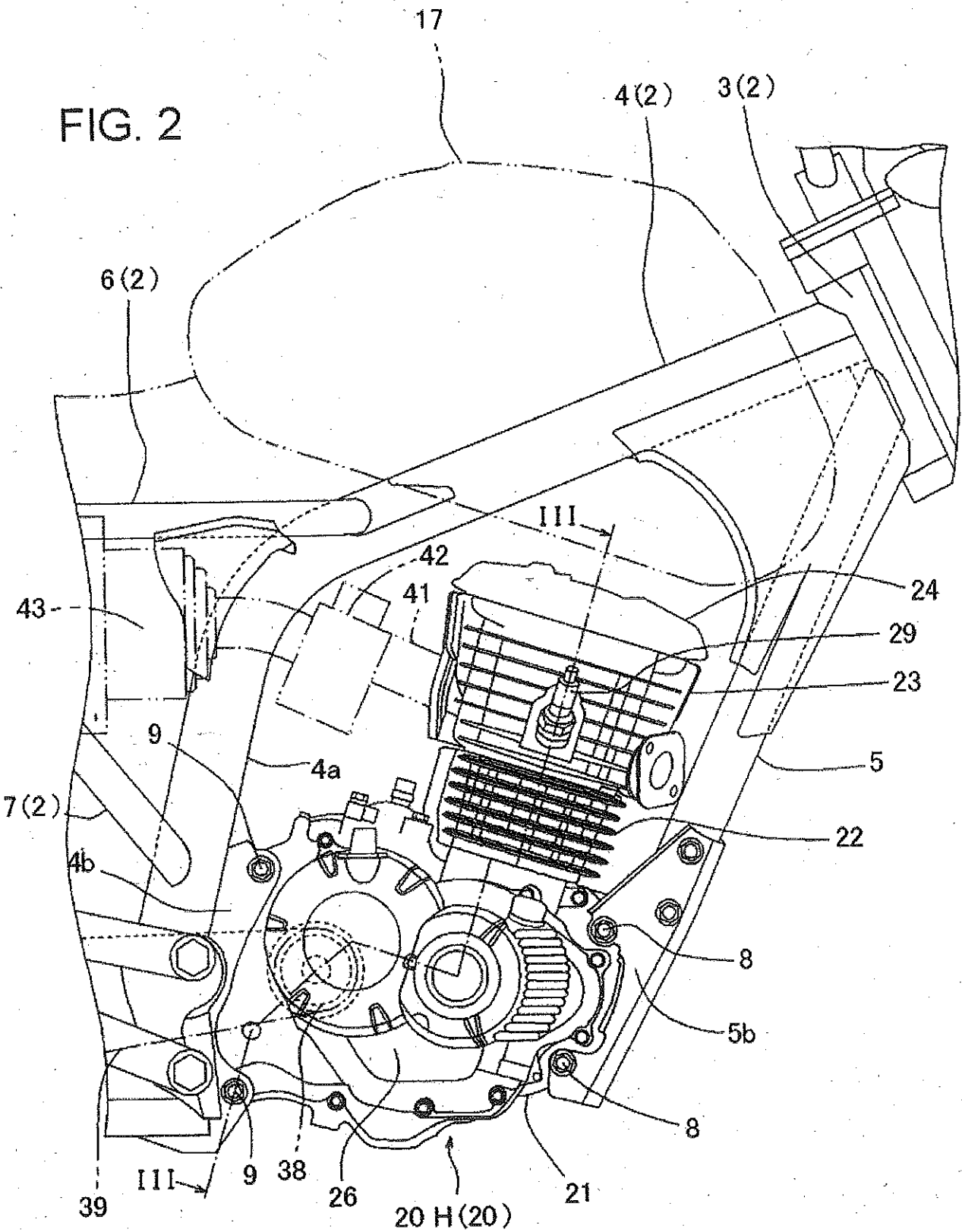


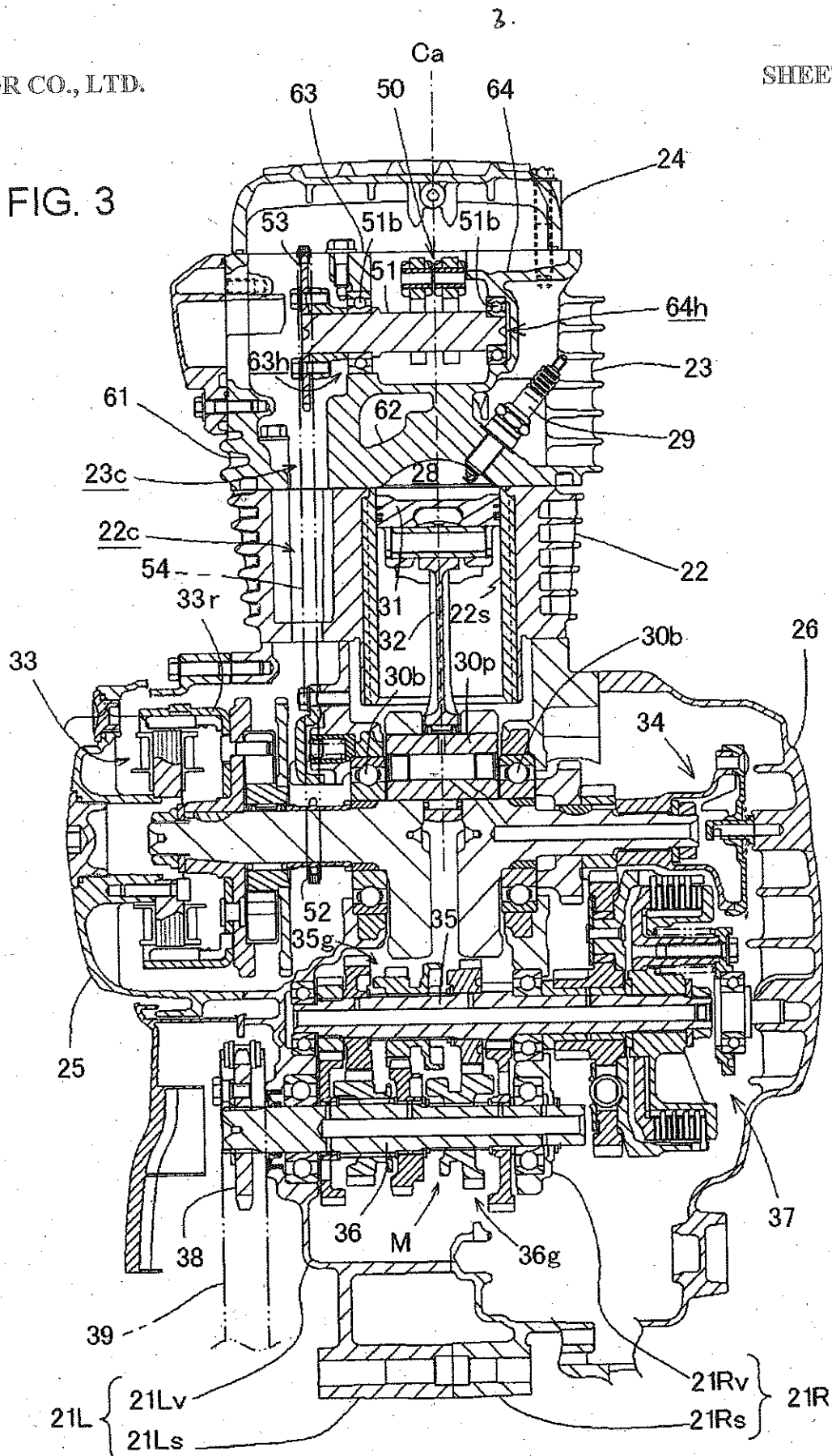
FIG. 1

FIG. 2



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FIG. 3



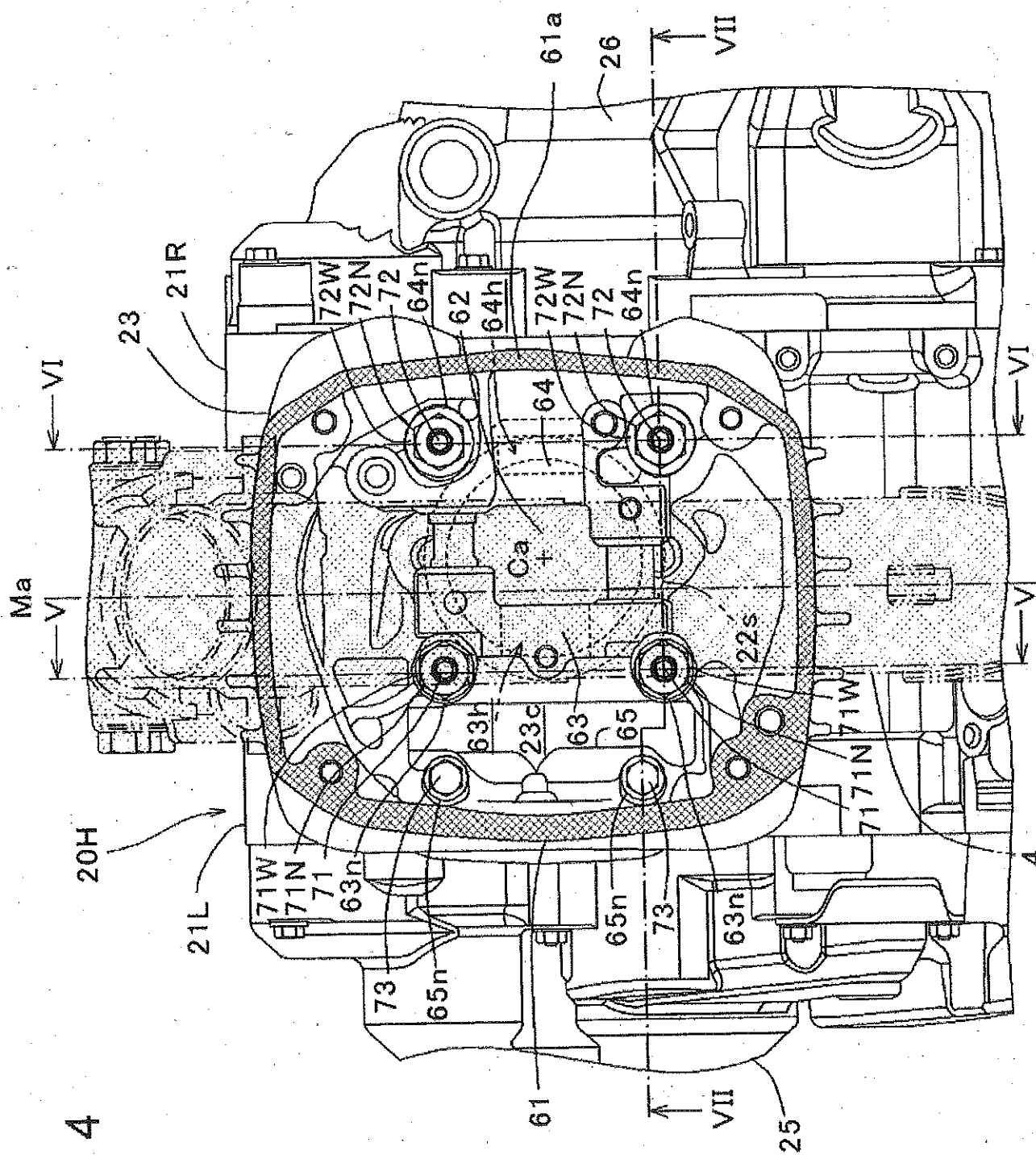
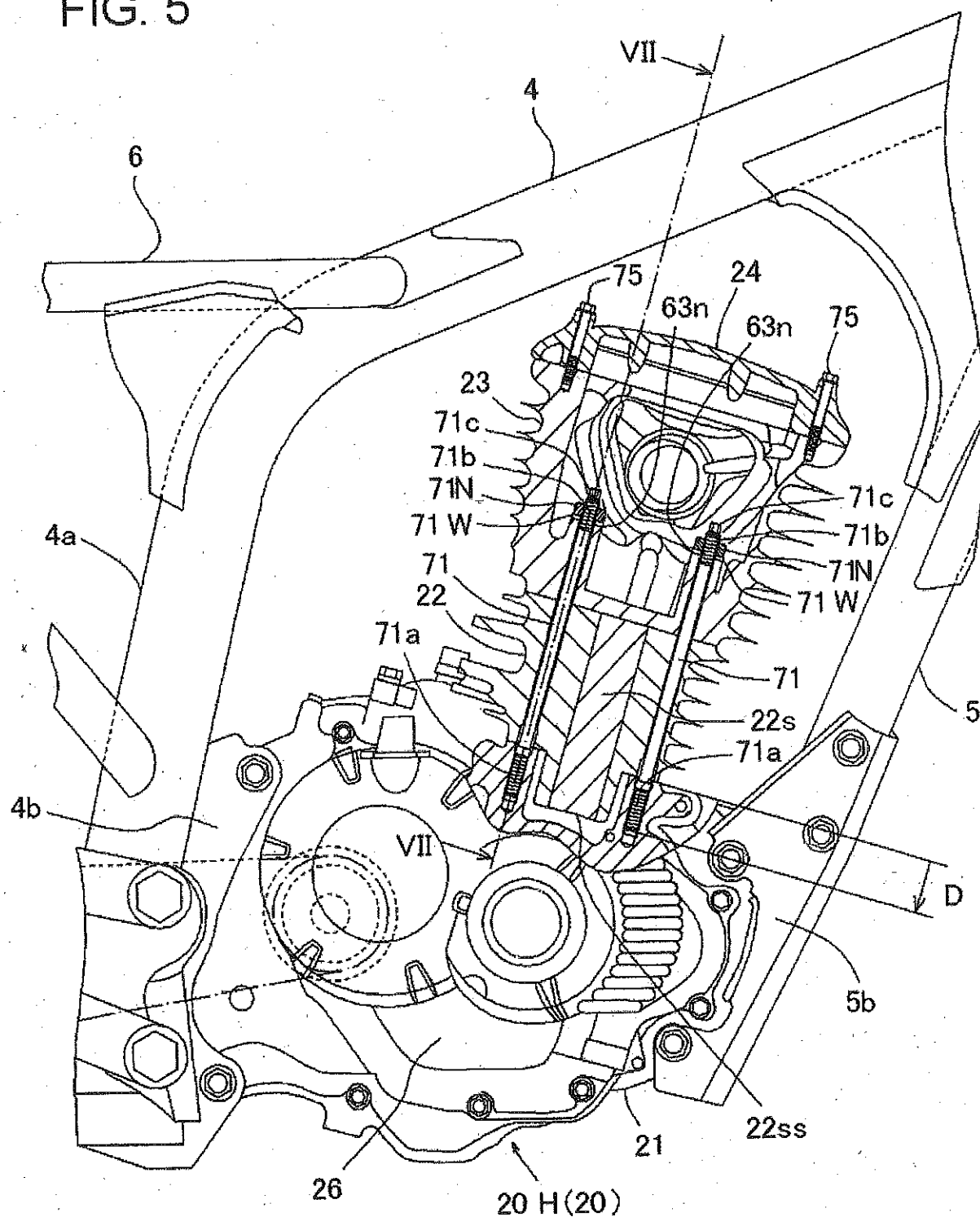


FIG. 4

FIG. 5



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FIG. 6

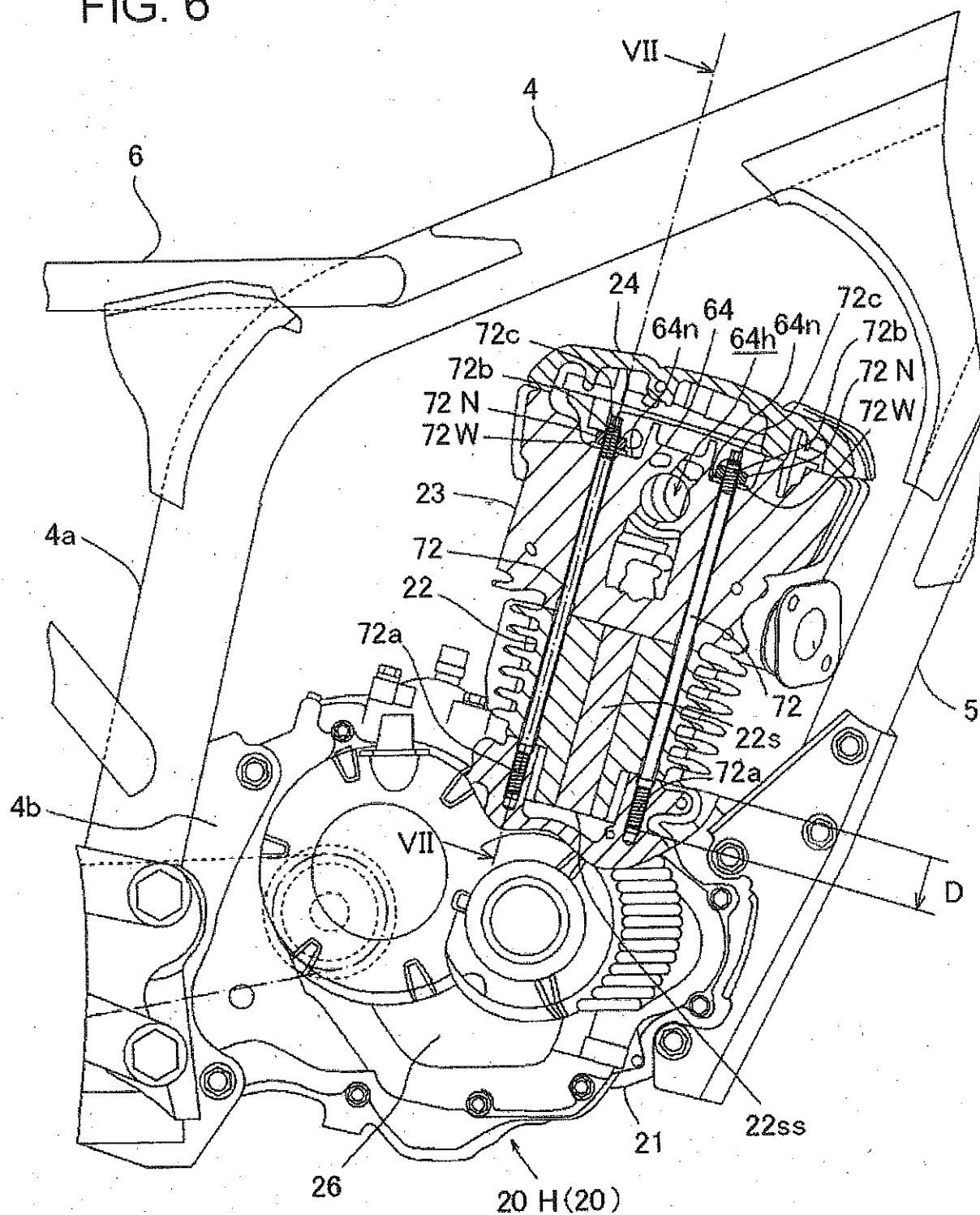


FIG. 7

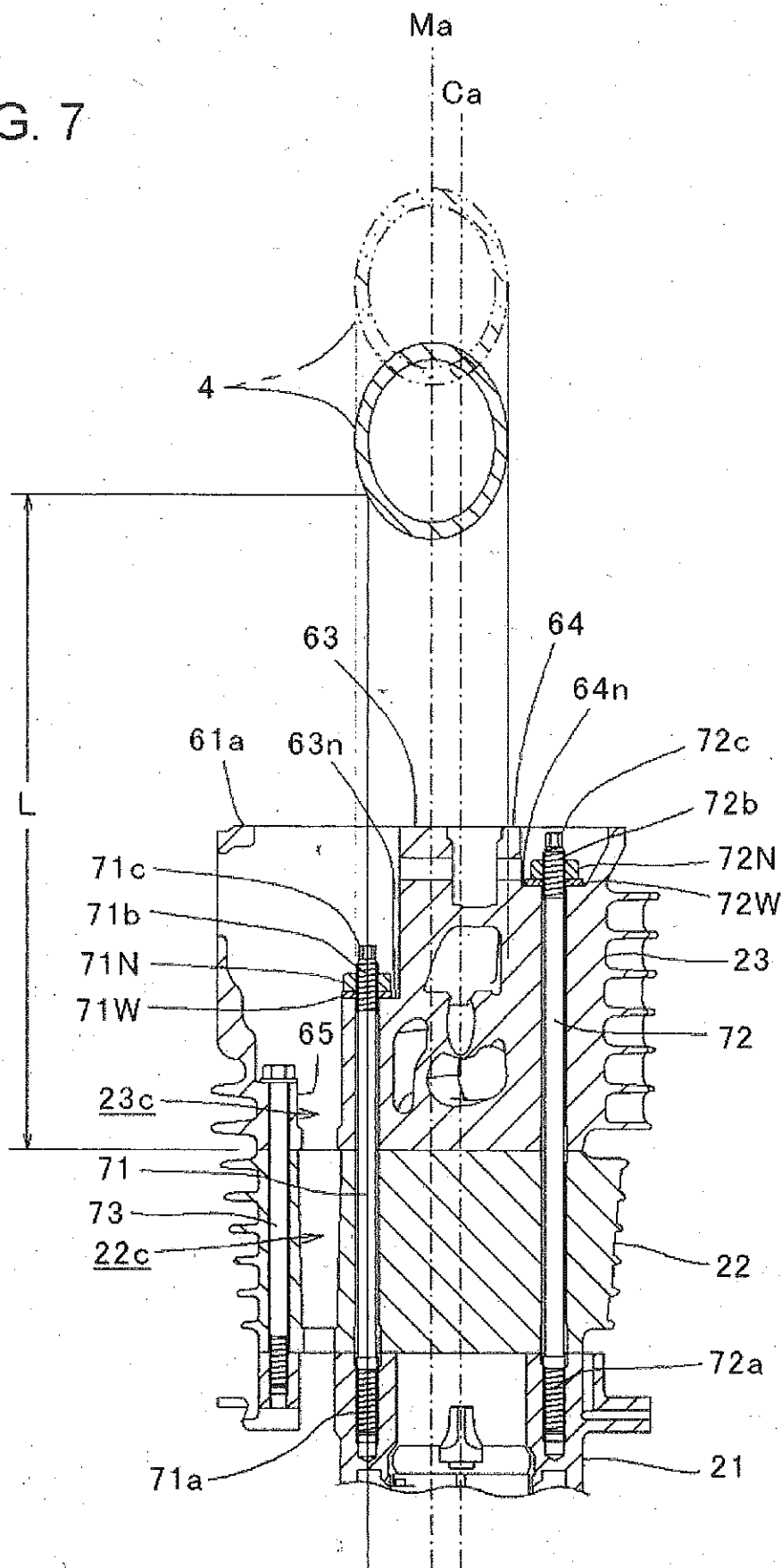
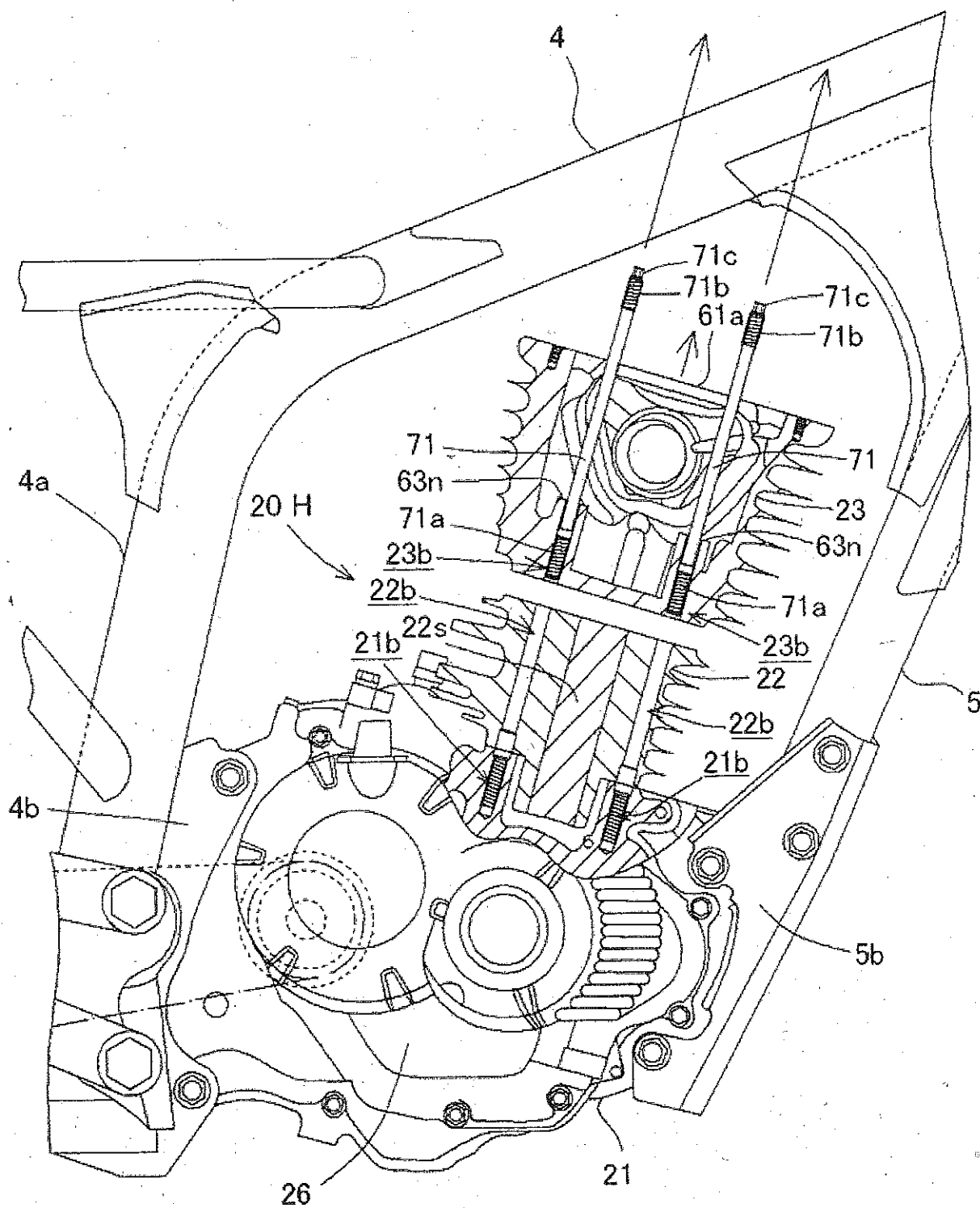
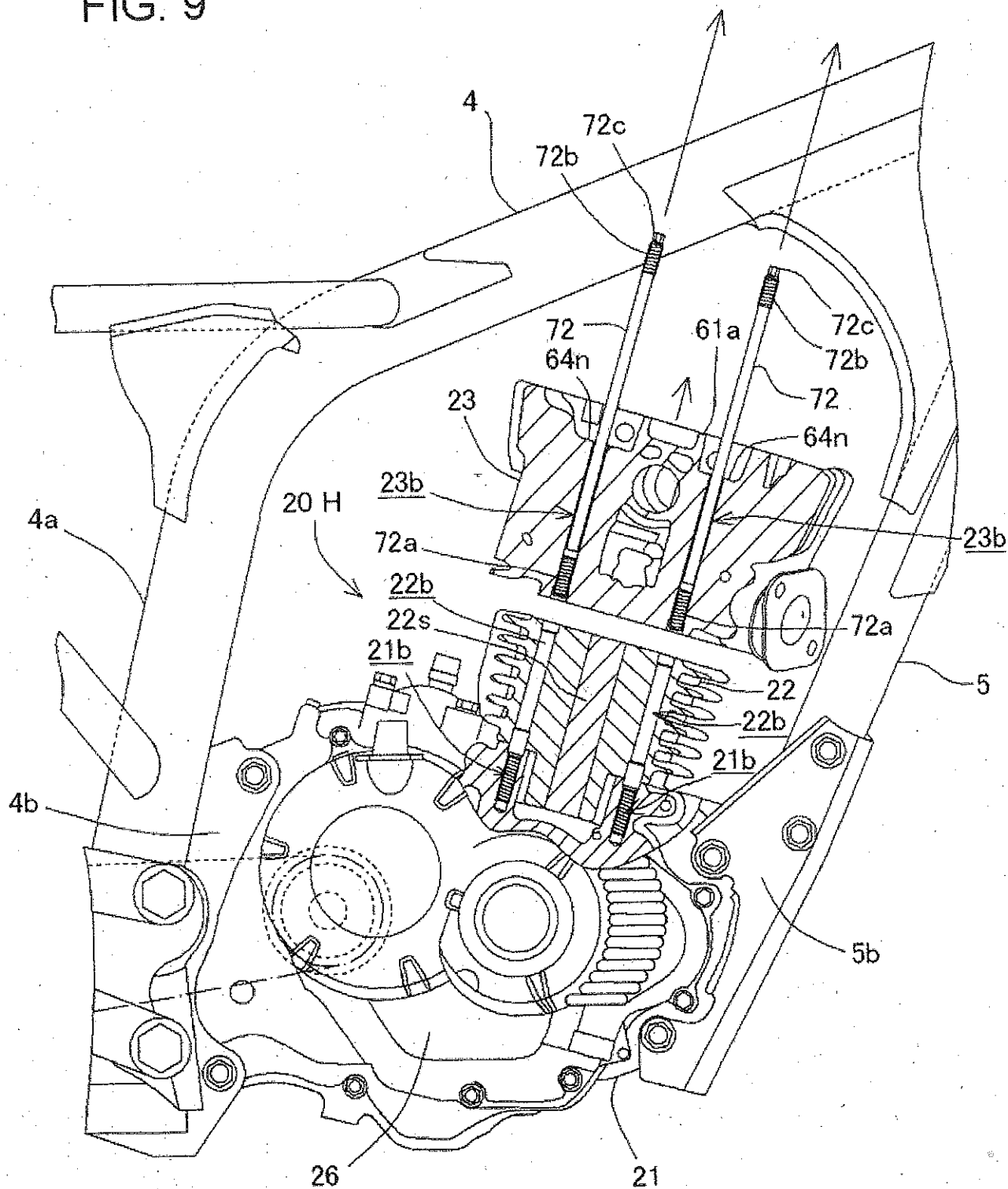


FIG. 8



[RANJNA MEHTA-DUTT]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

FIG. 9





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the nut mounting seat (63n) of the cylinder head (23) is configured to be contacted by the nut member (71N) which is screwed on the upper screw portion (71b) of the center neighboring stud bolt (71), wherein the nut mounting seat (63n) is located in such a position that a depth (E) from the upper end surface (61a) of the cylinder head (23) is greater than an implanted depth (D) of the implanting screw portion (71a) of the center neighboring stud bolt (71).

[0014]

According to a fifth feature of the present invention, in the internal combustion engine for the straddle type vehicle as defined in the third or fourth feature, an upper end of the frame width offset stud bolt (72) is located at substantially the same height as the upper end surface (61a) of the cylinder head (23).

[0015]

According to a sixth feature of the present invention, in the internal combustion engine for the straddle type vehicle as defined in any one of the first to fifth features, an implanted depth (D) of the crank case (21) into which the implanting screw portion (71a, 72a) of the stud bolt (71, 72) is screw-threaded is substantially identical to a projecting length of a projecting section (22ss) of a cylinder sleeve (22s) of the cylinder block (22) extending into a crank chamber.

[0016]

According to a seventh feature of the present invention, in the internal combustion engine for the straddle type vehicle as defined in any one of the first to sixth features, the internal combustion engine (20) has a single cylinder, and the cylinder block (22) has the cylinder sleeve (22a) which is offset, together with the stud bolts (71, 71) around the cylinder sleeve (22s), to either of left and right sides from the center in the vehicle width direction at which the main frame (4) is located, wherein the frame width offset stud bolt (72) is located on the offset side of the cylinder sleeve (22s), and a cam chain chamber (22c) is formed on an opposite side relative to the offset side of the cylinder sleeve (22s).

[0017]

cylinder head (23) is configured to be contacted by the nut member (71N) which is screwed on the upper screw portion (71b) of the center neighboring stud bolt (71), and the nut mounting seat (63n) is located in such a position that the depth (E) from the upper end surface (61a) of the cylinder head (23) is greater than the implanting depth (D) of the implanting screw portion (71a) of the center neighboring stud bolt (71). With this construction, when the implanting screw portion (71a) of the center neighboring stud bolt 71 is pulled out of the crank case (21), the center neighboring stud bolt (71) hardly projects from the cylinder head (23). Therefore, even if the upper space of the internal combustion engine (20) is narrow in the condition where the internal combustion engine (20) is mounted on the vehicle, the amount of movement for pulling out the center neighboring stud bolt (71) from the cylinder block (22) can be easily ensured, whereby the cylinder head (23) and the cylinder block (22) can be dismounted.

[0023]

According to the internal combustion engine for the straddle type vehicle as defined in the fifth feature, since the upper end of the frame width offset stud bolt (72), among the stud bolts (71, 72), the bolt center axis of which does not intersect with the main frame (4) is located at substantially the same height as the upper end surface of the cylinder head (23), the frame width offset stud bolt (72) can be properly lengthened while avoiding the increase in size of the internal combustion engine main body (20H). Therefore, the expansion of the cylinder block (22) and the cylinder head (23) accompanying the combustion of the internal combustion engine (20) is flexibly absorbed whereby the rigidity can be easily ensured.

[0024]

According to the internal combustion engine for the straddle type vehicle as defined in the sixth feature, since the implanted depth (D) of the crank case (21) into which the implanting screw portion (71a, 72a) of the stud

63n, 63n are located in a middle height position of the cylinder head 23 greatly recessed downwardly from the joining surface 61a constituting the upper end surface of the cylinder head 23.

Referring to FIGS. 5, a distance of the nut mounting seat 63n from the upper end surface 61a of the cylinder head 23 is greater than an implanting depth D of the implanting screw portion 71a. Therefore, each of the nut mounting seats 63n, 63n is located in such a position that a depth (E) from the upper end surface (61a) of the cylinder head (23) is greater than an implanted depth (D) of the implanting screw portion 71a.

[0056]

Further, referring to FIGS. 6 and 7, nut mounting seats 64n, 64n are formed by upper end opening surfaces of the bolt bore 23b, 23b which are located in the right bearing wall 64 of the cylinder head 23 and through which the front and rear frame width offset stud bolts 72, 72 pass. The nut mounting seats 64n, 64n are located in an upper height position of the cylinder head 23 slightly recessed downwardly from the joining surface 61a constituting the upper end surface of the cylinder head 23. Each of upper ends of the frame width offset stud bolts 72, 72 is located in substantially the same height position as the joining surface 61a and does not project upwardly from the joining surface 61a.

[0057]

Further, a lower part of a left side lateral wall of the rectangular head outer peripheral wall 61 of the cylinder head 23 swells out in the direction of the chain chamber 23c. In front of and in the rear of this swelling part 65 there are formed bolt bores 23b, 23b through which bolts 73, 73 pass. Bolt mounting seats 65n, 65n constituting upper opening surfaces of the bolt bores 23b, 23b are located in a lower height position greatly recessed downward from the joining surface 61a constituting the upper end surface of the cylinder head 23 (see FIG. 7).

[0058]

Corresponding to six bolt bores 23b of the cylinder head 23, bolt bores 22b are coaxially provided in the cylinder block 22, and implanted screw holes 21b are coaxially provided in the crank case 21.

stud bolts are offset from the main frame 4 outwardly in the vehicle width direction, and the center neighboring stud bolt 71 and the frame width offset stud bolt 72 can be arranged closer to each other so as to increase the tightening force. In addition, the cylinder can be tightened while keeping the good balance between left and right.

[0076]

The upper space from the internal combustion engine main body 20H to the main frame 4 is able to be limited to an extent that would prevent the contact between the center neighboring stud bolt 71 and the main frame 4 when the center neighboring stud bolt 71 is pulled out of the cylinder block 22, so that the upper space can be narrowed whereby it is possible to downsize the vehicle body.

[0077]

The nut mounting seat 63n of the cylinder head 23 to be contacted by the nut member 71N which is screwed on the upper screw portion 71b of the center neighboring stud bolt 71 is located below the upper end surface of the cylinder head 23. With this construction, the full length of the center neighboring stud bolt 71 can be shortened, so that the amount of movement for pulling out the stud bolt from the cylinder block 22 at the time of maintenance can be easily ensured, and the upper space of the internal combustion engine 20 can be narrowed whereby it is possible to downsize the vehicle body.

[0078]

The nut mounting seats 63n, 63n of the cylinder head 23 corresponding to the center neighboring stud bolts 71 is located in such a position that the depth (E) from the upper end surface (61a) of the cylinder head (23) is greater than the implanting depth (D) of the implanting screw portion 71a of the center neighboring stud bolt 71. With this construction, when the implanting screw portion 71a of the center neighboring stud bolt 71 is pulled out of the crank cas 21, the center neighboring stud bolt 71 hardly projects from the cylinder head 23. Therefore, even if the upper space of the internal combustion engine 20 is narrow in the condition where the internal combustion engine 20

surface of the cylinder head (23).

4. An internal combustion engine for a straddle type vehicle according to Claim 3, wherein the nut mounting seat (63n) of the cylinder head (23) is configured to be contacted by the nut member (71N) which is screwed on the upper screw portion (71b) of the center neighboring stud bolt (71), and wherein the nut mounting seat (63n) is located in such a position that a depth (E) from the upper end surface (61a) of cylinder head (23) is greater than an implanted depth (D) of the implanting screw portion (71a) of the center neighboring stud bolt (71).

5. An internal combustion engine for a straddle type vehicle according to claim 3 or 4, wherein an upper end of the frame width offset stud bolt (72) is located at substantially the same height as the upper end surface (61a) of the cylinder head (23).

6. An internal combustion engine for a straddle type vehicle according to any one of claims 1 through 5, wherein an implanted depth (D) of the crank case (21) into which the implanting screw portion (71a, 72a) of the stud bolt (71, 72) is screw-threaded is substantially identical to a projecting length of a projecting section (22ss) of a cylinder sleeve (22s) of the cylinder block (22) extending into a crank chamber.

7. An internal combustion engine for a straddle type vehicle according to any one of claims 1 through 6, wherein the internal combustion engine (20) has a single cylinder, and the cylinder block (22) has the cylinder sleeve (22a) which is offset, together with the stud bolts (71, 71) around the cylinder sleeve (22s), to either of left and right sides from the center in the vehicle width direction at which the main frame (4) is located, and wherein the frame width offset stud bolt (72) is located on the offset side of the cylinder sleeve (22s), and a cam chain chamber (22c) is formed on an opposite side with respect to the offset side of the cylinder sleeve (22s).

8. An internal combustion engine for a straddle type vehicle according to any one of claims 1 to 7, wherein an implanted screw hole (21b, 21b) of the crank case (21) into which the implanting screw portion (71a, 72a) of the stud bolt (71, 72) is screw-threaded is a screw hole with a closed bottom.

Dated this 26.11.2014


[NISHANT SHARMA]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANT[S]

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