toward the other end 104B of the rod-shaped body 104. The stop part 108 protrudes from the surface of the cover main body 102. The stop part 108 is positioned nearer to the other end 104B of the rod-shaped body 104 than the flange 124. An opening 109 is formed in a portion of the cover main body 102 that faces the rod-shaped body 104.

[0060] The left frame cover 100 has a securing portion 130 for securing the case 126 of the intake air temperature sensor 120. The securing portion 130 is formed on the cover main body 102. As illustrated in Fig. 7, the securing portion 130 is formed on a traveling path (traveling locus) L of the case 126 when the intake air temperature sensor 120 is pivoted. The securing portion 130 includes the first hook member 132A and the second hook member 132B both protruding from the surface of the cover main body 102. An opening 134 is formed in a portion of the cover main body 102 that is between the first hook member 132A and the second hook member 132B.

[0061] As illustrated in Fig. 2, the intake air temperature sensor 120 is disposed above the right end 90A of the radiator 90 as viewed from the vehicle front. The intake

air temperature sensor 120 is disposed rightward of the left front fork 9A. As illustrated in Fig. 3, the intake air temperature sensor 120 is disposed more rearward than the front end 90C of the radiator 90 and more frontward than the rear end 90D of the radiator 90. The intake air temperature sensor 120 is disposed in a region rearward of, as viewed from one side of the vehicle, a first linear line S1 connecting the upper end 90E of the radiator 90 and the lower end 90F of the radiator 90 to each other and extending frontward and obliquely upward, and above a second linear line S2 passing through the center of the radiator 90 and extending rearward and obliquely upward perpendicularly to the first linear line S1. The intake air temperature sensor 120 is disposed so that the sensor main unit 122 extends rearward and obliquely upward.

[0062] The intake air temperature sensor 120 is mounted to the left frame cover 100 so that the sensor main unit 122 is substantially parallel to the surface of the cover main body 112. By engaging the hole 128 and the rod-shaped body 104 with each other, the intake air temperature sensor 120 is mounted to the left frame cover 100 so that the sensor main unit 122 is substantially parallel to the surface of the cover main body 112. As illustrated in Fig. 3, the intake air temperature sensor 120 is disposed at the rear of the head pipe 5.

[0063] The phrase "substantially parallel to" here is meant to include the state in which, for example, the inclination angle of the sensor main body 122 with respect to the surface of the cover main body 112 is less than 5 degrees, in addition to the state in which the sensor main body 122 is parallel to the surface of the cover main body 112.

[0064] Next, the method for mounting the intake air temperature sensor 120 to the left frame cover 100 will be described. As illustrated in Fig. 6, the hole 128 of the flange 124 is engaged with the rod-shaped body 104 provided on the cover main body 102. As illustrated in Fig. 7, when the intake air temperature sensor 120 is pivoted in the direction indicated by arrow B relative to the left frame cover 100, the intake air temperature sensor 120 pivots along a traveling path L of the case 126. As illustrated in Fig. 8, when the intake air temperature sensor 120 comes into contact with the cover main body 102 of the left frame cover 100, the first hook member 132A interlocks with the first interlocking portion 127A and the second hook member 132B interlocks with the second interlocking portion 127B.

[0065] As illustrated in Fig. 1, the left outer cover 101 is disposed outward of the left frame cover 100. A right outer cover (not shown) is disposed outward of the right frame cover 110. An air intake port 103 is formed in the left outer cover 101. The air intake port 103 is positioned in front of the intake air temperature sensor 120. An air cleaner 140, into which the air having passed through the air intake port 103 flows, is disposed behind the intake air temperature sensor 120. The air cleaner 140 is disposed below the fuel tank 3.

[0066] In the motorcycle 1 according to the present preferred embodiment, the intake air temperature sensor 120 is disposed substantially parallel to the surface of the cover main body 102 of the left frame cover 100. As a result, the intake air temperature sensor 120 can be disposed in a more compact manner than the case where the intake air temperature sensor 120 is disposed substantially perpendicular to the surface of the cover main body 102 of the left frame cover 100, and the limited space can be utilized effectively.

[0067] In the present preferred embodiment, the intake air temperature sensor 120 has the flange 124 extending in a direction substantially perpendicular to the sensor main unit 122. The flange 124 has the hole 128, and the left frame cover 100 has the rod-shaped body 104 engageable with the hole 128. By engaging the hole 128 and the rod-shaped body 104 with each other, the intake air temperature sensor 120 is mounted to the left frame cover 100 so that the sensor main unit 122 is substantially parallel to the surface of the cover main body 102. Thus, the intake air temperature sensor 120 can be disposed substantially parallel to the surface of the cover main body 102 of the left frame cover 100 by such a simple structure, in which the hole 128 and the rod-shaped body 104 are engaged with each other.

[0068] In the present preferred embodiment, the hole 128 has an axis line extending substantially parallel to the sensor main unit 122, and the rod-shaped body 104 extends substantially parallel to the surface of the cover main body 102. Thus, the intake air temperature sensor 120 can be disposed substantially parallel to the surface of the cover main body 102 of the left frame cover 100 by such a simple structure, in which the rod-shaped body 104 is inserted in the hole 128.

[0069] In the present preferred embodiment, the left frame cover 100 has the coupling portion 106 interposed between the cover main body 102 and the rod-shaped body 104, for coupling the cover main body 102 and the rod-shaped body 104 to each other. The one end 104A of the rod-shaped body 104 is continuous with the coupling portion 106, and the other end 104B of the rod-shaped body 104 is spaced apart from the cover main body 102 so that a gap is formed between the rod-shaped body 104 and the cover main body 102. Thus, the intake air temperature sensor 120 can be disposed substantially parallel to the surface of the cover main body 102 of the left frame cover 100 easily by inserting the rod-shaped body 104 through the hole 128 from the other end 104B of the rod-shaped body 104 to cause the hole 128 and the rod-shaped body 104 to engage with each other.

[0070] In the present preferred embodiment, the other end 104B of the rod-shaped body 104 is positioned higher than the one end 104A of the rod-shaped body 104. Thus, the intake air temperature sensor 120 can be mounted to the surface of the cover main body 102 of the left frame cover 100 easily by fitting the hole 128 formed on the flange 124 onto the rod-shaped body 104 from above the other end 104B of the rod-shaped body 104.

[0071] In the present preferred embodiment, the left frame cover 100 has the stop part 108 positioned nearer to the other end 104B of the rod-shaped body 104 than the flange 124, the stop part 108 protruding from the surface of the cover main body 102 and being configured to restrict movement of the flange 124 toward the other end 104B of the rod-shaped body 104. This serves to prevent the intake air temperature sensor 120 from falling off because the stop part 108 restricts the flange 124 from moving toward the other end 104B of the rod-shaped body 104. Moreover, because the intake air temperature sensor 120 is prevented from falling off by the stop part 108, it is unnecessary to use another component, such as a bolt, for mounting the intake air temperature sensor 120 to the surface of the cover main body 102 of the left frame cover 100.

[0072] In the present preferred embodiment, the flange 124 has the contact portion 125 coming in contact with the stop part 108, and the sensor main unit 122 is disposed between the contact portion 125 and the hole 128 of the flange 124. Thus, the contact portion 125 and the hole 128 of the flange 124 are disposed at the opposite sides across the sensor main unit 122. Therefore, the intake air temperature sensor 120 can be mounted more reliably and prevented from falling off more reliably than the case where both the contact portion 125 and the hole 128 are disposed together at the same side.

[0073] In the present preferred embodiment, the left frame cover 100 has an opening 109 formed in a portion of the cover main body 102 that faces the rod-shaped body 104. This can reduce the weight of the left frame cover 100.

[0074] In the present preferred embodiment, the rod-shaped body 104 is formed integrally with the cover main body 102. Thus, the parts count can be reduced.

[0075] In the present preferred embodiment, the intake air temperature sensor 120 has the case 126 to which the sensor main unit 122 is mounted, and the left frame cover 100 has the securing portion 130 formed on the cover main body 102 and configured to secure the case 126. Thus, the case 126 of the intake air temperature sensor 120 is secured by the securing portion 130. As a result, the intake air temperature sensor 120 can be secured more reliably to the surface of the cover main body 102 of the left frame cover 100. Moreover, because the intake air temperature sensor 120 is secured more reliably to the surface of the cover main body 102 of the left frame cover 100 by the securing portion 130, it is unnecessary to use another component, such as a bolt, for mounting the intake air temperature sensor 120 to the surface of the cover main body 102 of the left frame cover 100.

[0076] In the present preferred embodiment, the rod-shaped body 104 and the hole 128 engage with each other so that the intake air temperature sensor 120 can be pivoted relative to the left frame cover 100, and the securing portion 130 is formed on a traveling path of the case 120 that is formed when the intake air temperature

sensor 120 is pivoted. This allows the intake air temperature sensor 120 to be secured to the securing portion 130 formed on the cover main body 102 by pivoting the intake air temperature sensor 120 relative to the left frame cover 100.

[0077] In the present preferred embodiment, the securing portion 130 includes the first hook member 132A and the second hook member 132B both protruding from the surface of the cover main body 102, and the case 126 has the first interlocking portion 127A interlocking with the first hook member 132A and the second interlocking portion 127B interlocking with the second hook member 132B. Thus, the first hook member 132A is interlocked with the first interlocking portion 127A of the case 126, and the second hook member 132B is interlocked with the second interlocking portion 127B of the case 126. As a result, the intake air temperature sensor 120 can be secured more reliably to the surface of the cover main body 102 of the left frame cover 100. Moreover, because the intake air temperature sensor 120 is secured more reliably to the surface of the cover main body 102 of the left frame cover 100 by the first hook member 132A and the second hook member 132B, it is unnecessary to use another component, such as a bolt, for mounting the intake air temperature sensor 120 to the surface of the cover main body 102 of the left frame cover 100.

[0078] In the present preferred embodiment, the left frame cover 100 has the opening 134 formed in a portion of the cover main body 102 that is between the first hook member 132A and the second hook member 132B. This can reduce the weight of the left frame cover 100.

[0079] In the present preferred embodiment, the motorcycle 1 further has the outer cover 101 disposed outward of the left frame cover 100, the air intake port 103 positioned in front of the intake air temperature sensor 120 and formed in the outer cover 101, and the air cleaner 140 positioned behind the intake air temperature sensor 120 and configured to allow the air having passed through the air intake port 103 to flow therein. Since the intake air temperature sensor 120 is disposed between the air intake port 103 and the air cleaner 140 in this way, the temperature of the air that flows into the air cleaner 140 can be measured more accurately. Moreover, because the intake air temperature sensor 120 is not exposed outside, the intake air temperature sensor 120 is prevented from being smeared with dirt or the like, so the reliability can be improved. Furthermore, the appearance of the motorcycle 1 is prevented from being spoiled.

[0080] In the present preferred embodiment, the motorcycle 1 further has the head pipe 5. The body frame 50 has the left main frame 52 extending rearward and obliquely downward from the head pipe 5, the left frame cover 100 is mounted to the left main frame 52, and the intake air temperature sensor 120 is disposed behind the head pipe 5. The space behind the head pipe 5 has relatively less restrictions on the component layout. Therefore, the degree of freedom in mounting the intake air

temperature sensor 120 can be increased.

[0081] In the present preferred embodiment, the surface of the cover main body 102 is a substantially vertical face. Thus, mounting work of the intake air temperature sensor 120 can be carried out from a side of the cover main body 102. As a result, the intake air temperature sensor 120 can be mounted to the surface of the cover main body 102 easily.

[0082] Fig. 9 is a left side view illustrating an intake air temperature sensor and a cover main body according to a second preferred embodiment.

[0083] As illustrated in Fig. 9, an intake air temperature sensor 220 has a flange 224 extending in a direction substantially perpendicular to the sensor main unit 222. The flange 224 has a rod-shaped body 228, serving as the first engaging portion and extending substantially parallel to the sensor main unit 222.

[0084] A left frame cover 200 has a flange 206. The flange 206 protrudes from the surface of a cover main body 202. The flange 206 is formed integrally with the cover main body 202. The flange 206 has a hole 204 serving as the second engaging portion and having an axis line A3 extending substantially parallel to the surface of the cover main body 202. The hole 204 is configured so as to be engagable with the rod-shaped body 228 of the flange 224.

[0085] In the present preferred embodiment, the intake air temperature sensor 220 has the flange 224 extending in a direction substantially perpendicular to the sensor main unit 222. The flange 224 has the rod-shaped body 228. The rod-shaped body 228 extends substantially parallel to the sensor main unit 222. The left frame cover 200 has the hole 204 engagable with the rod-shaped body 228. The hole 204 has the axis line A3 extending substantially parallel to the surface of the cover main body 202. Thus, the intake air temperature sensor 220 can be disposed substantially parallel to the surface of the cover main body 202 of the left frame cover 200 by such a simple structure, in which the rod-shaped body 228 is inserted in the hole 204.

[0086] Moreover, the intake air temperature sensor 120 may not necessarily be disposed so that the sensor main unit 122 extends rearward and obliquely upward. The sensor main unit 122 may be disposed so as to extend in any direction as long as the sensor main unit 122 is substantially parallel to the surface of the cover main body 102.

- 1 -- Motorcycle
- 5 -- Head pipe
- 50 -- Body frame
- 52 -- Left main frame
- 72 -- Right main frame
- 80 -- Engine
- 100 -- Left frame cover
- 101 -- Left outer cover
- 102 -- Cover main body
- 103 -- Air intake port

104 -- Rod-shaped body
 104A -- One end of the rod-shaped body
 104B -- Other end of the rod-shaped body
 106 -- Coupling portion
 108 -- Stop part
 109 -- Opening
 120 -- Intake air temperature sensor
 122 -- Sensor main unit
 124 -- Flange
 125 -- Contact portion
 126 -- Case
 127A -- First interlocking portion
 127B -- Second interlocking portion
 128 -- Hole
 130 -- Securing portion
 132A -- First hook member
 132B -- Second hook member
 134 -- Opening
 140 -- Air cleaner

Claims

1. A motorcycle (1) comprising:

a body frame (50);
 a frame cover (100; 200) mounted to the body frame (50); and
 an intake air temperature sensor (120; 220) comprising a rod-shaped sensor main unit (122; 222) configured to measure the temperature of air, wherein:

the frame cover (100; 200) has a cover main body (102; 202) having a surface; and
 the intake air temperature sensor (120; 220) is mounted to the frame cover (100; 200) so that the sensor main unit (122; 222) is substantially parallel to the surface of the cover main body (102; 202).

2. The motorcycle (1) according to claim 1, wherein:

the intake air temperature sensor (120; 220) has a flange (124; 224) extending in a direction substantially perpendicular to the sensor main unit (122; 222);
 the flange (124; 224) has a first engaging portion (128; 228);
 the frame cover (100; 200) has a second engaging portion (104; 204) engagable with the first engaging portion (128; 228); and
 the first engaging portion (128; 228) and the second engaging portion (104; 204) are engaged with each other, whereby the intake air temperature sensor (120; 220) is mounted to the frame cover (100; 200) so that the sensor main unit (122; 222) is substantially parallel to the surface

of the cover main body (102; 202).

3. The motorcycle (1) according to claim 2, wherein:

the first engaging portion (128) comprises a hole (128) having an axis line extending substantially parallel to the sensor main unit (122); and
 the second engaging portion (104) preferably comprises a rod-shaped body (104) extending substantially parallel to the surface of the cover main body (102).

4. The motorcycle (1) according to claim 3, wherein:

the frame cover (100) has a coupling portion (106) interposed between the cover main body (102) and the rod-shaped body (104) and configured to couple the cover main body (102) and the rod-shaped body (104) to each other;
 one end of the rod-shaped body (104A) is preferably continuous with the coupling portion (106), and the other end of the rod-shaped body (104B) is preferably spaced apart from the cover main body (102) so that a gap is formed between the rod-shaped body (104) and the cover main body (102); and
 the other end of the rod-shaped body (104B) is preferably positioned higher than the one end of the rod-shaped body (104A).

5. The motorcycle (1) according to claim 4, wherein the frame cover (100) has a stop part (108) positioned nearer to the other end of the rod-shaped body (104B) than the flange (124), the stop part (108) preferably protruding from the surface of the cover main body (102) and preferably being configured to restrict movement of the flange (124) toward the other end of the rod-shaped body (104B).

6. The motorcycle (1) according to claim 5, wherein:

the flange (124) has a contact portion (125) coming in contact with the stop part (108); and
 the sensor main unit (122) is preferably disposed between the contact portion (125) and the hole (128) of the flange (124).

7. The motorcycle (1) according to any one of claims 3 through 6, wherein the frame cover (100) has an opening (109) formed in a portion of the cover main body (102) facing the rod-shaped body (104).

8. The motorcycle (1) according to claim 2, wherein:

the first engaging portion (228) comprises a rod-shaped body (228) extending substantially parallel to the sensor main unit (222); and
 the second engaging portion (204) comprises a

hole (204) having an axis line extending substantially parallel to the sensor main unit (222).

9. The motorcycle (1) according to any one of claims 2 through 8, wherein the second engaging portion (104; 204) is formed integrally with the cover main body (102; 202).

10. The motorcycle (1) according to any one of claims 1 through 9, wherein:

the intake air temperature sensor (120; 220) has a case (126) to which the sensor main unit (122; 222) is mounted; and
the frame cover (100; 200) preferably has a securing portion (130) formed on the cover main body (102; 222) and configured to secure the case (126).

11. The motorcycle (1) according to claim 10, wherein:

the first engaging portion (128; 228) and the second engaging portion (104; 204) engage with each other so that the intake air temperature sensor (120; 220) is pivotable relative to the frame cover (100; 200); and
the securing portion (130) is preferably formed on a traveling path of the case (126), the traveling path formed when the intake air temperature sensor (120; 220) is pivoted.

12. The motorcycle (1) according to claim 10 or 11, wherein:

the securing portion (130) comprises a first hook member (132A) and a second hook member (132B) both protruding from the surface of the cover main body (102);
the case (126) preferably has a first interlocking portion (127A) interlocking with the first hook member (132A) and a second interlocking portion (127B) interlocking with the second hook member (132B); and
the frame cover (100; 200) preferably has an opening (134) formed in a portion of the cover main body (102) that is between the first hook member (132A) and the second hook member (132B).

13. The motorcycle (1) according to any one of claims 1 through 12, further comprising:

an outer cover (101) disposed outward of the frame cover (100; 200);
an air intake port (103), positioned in front of the intake air temperature sensor (120; 220) and formed in the outer cover (101); and
an air cleaner (140) positioned behind the intake

air temperature sensor (120; 220) and configured to allow the air having passed through the air intake port (103) to flow therein.

14. The motorcycle (1) according to any one of claims 1 through 13, further comprising:

a head pipe (5); and wherein:

the body frame (50) has a main frame (52) extending rearward and obliquely downward from the head pipe (5);
the frame cover (100; 200) is mounted to the main frame (52); and
the intake air temperature sensor (120; 220) is disposed behind the head pipe (5).

15. The motorcycle (1) according to any one of claims 1 through 14, wherein the surface of the cover main body (102; 202) is a substantially vertical face.

FIG.1

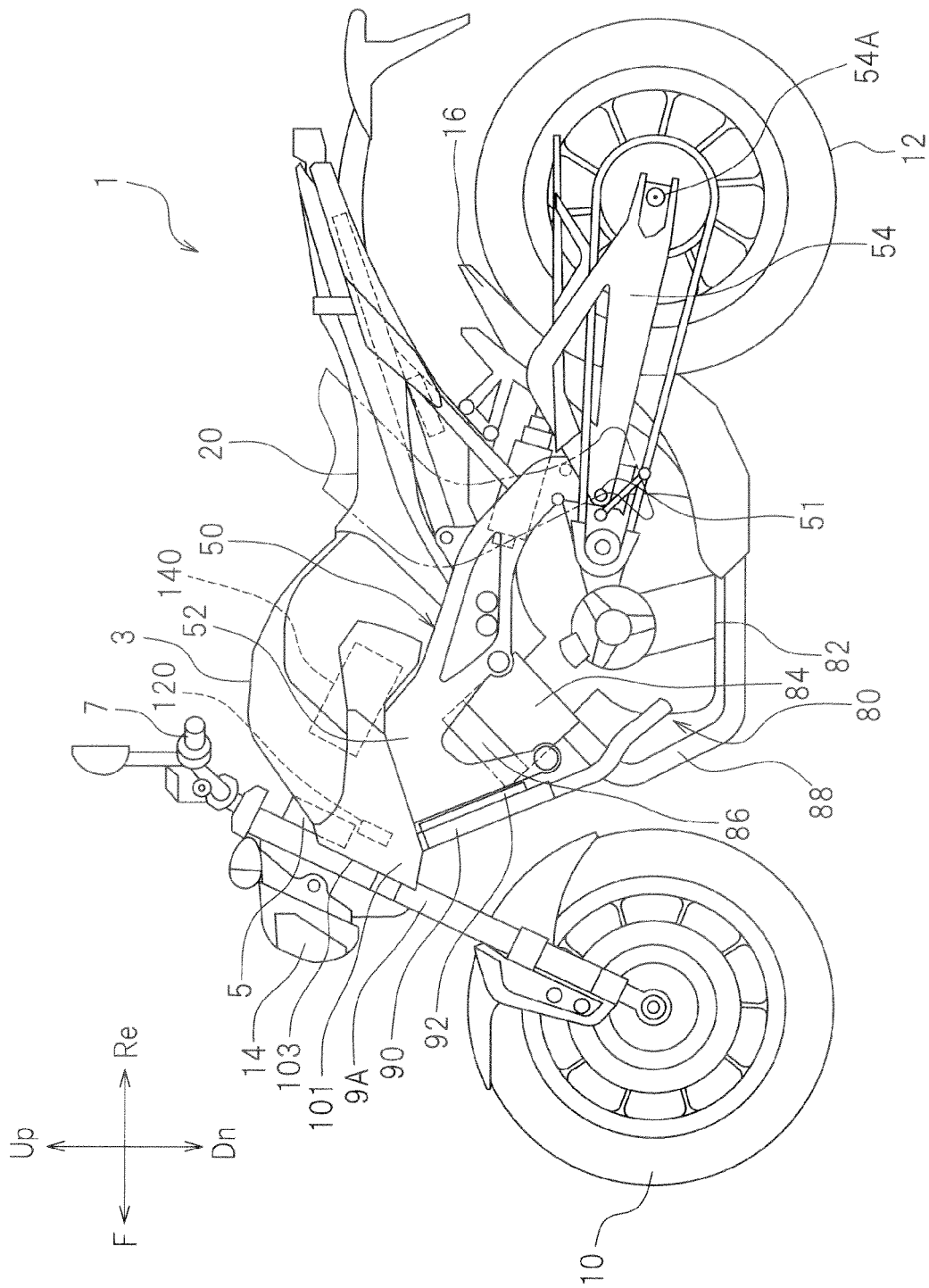
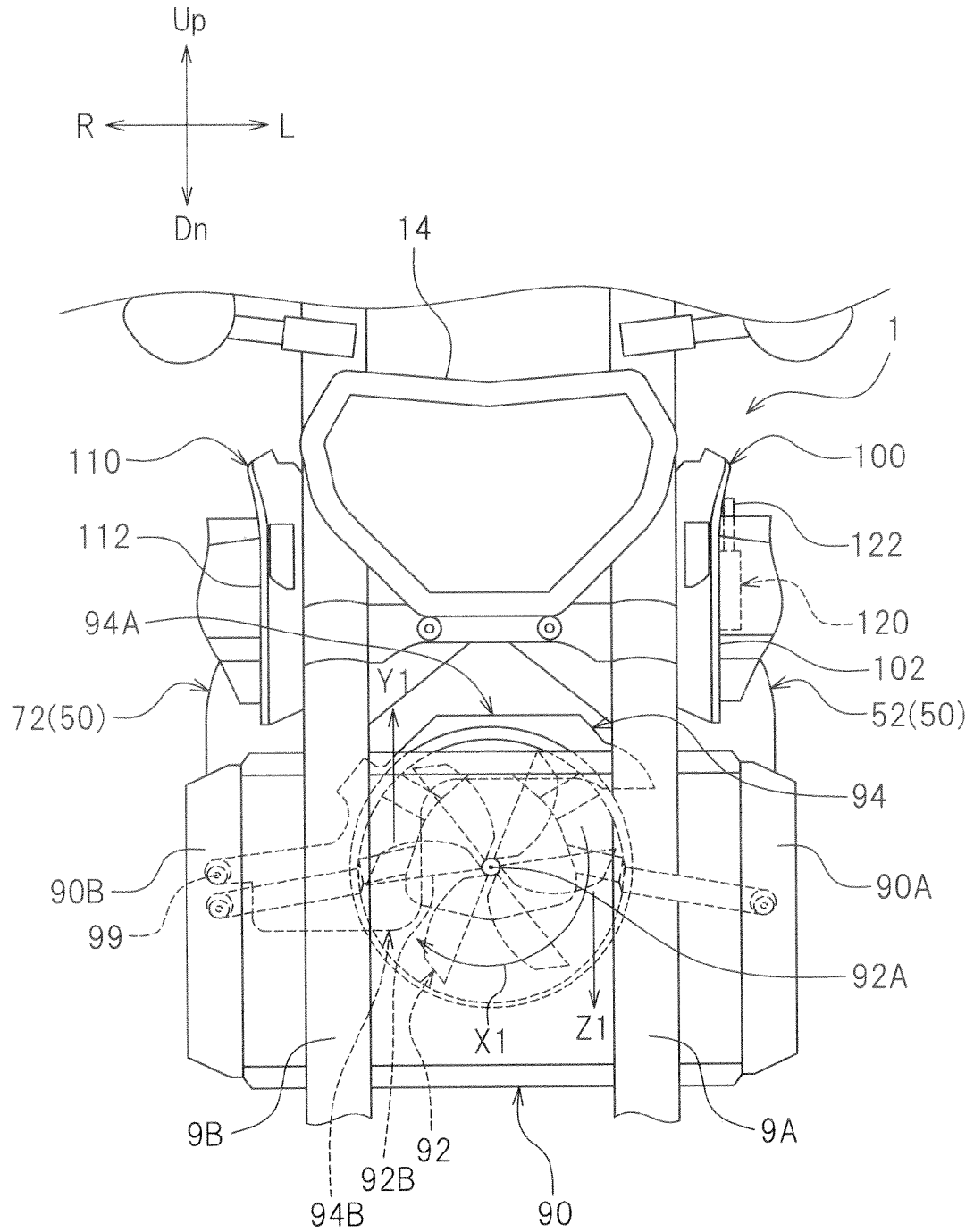
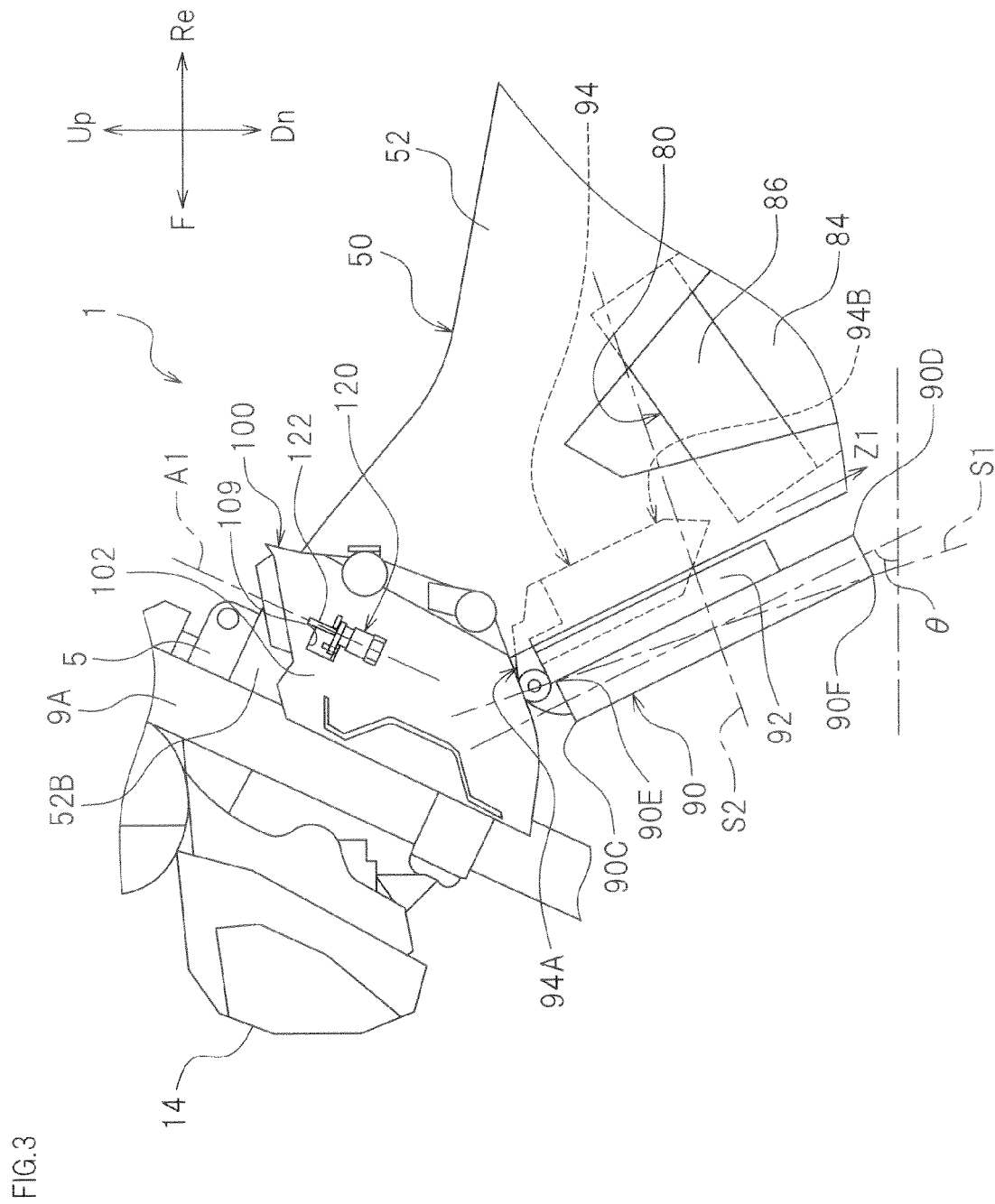


FIG.2





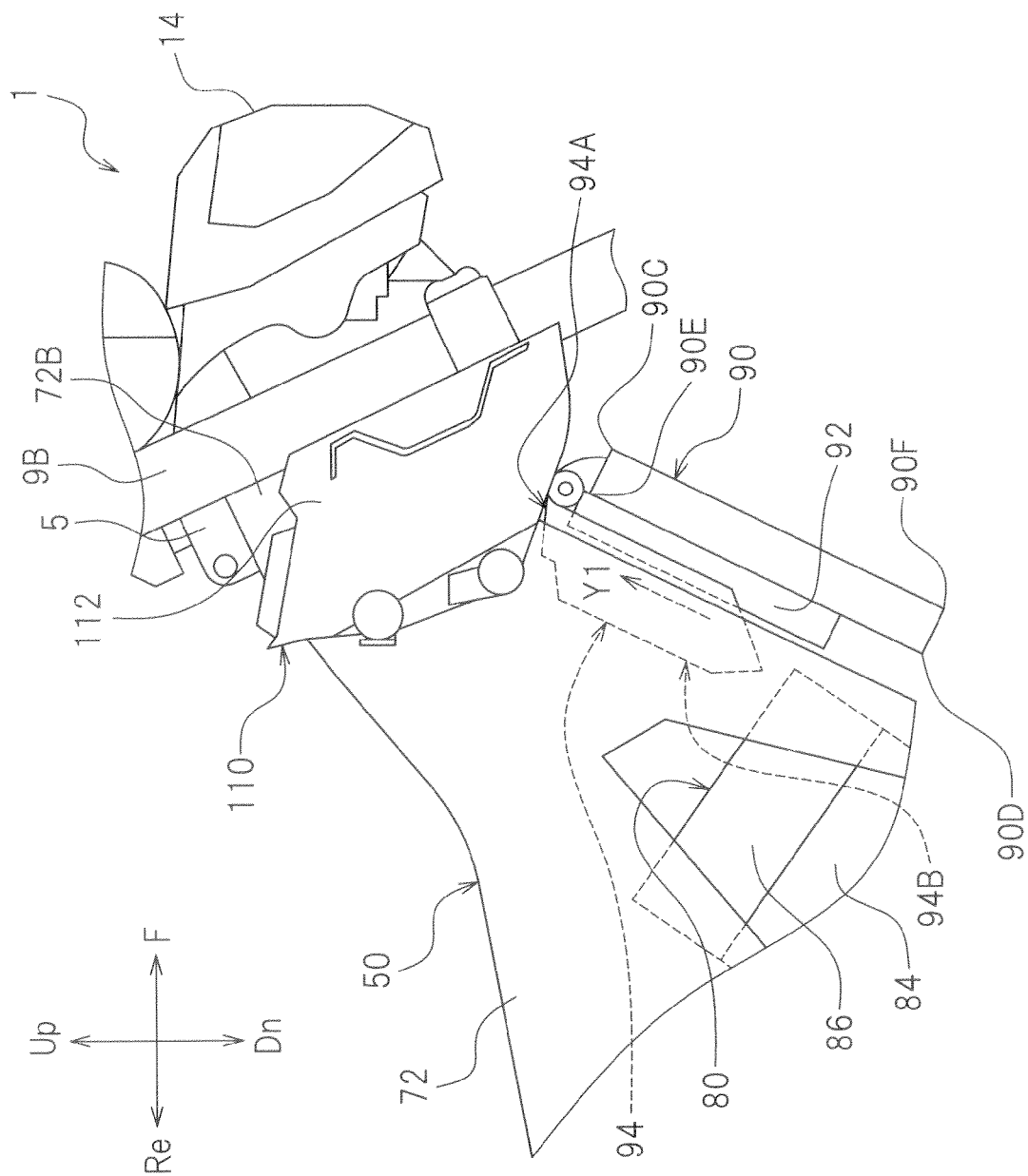


FIG. 4

FIG.5

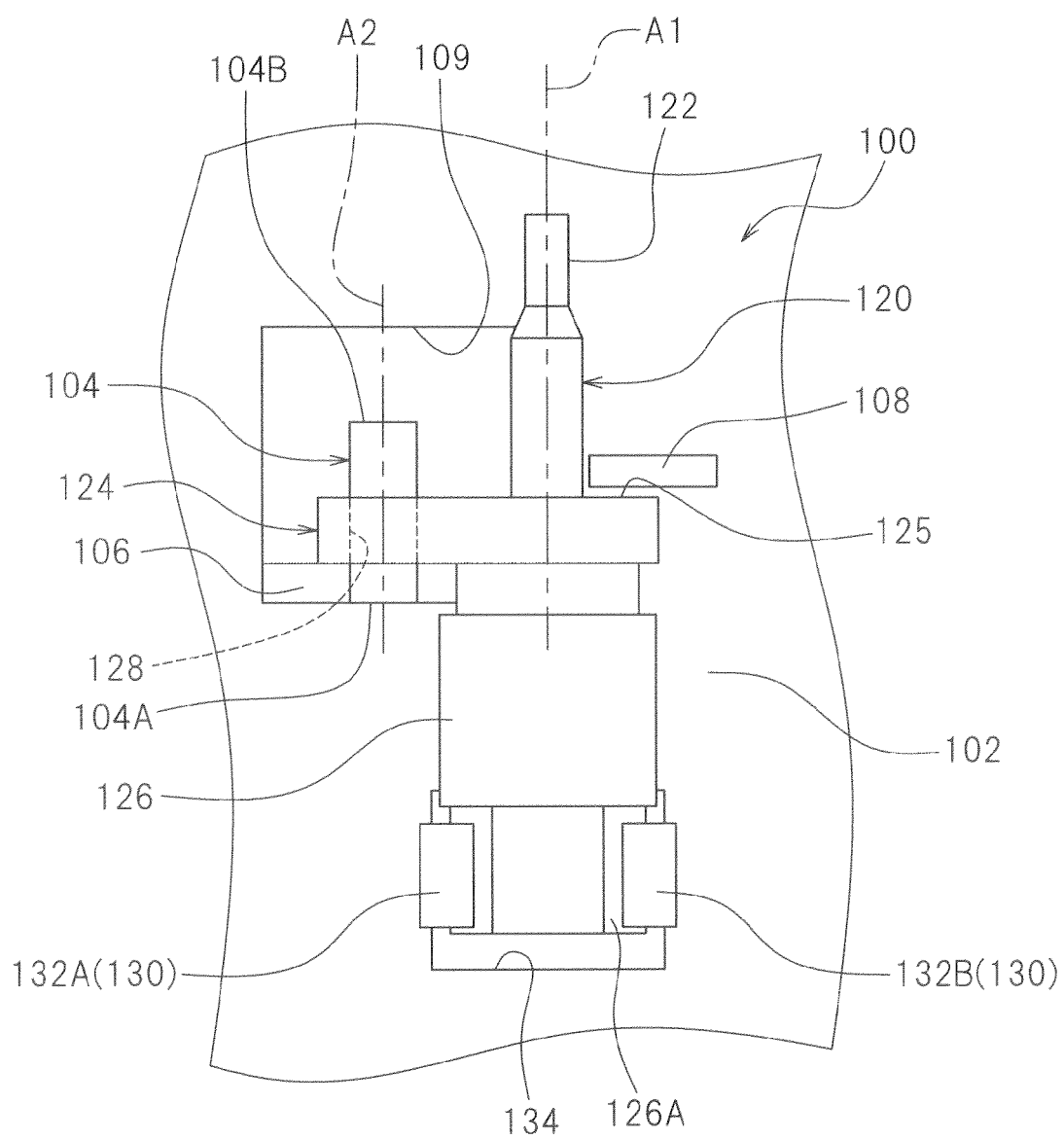


FIG.6

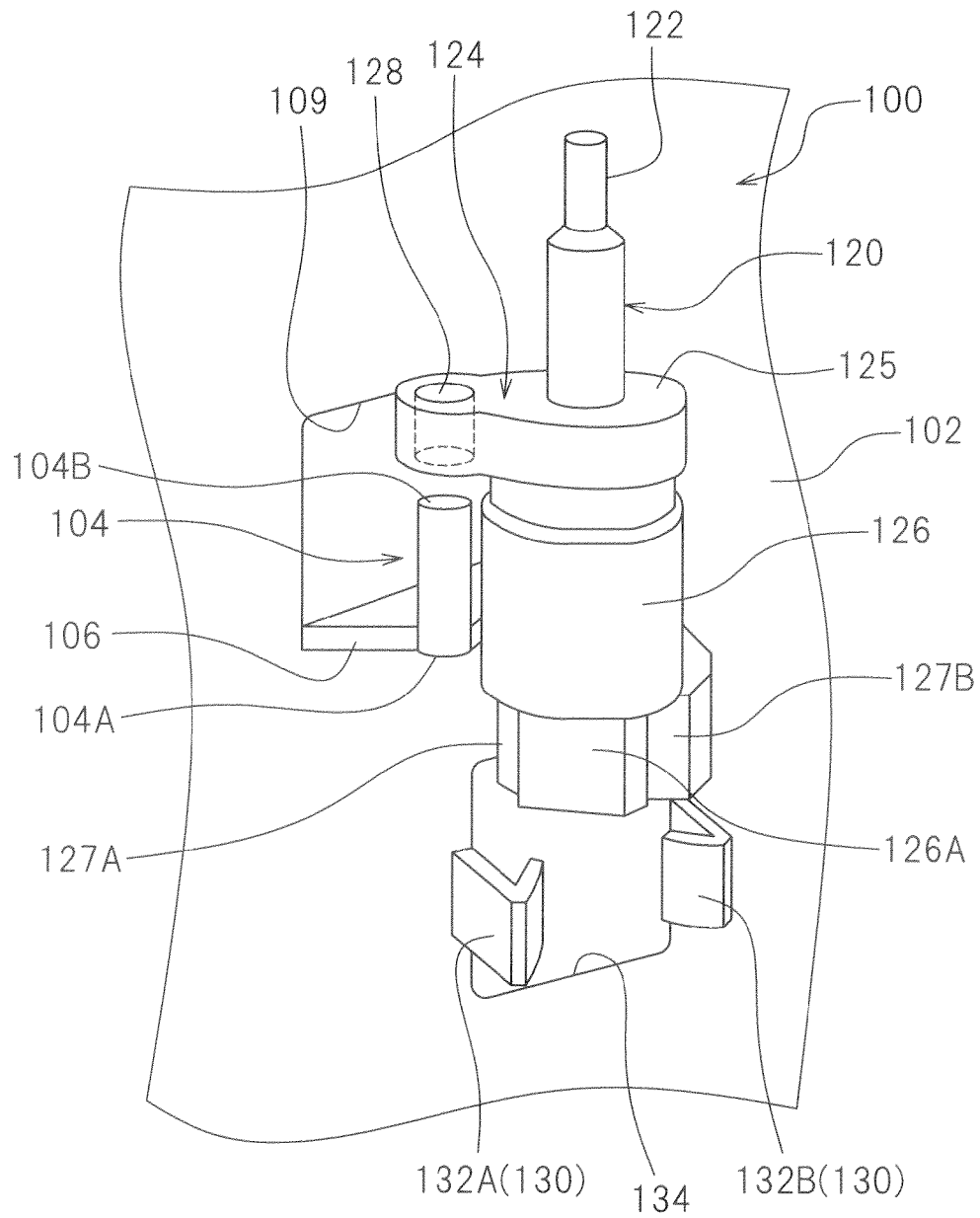


FIG.7

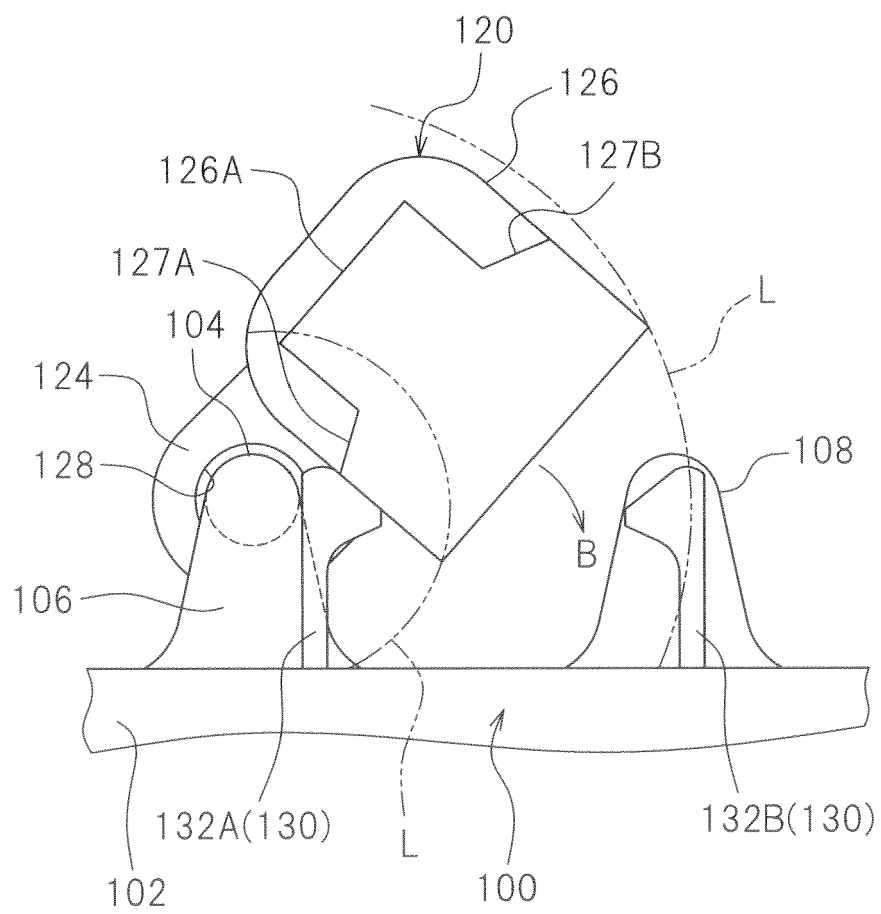


FIG.8

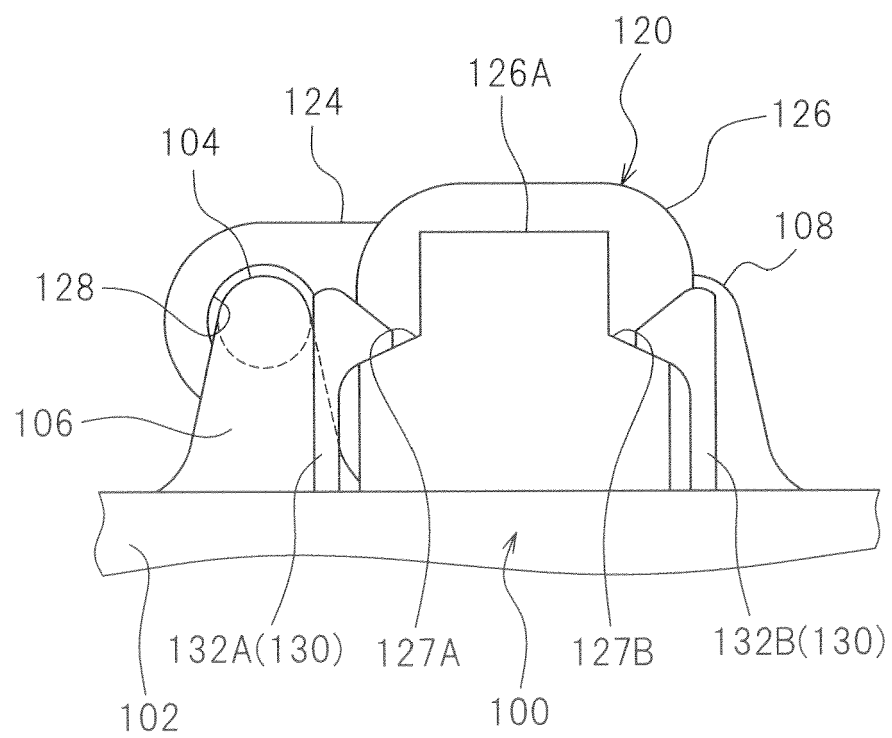
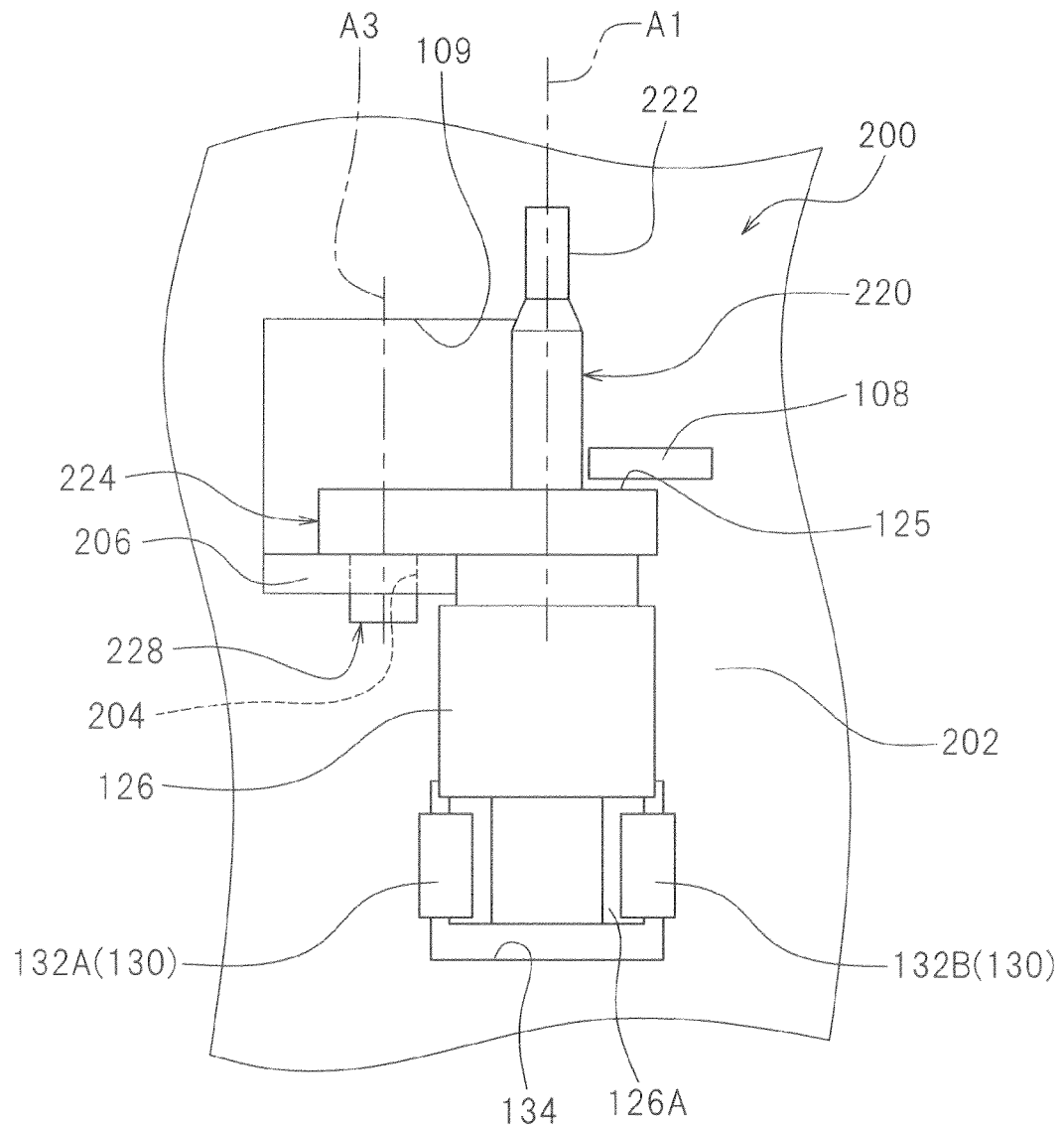


FIG.9



REFERENCES CITED IN THE DESCRIPTION

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