(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 397 660 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
10.02.2016 Bulletin 2016/06

(51) Int Cl.:
F01L 1/26 *(2006.01)* ***F01L 1/18*** *(2006.01)*
F01L 13/00 *(2006.01)*

(21) Application number: **11167016.2**

(22) Date of filing: **23.05.2011**

(54) **Structure of driving member of engine valve**

Struktur zum Antreiben eines Motorventilelements

Structure d'élément de commande de soupape de moteur

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **15.06.2010 TW 099119479**

(43) Date of publication of application:
21.12.2011 Bulletin 2011/51

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Printed by Jouve, 75001 PARIS (FR)

Description

(a) Technical Field of the Invention

[0001] The present invention generally relates to a driving member of valve of engine, and more particularly to a structure of valve driving member of engine that simplifies engineering of variable lift of an engine valve.

(b) Description of the Prior Art

[0002] FIG 1 of the attached drawings shows a conventional structure of valve variable-lift mechanism for an engine 1, wherein first and second driving members 21, 22 are arranged above an engine valve 2. The second driving member 22 is a multiple-link assembly. The first and second driving members 21, 22 may individually drive the engine valve 2 to realize variation of lift stroke of the engine valve 2. In other words, when the engine valve 2 is driven by the first driving member 21, the engine valve 2 is of a small lift opening condition, while when the engine valve 2 is driven by the second driving member 22, the engine valve 2 is of a large lift opening condition. As such, switching of intake and exhaust valves can be realized for different lifts of engine valve 2 according to rotational speeds of the engine 1.

[0003] The conventional structure of valve variable-lift mechanism for the engine 1 described above uses the first and second driving members 21, 22 arranged above the engine valve 2 to individually drive the engine valve 2. Although this is effective to realize switching of intake and exhaust valves for different lifts of engine valve 2 according to the rotational speeds of the engine 1, yet the second driving member 22 is of a multiple-link assembly, which is complicated in structure and requires quite an amount of space for operation. Thus, the cylinder head 1a of the engine 1 must be enlarged in order to provide a sufficient amount of space for the operation of the second driving member 22. Enlarging the cylinder head 1a of the engine 1 will certainly increase the cost of the engine 1 and also increase complication of engineering for the engine 1. For a motorcycle or scooter, the amount of space provided for accommodating an engine 1 is very limited. Thus, it is desired to provide a structure-simplified valve variable-lift mechanism for engines and this is a major challenge of the motorcycle/scooter industry.

[0004] Reference documents are known in the field, including US 5 207 193 A, EP 0 607 918 A1, EP 0 661 417 A2, EP 2 180 152 A1, and EP 0276 577 A1.

[0005] US 5 207 193 A discloses a valve operating system in internal combustion engine, wherein the engine comprise a crankcase, a cylinder block (10) mounted on the crankcase, and a cylinder head (11) mounted on the cylinder block (10). The cylinder head (11) comprises an intake port (17) and an intake valve (V_{I1}, V_{I2}) and an exhaust port (18) and an exhaust valve (V_{E1}, V_{E2}). A camshaft seat is arranged between the intake valve (V_{I1}, V_{I2}) and the exhaust valve (V_{E1}, V_{E2}). The camshaft seat comprises a camshaft (25) that is driven by a timing chain. The camshaft (25) comprises a first intake cam (33), a second intake cam (31), and an exhaust cam (34, 35) mounted thereto, whereby through the first intake cam (33), the second intake cam (31), and the exhaust cam (34, 35), the camshaft (25), when put in rotation, drives an intake valve driving member (38,36) or an exhaust valve driving member (41,42), and further, through the intake valve driving member (38,36) or the exhaust valve driving member (41, 42), the intake valve (V_{I1}, V_{I2}) or the exhaust valve (V_{E1}, V_{E2}) is caused to operate and wherein the intake valve driving member (38,36) comprises a first driving member (36) and a second driving member (36). The first driving member (38) forms a positioning hole, a bore (69), and a push roller (44). The second driving member (3 6) forms a positioning hole, a bore (65), a push roller (43), and a pressing section. The positioning holes of the first driving member (38) and the second driving member (36) receive extension of a shaft rod (39) therethrough. The push roller (44) of the first driving member (38) is in engagement with the first intake cam (33). The push roller (43) of the second driving member (36) is in engagement with the second intake cam (31). The pressing section of the second driving member (36) is in engagement with the intake valve (V_{I1}). The bore (69) of the first driving member (38) and the bore (65) of the second driving member (36) are in communication with each other to form a hydraulic cylinder, whereby the hydraulic cylinder allows the first driving member (38) and the second driving member (36) to operate independent of each other in a low lift opening condition of the intake valve (V_{I1}) and allows the first driving member (38) and the second driving member (39) to operatively connect to each other in a high lift opening condition of the intake valve (V_{I1}).

[0006] However, US 5 207 193 A does not teach a position-constraining mechanism comprising a position-constraining rod in pushing engagement with positioning bars of the first and second driving members. US 5 207 193 A also does not teach the position-constraining mechanism comprises a pressure relief hole. Further, US 5 207 193 A does not teach the positioning bars of the first and second driving members are located between positioning holes and a pressing section.

[0007] EP 0 607 918 A1 discloses a SOHC-type valve operating system in internal combustion engine, which comprises a single cam shaft commonly provided for a pair of intake valves and a pair of exhaust valves. A plurality of intake valve driving members are rockably disposed between the cam shaft and the pair of intake valve and have a operative-connection switchover mechanism for switching over the connection and disconnection of the intake valve driving members. However, EP 0 607 918 A1 does not teach a position-constraining mechanism comprising a position-constraining rod in pushing engagement with positioning bars of the first and second driving members. EP 0 607 918 A1 also does not teach

the position-constraining mechanism comprises a pressure relief hole. Further, EP 0 607 918 A1 does not teach the positioning bars of the first and second driving members are located between positioning holes and a pressing section.

[0008] EP 0 661417 A2 discloses a valve operating device for internal combustion engine, which comprises a plurality of rocker arms, a plurality of cams provided on a cam shaft in independent correspondence to the rocker arms, and a connection switchover device capable of switching over the connection and disconnection of the rocker arms in combination. However, EP 0 661 417 A2 does not teach a position-constraining mechanism comprising a position-constraining rod in pushing engagement with positioning bars of the first and second driving members. EP 0 661417 A2 also does not teach the position-constraining mechanism comprises a pressure relief hole. Further, EP 0 661 417 A2 does not teach the positioning bars of the first and second driving members are located between positioning holes and a pressing section.

[0009] EP 2 180 152 A1 discloses a valve gear control device for internal combustion engine, in which hydraulic pressure applied to a valve operation mode changing mechanism is controlled by hydraulic pressure control means that is formed from a holder mounted on a cylinder head, a spool valve formed by slidably housing a spool valve body in a valve body, and an electromagnetic open/close valve for controlling hydraulic pressure of a pilot hydraulic chamber. However, EP 2 180 152 A1 does not teach a position-constraining mechanism comprising a position-constraining rod in pushing engagement with positioning bars of the first and second driving members. EP 2 180 152 A1 also does not teach the position-constraining mechanism comprises a pressure relief hole. Further, EP 2 180 152 A1 does not teach the positioning bars of the first and second driving members are located between positioning holes and a pressing section.

[0010] EP 0276 577 A1 discloses a valve operating mechanism for an internal combustion engine, which comprises a low-speed cam for operating the intake or exhaust valves during low-speed operation of the engine and a high-speed cam for operating the intake or exhaust valves during high-speed operation of the engine. However, EP 0276 577 A1 does not teach a position-constraining mechanism comprising a position-constraining rod in pushing engagement with positioning bars of the first and second driving members. EP 0276 577 A1 also does not teach the position-constraining mechanism comprises a pressure relief hole. Further, EP 0276 577 A1 does not teach the positioning bars of the first and second driving members are located between positioning holes and a pressing section.

SUMMARY OF THE INVENTION

[0011] The primary objective of the present invention is to provide a structure of driving member of valve of engine, wherein the engine comprises a crankcase, a cylinder block mounted on the crankcase, and a cylinder head mounted on the cylinder block. The cylinder head comprises an intake port and an intake valve and an exhaust port and an exhaust valve, and an oil control valve. A camshaft seat is arranged between the intake valve and the exhaust valve. The camshaft seat comprises a camshaft that is driven by a timing chain. The camshaft comprises a first intake cam, a second intake cam, and an exhaust cam mounted thereto. Through the first intake cam, the second intake cam, and the exhaust cam, the camshaft, when put in rotation, drives an intake valve driving member or an exhaust valve driving member, and further, through the intake valve driving member or the exhaust valve driving member, the intake valve or the exhaust valve is caused to take a lift for intake or exhaust operation. The intake valve driving member comprises a first driving member and a second driving member. The first driving member forms a positioning hole, a bore, and a push roller and the second driving member forms a positioning hole, a bore, a push roller, and a pressing section. The push roller of the first driving member is in engagement with the first intake cam and the push roller of the second driving member is in engagement with the second intake cam. Further, the pressing section of the second driving member is in engagement with the intake valve. The bore of the first driving member and the bore of the second driving member are in communication with each other to form a hydraulic cylinder. The hydraulic cylinder has two ends respectively closed by closure caps. The hydraulic cylinder receives therein a spring and first and second pistons. As such, the first driving member and the second driving member can be selectively driven to operate independent of each other or in combination with each other to vary the lift of an engine intake valve thereby simplifying the engineering of variable lift for engine intake vale.

[0012] Another objective of the present invention is to provide a structure of driving member of valve of engine, wherein a position-constraining mechanism is arranged above the cylinder head and the position-constraining mechanism comprises a position-constraining rod, a spring, and a pressure relief hole, whereby with the position-constraining mechanism being in pushing engagement with the first driving member and the second driving member the positioning bar, it is ensured that the bores of the first and second driving members can be set at predetermined locations.

[0013] A further objective of the present invention is to provide a structure of driving member of valve of engine, wherein the first driving member and the second driving member comprise positioning bars that are located between the positioning holes and the pressing section and the bores of the first and second driving members are located between the push rollers and the positioning holes and located above a center-connection line connecting between centers of the push rollers and the positioning holes whereby the overall height of the cylinder

head is effectively reduced.

[0014] The foregoing objectives and summary provide only a brief introduction to the present invention. To fully appreciate these and other objects of the present invention as well as the invention itself, all of which will become apparent to those skilled in the art, the following detailed description of the invention and the claims should be read in conjunction with the accompanying drawings. Throughout the specification and drawings identical reference numerals refer to identical or similar parts.

[0015] Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed description and the accompanying sheets of drawings in which a preferred structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

FIG 1 is schematic view showing a conventional cylinder head.

FIG 2 is a perspective view illustrating an engine cylinder head according to the present invention.

FIG 3 is a cross-sectional view of a portion of the cylinder head according to the present invention.

FIG 4 is a perspective view illustrating a camshaft according to the present invention.

FIG 5 is a top view of the cylinder head according to the present invention.

FIG 6 is a perspective view illustrating an exhaust valve driving member according to the present invention.

FIG 7 is an exploded view illustrating an intake valve driving member according to the present invention.

FIGS. 8 and 9 are schematic views illustrating the operation of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] The following descriptions are exemplary embodiments only, and are not intended to limit the scope, applicability or configuration of the invention in any way. Rather, the following description provides a convenient illustration for implementing exemplary embodiments of the invention. Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims.

[0018] Referring to FIG 2, the present invention provides an engine 3, which comprises a crankcase 31, a cylinder block 32 that is mounted on the crankcase 31, and a cylinder head 33 that is mounted on the cylinder block 32.

[0019] The crankcase 31 comprises a crankshaft (not shown) arranged therein. The crankcase 31 comprises an oil pump 311 arranged therein. The oil pump 311 pumps oil to a primary oil supply passage 312. The primary oil supply passage 312 extends from the crankcase 31 through the cylinder block 32 to communicate an oil control valve 4 that is mounted to the cylinder head 33.

[0020] The cylinder block 32 is mounted on the crankcase 31 and receives a timing chain 5 to extend therethrough. The cylinder block 32 comprises a timing chain tensioner 51 that is arranged at a side corresponding to an intake port 331 of the cylinder head 33.

[0021] The cylinder head 33 comprises the intake port 331 that is arranged at an intake side and an intake valve 332 and an exhaust port 333 that is arranged at an exhaust side and an exhaust valve 334. Referring to FIGS. 2,3,4, and 5, the cylinder head 33 comprises a camshaft seat 335 that is integrally formed between the intake valve 332 and the exhaust valve 334. The camshaft seat 335 comprises a camshaft 336 that is driven by the timing chain 5. The camshaft 336 comprises a first intake cam (high lift cam) 3361, a second intake cam (low lift cam) 3362, and an exhaust cam 3363 mounted thereto. Through the first intake cam 3361, the second intake cam 3362, and the exhaust cam 3363, the camshaft 336, when in rotation, may drive an intake valve driving member 6 and an exhaust valve driving member 7 of the intake valve 332 and the exhaust valve 334. Referring to FIGS. 3, 5, and 6, the exhaust valve driving member 7 has an end forming a pressing section 71, which is in engagement with the exhaust valve 334 and has an end forming a gap adjusting member 711, and an opposite end forming a push roller 72, which is in engagement with the exhaust cam 3363. A bearing sleeve 73 extends sideways from a side of the exhaust valve driving member 7 for receiving the extension of a shaft rod 74 therethrough. Through the shaft rod 74, the exhaust valve driving member 7 is securely positioned on the camshaft seat 335, whereby the exhaust cam 3363 of the camshaft 336 may drive the push roller 72 to have the pressing section 71 pressing the exhaust valve 334 for opening the exhaust valve to discharge exhaust gas. A gap between the pressing section 71 and the exhaust valve 334 can be adjusted through the gap adjusting member 711 in order to ensure the exhaust valve 334 has a desired lift stroke. Further, referring to FIGS. 3, 5, and 7, the intake valve driving member 6 comprises a first driving member 61 and a second driving member 62. The first driving member 61 forms in a front portion thereof a positioning hole 611, a positioning bar 612 being arranged to project from a front lower side of the positioning hole 611, and also forms a through bore 613 at a location behind the positioning hole 611, a push roller 614 being arranged behind the bore 613. Corresponding to the first driving member 61, the second driving member 62 forms, in sequence, a positioning hole 621, a positioning bar 622, a through bore 623, and a push roller 624. Further, the second driving member 62 comprises a pressing section 625 extending from a front side of the positioning hole 621 and the press-

ing section 625 has a front end forming a gap adjusting member 6251. The push roller 614 of the first driving member 61 is set in engagement with the first intake cam 3361 of the camshaft 336, while the push roller 624 of the second driving member 62 is in engagement with the second intake cam 3362 of the camshaft 336. Further, the pressing section 625 of the second driving member 62 is in engagement with the intake valve 332. A gap between the pressing section 625 and the intake valve 332 can be adjusted through the gap adjusting member 6251 in order to ensure that the intake valve 332 has a desired lift stroke. Further, with a shaft rod 63 received through the positioning holes 611, 621, the first driving member 61 and the second driving member 62 are securely positioned on the camshaft seat 335, whereby the first driving member 61 and the second driving member 62 are reciprocally rotatable about a center defined by the shaft rod 63. Further, as shown in FIG 3, the positioning bars 612, 622 of the first driving member 61 and the second driving member 62 are respectively arranged at locations between the positioning holes 611, 621 and the pressing section 625. The bores 613, 623 of the first driving member 61 and the second driving member 62 are located between the push rollers 614, 624 and the positioning holes 611, 621 and are located above a center-connection line A connecting between centers of the push roller 614, 624 and the positioning holes 611, 621 so as to effectively reduce the overall height of the cylinder head 33. Referring to FIGS. 5, 7, 8, and 9, the bore 613 of the first driving member 61 and the bore 623 of the second driving member 62 are arranged to connect to and communicate each other to collectively form a hydraulic cylinder 64. The hydraulic cylinder 64 has opposite ends that are respectively closed and sealed by closure caps 641a, 641b. Each of the closure caps 641a, 641b forms a projecting peg 6411a, 6411b extending inward of the hydraulic cylinder 64. The hydraulic cylinder 64 receives therein a spring 642 and a first piston 643 and a second piston 644, which are hydraulically movable by oil pressure. The hydraulic cylinder 64 is connected through driving oil passages 65, 66 to the oil control valve 4 in order to receive hydraulic power therefrom. Further, the first piston 643 has two ends respectively forming a first recess 6431 and a second recess 6432 for the purposes of reducing weight of the first piston 643 and thus enhancing movability of the first piston 643 within the hydraulic cylinder 64. The first recess 6431 is shaped to receive the projecting peg 6411a of the closure cap 641a therein and the projecting peg 6411b of the closure cap 641b is engageable with an end of the second piston 644, whereby the first piston 643 and the second piston 644 are spaced from the ends of the hydraulic cylinder 64 by distances to allow oil flowing through the driving oil passages 65, 66 into the hydraulic cylinder 64 may reliably move the first piston 643 and the second piston 644. Further, with the projecting pegs 6411a, 6411b of the closure caps 641a, 641b, the first piston 643 and the second piston 644 are positionable at predetermined locations during their operations so as to ensure the movability of the first piston 643 and the second piston 644 within the hydraulic cylinder 64. Further, the cylinder head 33 is provided, at a location below the positioning bars 612, 622, with a position-constraining mechanism 337. The position-constraining mechanism 337 comprises a position-constraining rod 3371, a spring 3372, and a pressure relief hole 3373. The position-constraining mechanism 337 is provided for supporting pushing engagement of the positioning bars 612, 622 in order to ensure that the bore 613 of the first driving member 61 and the bore 623 of the second driving member 62 can be set at predetermined locations. Further, when the position-constraining mechanism 337 is acted upon by undue pushing forces applied by the positioning bars 612, 622, the pressure relief hole 3373 is timely opened to release pressure in order to ensure the movability of the first piston 643 and the second piston 644 within the hydraulic cylinder 64.

[0022] To practice the present invention, as shown in FIGS. 2, 3, 8, and 9, the oil pump 311 arranged in the crankcase 31 pumps oil to the primary oil supply passage 312, which extends from the crankcase 31 through the cylinder block 32 to communicate the oil control valve 4 that is mounted to the cylinder head 3, wherein the oil control valve 4 supplies the oil into the driving oil passages 65, 66 of the cylinder head 33 to feed into the hydraulic cylinder 64. Further, as shown in FIGS. 8 and 9, through detection of traveling condition of a vehicle by an ECU (not shown) of the engine 3, if it is determined that the engine valve requires only low lift opening, the ECU of the engine 3 instructs the oil control valve 4 to feed the oil through the driving oil passage 65 into the hydraulic cylinder 64, as shown in FIG 8, whereby through the oil pressure and a spring force of the spring 642, the first piston 643 and the second piston 644 are moved in a direction toward the first driving member 61. The oil, after flowing through the driving oil passage 65 into the bore 621 of the second driving member 62, is guided by the projecting peg 6411 of the closure cap 641a and the first piston 643 into the recess 6431 of the first piston 643, and at the same time, the oil contained in the first driving member 61 is forced to discharge through the driving oil passage 66, whereby the second piston 644 is moved to locate within the first driving member 61 and is positioned at a predetermined location by the projecting peg 6411b of the closure cap 6411b at the side corresponding to the first driving member 61 and the first piston 643 is located in the second driving member 62. Under this condition, the first driving member 61 and the second driving member 62 are allowed to rotate independent of each other. Since the pressing section 625 at the front end of the second driving member 62 is in engagement with the intake valve 332 and the push roller 624 at the rear end of the second driving member 62 is in engagement with the second intake cam (low lift cam) 3362 of the camshaft 336, the intake valve 332 of the engine 3 is set in a low lift opening condition. Further, when the engine 3 is

switched, due to change of vehicle traveling condition, to a high lift opening condition for the intake valve, the ECU of the engine 3 instructs the oil control valve 4 to feed oil through the driving oil passage 66 into the hydraulic cylinder 64, as shown in FIG 9, whereby the oil flows through the driving oil passage 66 into the bore 613 of the first driving member 6 and at the same time, the oil contained in the bore 623 of the second driving member 62 is discharged. Through the oil pressure, the first piston 643 and the second piston 644 are moved in a direction toward the second driving member 62 to have the first piston 643 located in the second driving member 62 and through the constrain imposed by the projecting peg 6411 a of the closure cap 641a of the second driving member 62, the first piston 643 and the second piston 644 are located at predetermined locations where the second piston 644 is set between the first driving member 61 and the second driving member 62, whereby the first driving member 61 and the second driving member 62 are coupled to each other. Since the push roller 614 at the rear end of the first driving member 61 is in engagement with the first intake cam (high lift cam) 3361 of the camshaft 336 and the pressing section 625 at the front end of the second driving member 62 is in engagement with the intake valve 332, the second driving member 62 is moved by the first driving member 61 to set the intake valve 332 to a desired high lift opening condition according to the lift of the first intake cam (high lift cam) 3361. As such, variable valve lift of the engine 3 can be realized.

[0023] Efficacies of the present invention are that the camshaft 336 is provided with the first intake cam 3361, the second intake cam 3362, and the exhaust cam 3363, and the intake valve driving member 6 comprises the first driving member 61 and the second driving member 62, and further, the bore 613 of the first driving member 61 and the bore 623 of the second driving member 62 are in communication with each other to form the hydraulic cylinder 64, with the spring 642 and the first piston 643 and the second piston 644 that are movable hydraulically and by the spring 642 being contained within the hydraulic cylinder 64, the first driving member 61 and the second driving member 62 are selectively rotatable independent of each other or in combination with each other to vary lift stroke of the intake valve 332 of the engine 3, and thus simplifying engineering of variable lift for the engine valve 332 of the engine 3. Further, with the positioning bars 612, 622 of the first driving member 61 and the second driving member 62 located between the positioning holes 611, 621 and the pressing section 625 and with the bores 613, 623 of the first driving member 61 and the second driving member 62 located between the push rollers 613, 6232 and the positioning holes 611, 621 and located above the center-connection line A connecting between centers of the push rollers 614, 624 and the positioning holes 611, 621, the overall height of the cylinder head 33 is effectively reduced.

Claims

1. A driving member of a valve of an engine, the engine (3) comprising a
crankcase (31), a cylinder block (32) mounted on the crankcase (31), and a cylinder head (33) mounted on the cylinder block (32), the cylinder head (33) comprising an intake port (331) and an intake valve (332) and an exhaust port (333) and an exhaust valve (334), a camshaft seat (335) being arranged between the intake valve (332) and the exhaust valve (334), the camshaft seat (335) comprising a camshaft (336) that is driven by a timing chain (5), the camshaft (336) comprising a first intake cam (3361), a second intake cam (3362), and an exhaust cam (3363) mounted thereto, whereby through the first intake cam (3361), the second intake cam (3362), and the exhaust cam (3363), the camshaft (336), when put in rotation, drives an intake valve driving member (6) or an exhaust valve driving member (7), and further, through the intake valve driving member (6) or the exhaust valve driving member (7), the intake valve (332) or the exhaust valve (334) is caused to operate, the intake valve driving member (6) comprising
a first driving member (61) and a second driving member (62), the first driving member (61) forming a positioning hole (611), a bore (613), and a push roller (614), the second driving member (62) forming a positioning hole (621), a bore (623), a push roller (624), and a pressing section (625), the positioning holes (611, 612) of the first driving member (61) and the second driving member (62) receiving extension of a shaft rod (63) therethrough, the push roller (614) of the first driving member (61) being in engagement with the first intake cam (3361), the push roller (624) of the second driving member (62) being in engagement with the second intake cam (3362), the pressing section (625) of the second driving member (62) being in engagement with the intake valve (332), the bore (613) of the first driving member (61) and the bore (623) of the second driving member (62) being in communication with each other to form a hydraulic cylinder (64), whereby the hydraulic cylinder (64) allows the first driving member (61) and the second driving member (62) to operate independent of each other in a low lift opening condition of the intake valve (332) and allows the first driving member (61) and the second driving member (62) to operatively connect to each other in a high lift opening condition of the intake valve (332), the cylinder head (33) comprising a position-constraining mechanism (337) in pushing engagement with the first driving member (61) and the second driving member (62), the position-constraining mechanism (337) comprising a position-constraining rod (3371), a spring (3372), and a pressure relief hole (3373), the first driving member (61) and the second driving member (62) comprising

positioning bars (612, 622), that are in pushing engagement with the position-constraining rod (3371) of the position-constraining mechanism (337), the positioning bars (612, 622) of the first driving member (61) and the second driving member (62) being located between the positioning holes (611, 621) and the pressing section (625).

2. The valve driving member of engine according to claim 1, wherein the cylinder head (33) comprises an oil control valve (4).

3. The valve driving member of engine according to claim 1, wherein the bores (613, 623) of the first driving member (61) and the second driving member (62) are located between the push rollers (614, 624) and the positioning holes (611, 621) and are located above a center-connection line (A) connecting between centers of the push rollers (614, 624) and the positioning holes (611, 621).

4. The valve driving member of engine according to claim 1 or 3, wherein the first driving member (61) and the second driving member (62) are each formed integrally.

5. The valve driving member of engine according to claim 1, wherein the pressing section (625) comprises a gap adjusting member (6251).

6. The valve driving member of engine according to claim 1, wherein the hydraulic cylinder (64) has two ends respectively closed by closure caps (641a, 641b) and receives therein a spring (642), the first piston (643), and the second piston (644).

7. The valve driving member of engine according to claim 6, wherein the first piston (643) forms a first recess (6431) and a second recess (6432).

8. The valve driving member of engine according to claim 7, wherein the closure caps (641a, 641b) form projecting pegs (6411 a, 6411b) projecting inward of the hydraulic cylinder (64).

Patentansprüche

1. Struktur zum Antreiben eines Motorventilelements, wobei der Motor (3) folgendes umfasst:

ein Motorgehäuse (31), einen Zylinderblock (32), der auf das Motorgehäuse montiert (31) ist, und einen Zylinderkopf (33), der auf den Zylinderblock (32) montiert ist, wobei der Zylinderkopf (33) ein Einlassöffnung (331) und ein Einlassventil (332) und einen Auslass (333) und ein Auslassventil (334) umfasst, wobei eine Nockenwellenaufnahme (335) zwischen dem Einlassventil (332) und dem Auslassventil (334) angeordnet ist, wobei die Nockenwellenaufnahme (335) eine Nockenwelle (336) umfasst, die von einer Steuerkette (5) angetrieben wird, und die Nockenwelle (336) eine erste Einlassnocke (3361), eine zweite Einlassnocke (3362), und eine Auslassnocke (3363) umfasst, die daran montiert sind, wodurch durch die erste Einlassnocke (3361), die zweite Einlassnocke (3362) und die Auslassnocke (3363) die Nockenwelle (336), wenn sie in Rotation versetzt wird, ein Einlassventilantriebsteil (6) oder ein Auslassventilantriebsteil (7) antreibt, und weiter, durch das Einlassventilantriebsteil (6) oder das Auslassventilantriebsteil (7) das Einlassventil (332) oder das Auslassventil (334) in Betrieb gesetzt wird, wobei das Einlassventilantriebsteil (6) folgendes umfasst:

ein erstes Antriebsteil (61) und ein zweites Antriebsteil (62), wobei das erste Antriebsteil (61) ein Positionierloch (611) bildet, eine Bohrung (613), und eine Schubwalze (614), wobei das zweite Antriebsteil (62) ein Positionierloch (621) bildet, eine Bohrung (623), eine Schubwalze (624), und einen Druckabschnitt (625), wobei die Positionierlöcher (611,612) des ersten Antriebsteils (61) und des zweiten Antriebsteils (62) die Verlängerung eines Wellenstabs (63) dort hindurch aufnehmen, wobei die Schubwalze (614) des ersten Antriebsteils (61) in Eingriff mit der ersten Einlassnocke (3361) und die Schubwalze (624) des zweiten Antriebsteils (62) in Eingriff mit der zweiten Einlassnocke (3362) ist,
wobei der Druckabschnitt (625) des zweiten Antriebsteils (62) in Eingriff mit dem Einlassventil (332) ist und die Bohrung (613) des ersten Antriebsteils (61) und die Bohrung (623) des zweiten Antriebsteils (62) miteinander in Verbindung stehen, um einen Hydraulikzylinder (64) zu bilden, wodurch der Hydraulikzylinder (64) es dem ersten Antriebsteil (61) und dem zweiten Antriebsteil (62) gestattet, unabhängig voneinander in einem Niedrighuböffnungszustand des Einlassventils (332) zu arbeiten, und es dem ersten Antriebsteil (61) und dem zweiten Antriebsteil (62) gestattet, sich im Hochhuböffnungszustand des Einlassventils (332) operativ miteinander zu verbinden, wobei der Zylinderkopf (33) einen Positionshaltemechanismus (337) umfasst, der in Schiebeeingriff mit dem ersten Antriebsteil (61) und dem zweiten Antriebsteil (62) steht, wobei der Positionshaltemechanis-

mus (337) einen Positionshaltestab (3371), eine Feder (3372) und eine Druckentlastungsbohrung (3373) umfasst, wobei das erste Antriebsteil (61) und das zweite Antriebsteil (62) Positionierungsstäbe (612, 622) umfassen, die in Schiebeeingriff mit dem Positionshaltestab (3371) des Positionshaltemechanismus (337) stehen, wobei die Positionierungsstäbe (612, 622) des ersten Antriebsteils (61) und des zweiten Antriebsteils (62) zwischen den Positionierlöchern (611,621) und dem Druckabschnitt (625) positioniert sind.

2. Struktur zum Antreiben eines Motorventilelements nach Anspruch 1, wobei der Zylinderkopf (33) ein Ölregelventil (4) umfasst.

3. Struktur zum Antreiben eines Motorventilelements nach Anspruch 1, wobei die Bohrungen (613, 623) des ersten Antriebsteils (61) und des zweiten Antriebsteils (62) sich zwischen den Schubrollen (614, 624) und den Positionierlöchern (611, 621) befinden und oberhalb einer Mittelverbindungslinie (A), die die Mitten der Schubwalzen (614, 624) und der Positionierlöcher (611, 621) verbindet.

4. Struktur zum Antreiben eines Motorventilelements nach Anspruch 1 oder 3, wobei das erste Antriebsteil (61) und das zweite Antriebsteil (62) jeweils einstückig sind.

5. Struktur zum Antreiben eines Motorventilelements nach Anspruch 1, wobei der Druckabschnitt (625) ein Abstandsregelelement (6251) umfasst.

6. Struktur zum Antreiben eines Motorventilelements nach Anspruch 1, wobei der Hydraulikzylinder (64) zwei Enden hat, die jeweils durch Schließkappen (641a; 641b) geschlossen sind, und darin eine Feder (642), den ersten Kolben (643) und den zweiten Kolben (644) aufnimmt.

7. Struktur zum Antreiben eines Motorventilelements nach Anspruch 6, wobei der erste Kolben (643) eine erste Aussparung (6431) und eine zweite Aussparung (6432) bildet.

8. Struktur zum Antreiben eines Motorventilelements nach Anspruch 7, wobei die Schließkappen (641 a, 641 b) hervorstehende Stifte (6411 a, 6411 b) bilden, die ins Innere des Hydraulikzylinders (64) ragen.

Revendications

1. Elément de commande de soupape de moteur, le moteur (3) comprenant un carter (31), un bloc-cylindres (32) monté sur le carter (31), et une culasse (33) montée sur le bloc-cylindres (32), la culasse (33) comprenant un orifice d'admission (331) et une soupape d'admission (332) et un orifice d'échappement (333) et une soupape d'échappement (334), un logement d'arbre à cames (335) disposé entre la soupape d'admission (332) et la soupape d'échappement (334), le logement d'arbre à cames (335) comprenant un arbre à cames (336) guidé par une chaîne de distribution (5), l'arbre à cames (336) comprenant une première came d'admission (3361), une deuxième came d'admission (3362) et une came d'échappement (3363) montées à cela, de manière que, à travers la première came d'admission (3361), la deuxième came d'admission (3362) et la came d'échappement (3363), l'arbre à cames (336), lorsqu'il est mis en rotation, actionne un élément de commande de soupape d'admission (6) ou un élément de commande de soupape d'échappement (7), et de plus, à travers l'élément de commande de soupape d'admission (6) ou l'élément de commande de soupape d'échappement (7), la soupape d'admission (332) ou la soupape d'échappement (334) est actionnée, l'élément de commande de soupape d'admission (6) comprenant
un premier élément de commande (61) et un deuxième élément de commande (62), le premier élément de commande (61) formant un trou de positionnement (611), un trou (613) et un rouleau de poussée (614), le deuxième élément de commande (62) formant un trou de positionnement (621), un trou (623), un rouleau de poussée (624) et une section de pressage (625), les trous de positionnement (611, 612) du premier élément de commande (61) et du deuxième élément de commande (62) recevant une extension d'une tige d'arbre (63) à travers eux, le rouleau de poussée (614) du premier élément de commande (61) étant en prise avec la première came d'admission (3361) et le rouleau de poussée (624) du deuxième élément de commande (62) étant en prise avec la deuxième came d'admission (3362),
la section de pressage (625) du deuxième élément de commande (62) étant en prise avec la soupape d'admission (332), le trou (613) du premier élément de commande (61) et le trou (623) du deuxième élément de commande (62) étant en communication l'un avec l'autre pour former un vérin hydraulique (64), de manière que le vérin hydraulique (64) permette au premier élément de commande (61) et au deuxième élément de commande (62) d'opérer indépendamment l'un de l'autre dans une condition d'ouverture de position basse de la soupape d'admission (332) et permette au premier élément de commande (61) et au deuxième élément de commande (62) de se connecter l'un à l'autre de façon opérative dans une condition d'ouverture de position haute de la soupape d'admission (332), la culasse (33) comprenant un mécanisme de fixation en posi-

tion (337) en engrènement poussant avec le premier élément de commande (61) et le deuxième élément de commande (62), le mécanisme de fixation en position (337) comprenant une barre de fixation en position (3371), un ressort (3372) et un trou de limitation de pression (3373), le premier élément de commande (61) et le deuxième élément de commande (62) comprenant des barres de positionnement (612, 622) qui sont en engrènement poussant avec la barre de fixation en position (3371) du mécanisme de fixation en position (337), les barres de positionnement (612, 622) du premier élément de commande (61) et deuxième élément de commande (62) étant situées entre les trous de positionnement (611, 621) et la section de pressage (625).

2. Elément de commande de soupape de moteur selon la revendication 1, où la culasse (33) comprend une soupape de contrôle d'huile (4).

3. Elément de commande de soupape de moteur selon la revendication 1, où les trous (613, 623) du premier élément de commande (61) et du deuxième élément de commande (62) sont situés entre les rouleaux de poussée (614, 624) et les trous de positionnement (611, 621) et sont situés au-dessus d'une ligne de connexion de centres (A) connectant entre les centres des rouleaux de poussée (614, 624) et les trous de positionnement (611, 621).

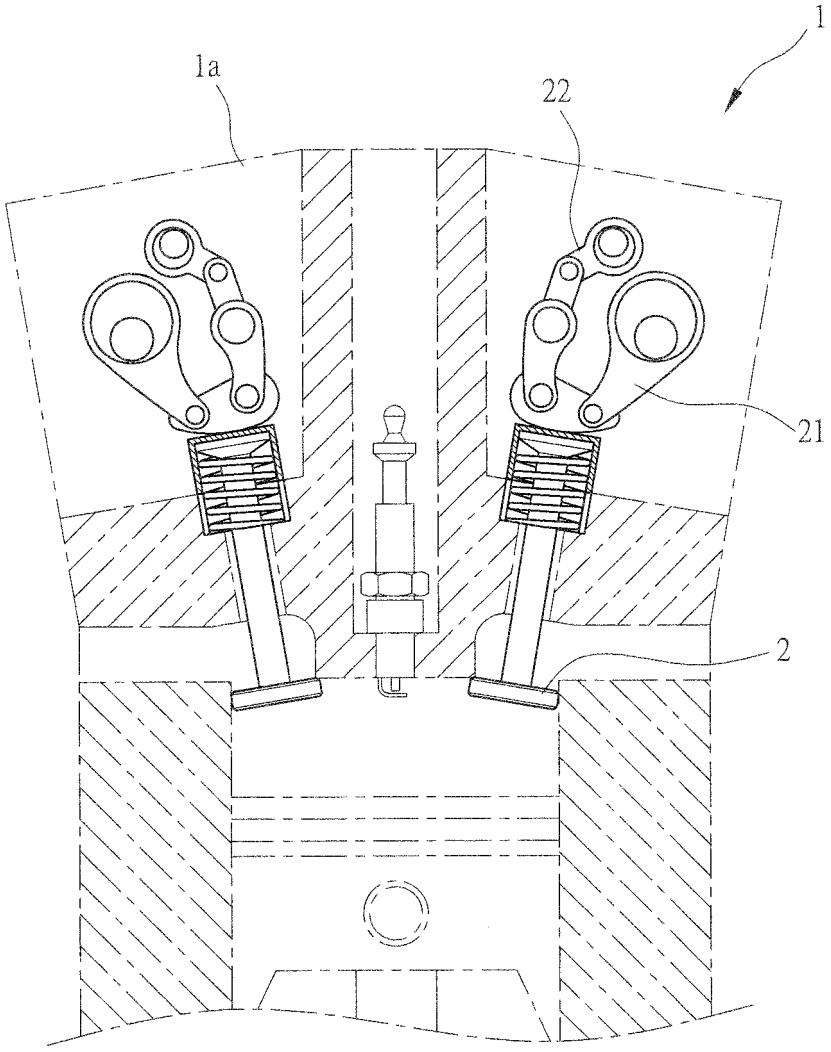
4. Elément de commande de soupape de moteur selon la revendication 1 ou 3, où le premier élément de commande (61) et le deuxième élément de commande (62) sont chacun formés intégralement.

5. Elément de commande de soupape de moteur selon la revendication 1, où la section de pressage (625) comprend un élément pour régler l'espacement (6251).

6. Elément de commande de soupape de moteur selon la revendication 1, où le vérin hydraulique (64) a deux extrémités respectivement fermées par des chapeaux de fermeture (641a, 641b) et reçoit dedans un ressort (642), le premier piston (643) et le deuxième piston (644).

7. Elément de commande de soupape de moteur selon la revendication 6, où le premier piston (643) forme un premier enfoncement (6431) et un deuxième enfoncement (6432).

8. Elément de commande de soupape de moteur selon la revendication 7, où les chapeaux de fermeture (641a, 641b) forment des chevilles saillantes (6411 a, 6411b) saillant vers l'intérieur du vérin hydraulique (64).



PRIOR ART
FIG.1

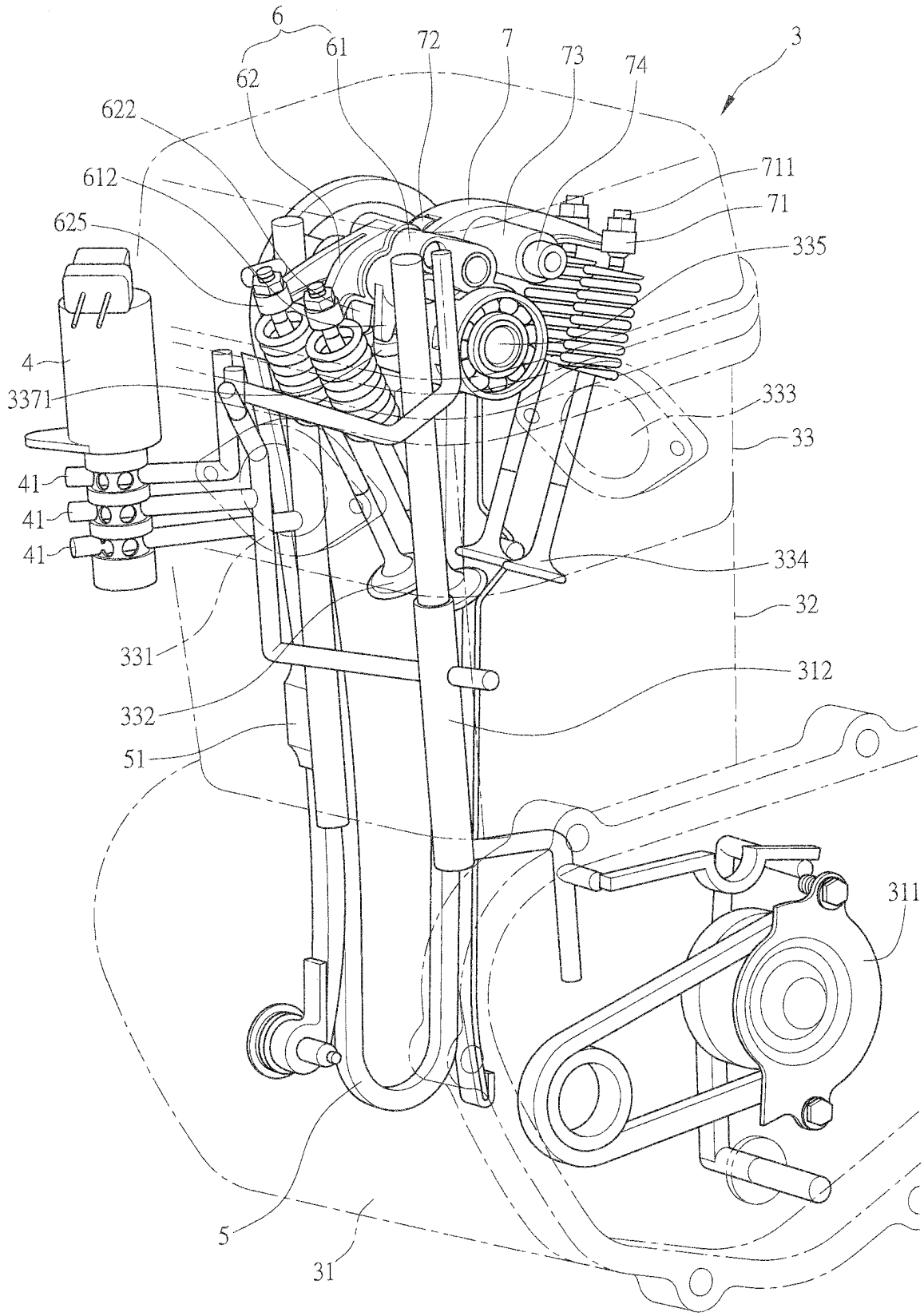

6
61
72
7
73
74
3
62
622
612
625
711
71
335
4
3371
333
33
41
41
41
334
32
331
312
332
51
311
5
31

FIG.2

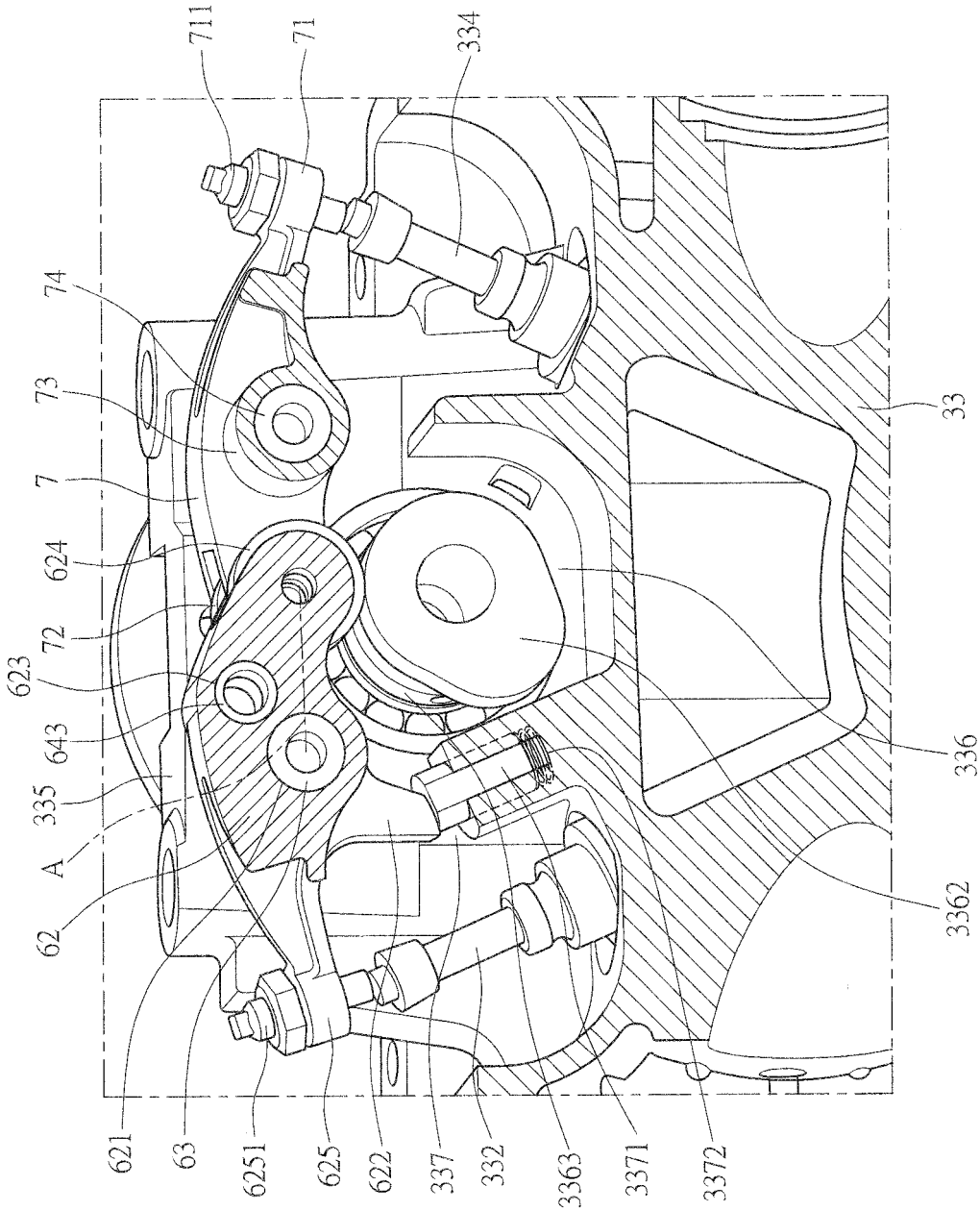

711
71
334
74
73
7
624
72
623
643
335
A
62
621
63
6251
625
622
337
332
3363
3371
3372
3362
336
33

FIG.3

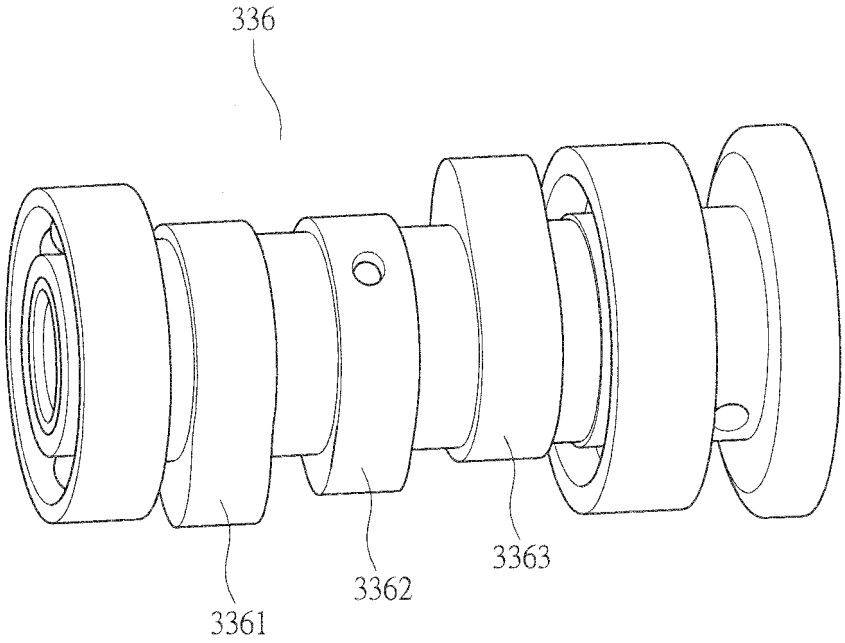
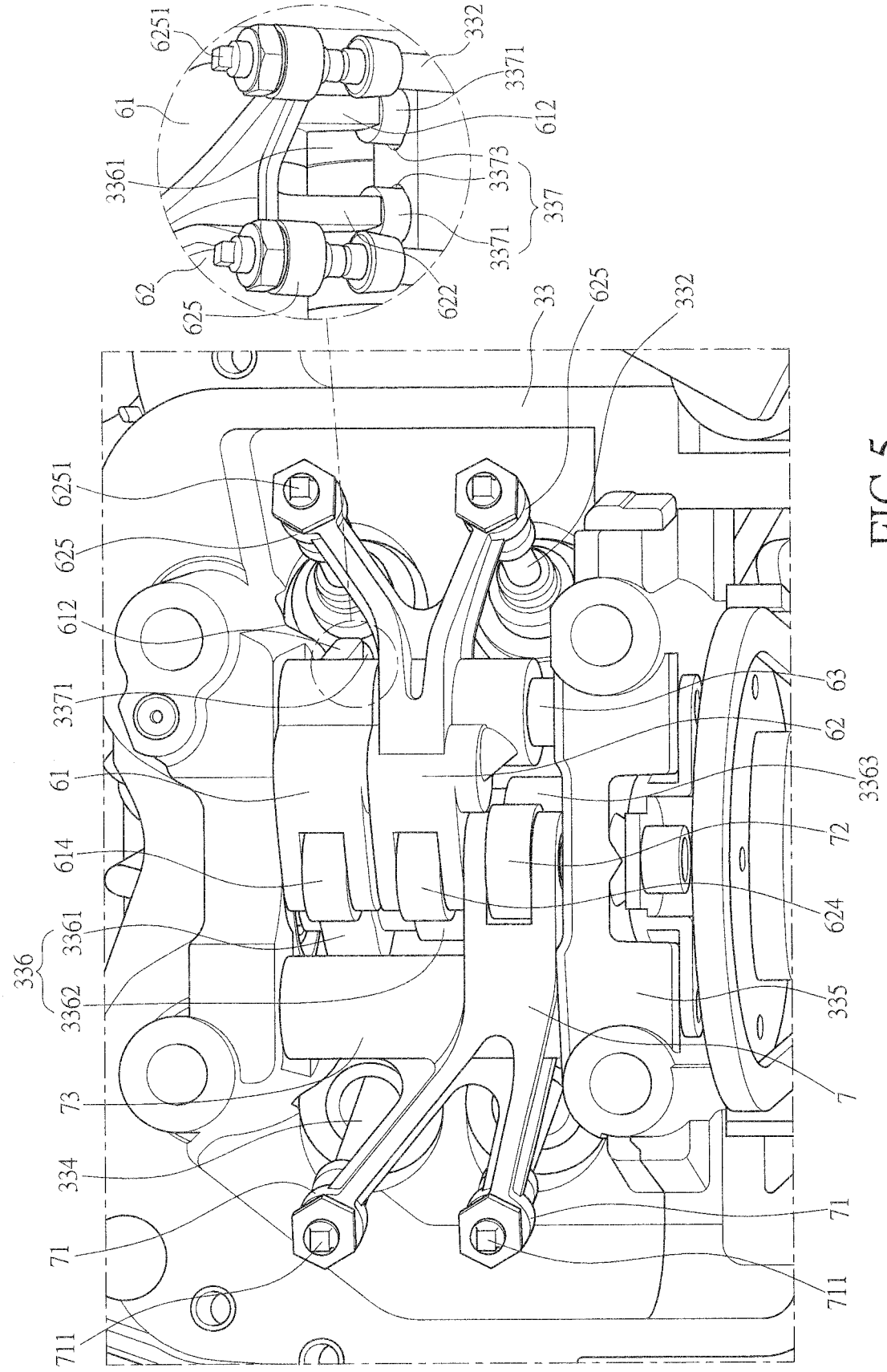


FIG.4


6251
332
61
3371
612
3361
3373
337
62
625
622
33
711
71
334
73
336
3362
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614
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3371
612
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6251
63
62
3363
72
624
335
7

FIG.5

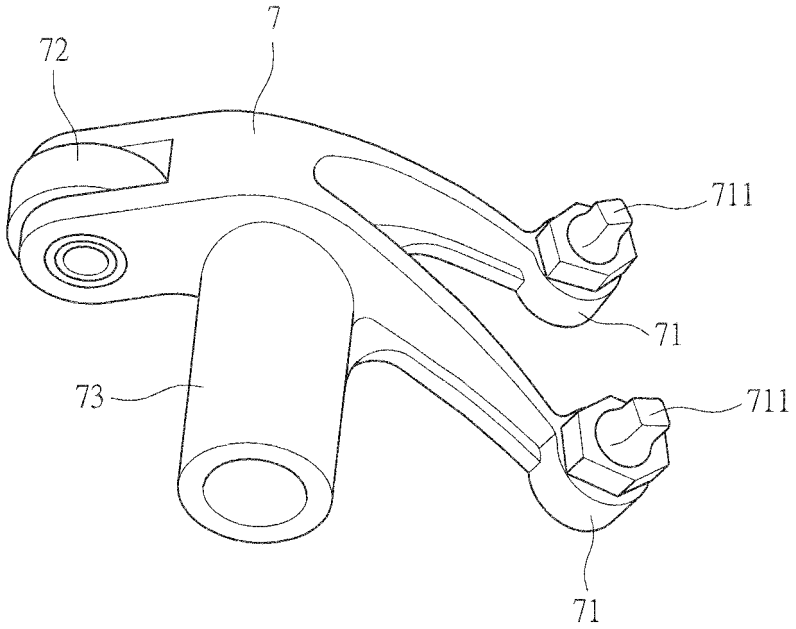


FIG.6

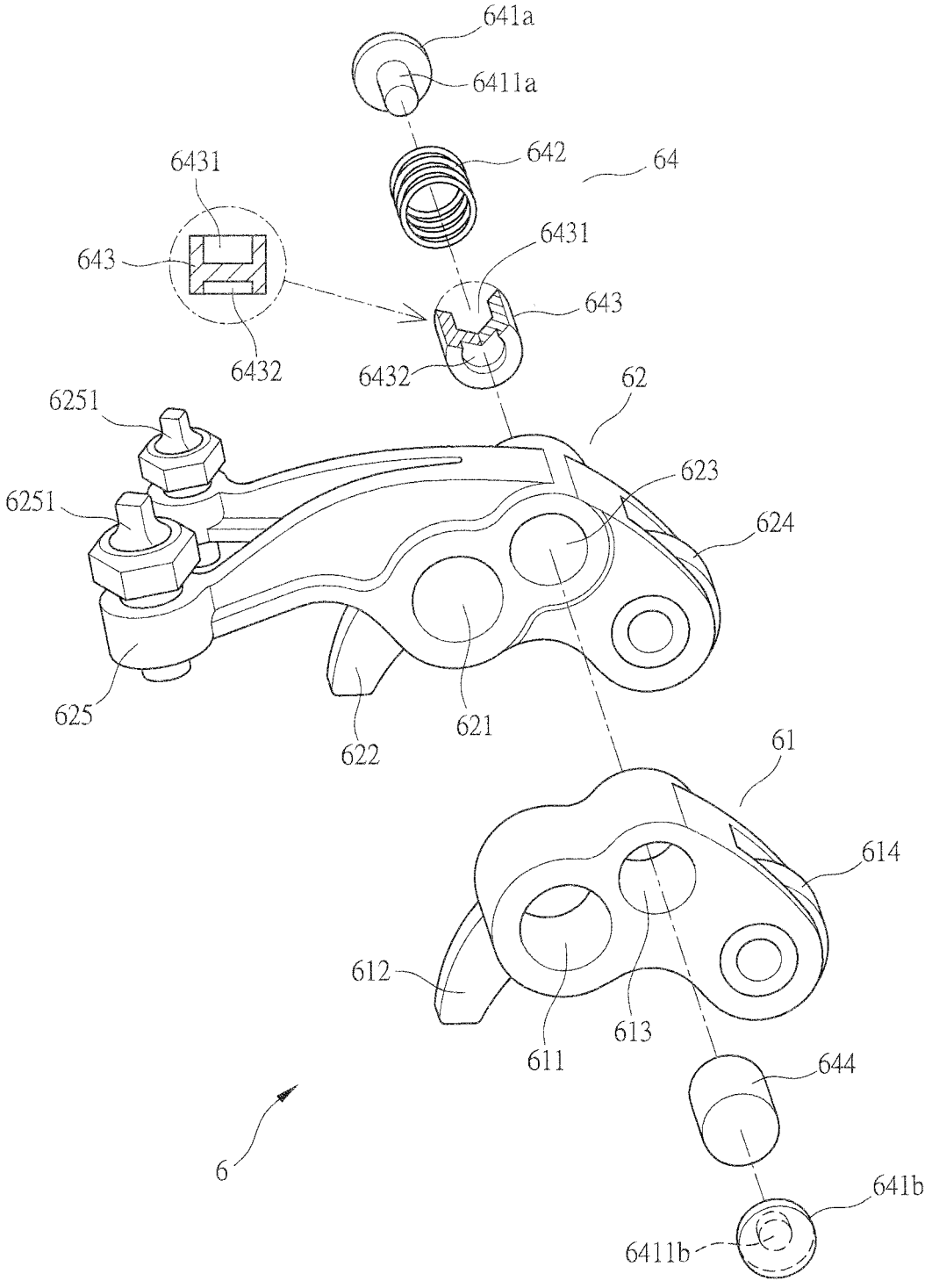

641a
6411a
642
64
6431
643
6431
643
6432
6432
62
6251
6251
623
624
625
621
622
61
614
612
611
613
644
641b
6411b
6

FIG.7

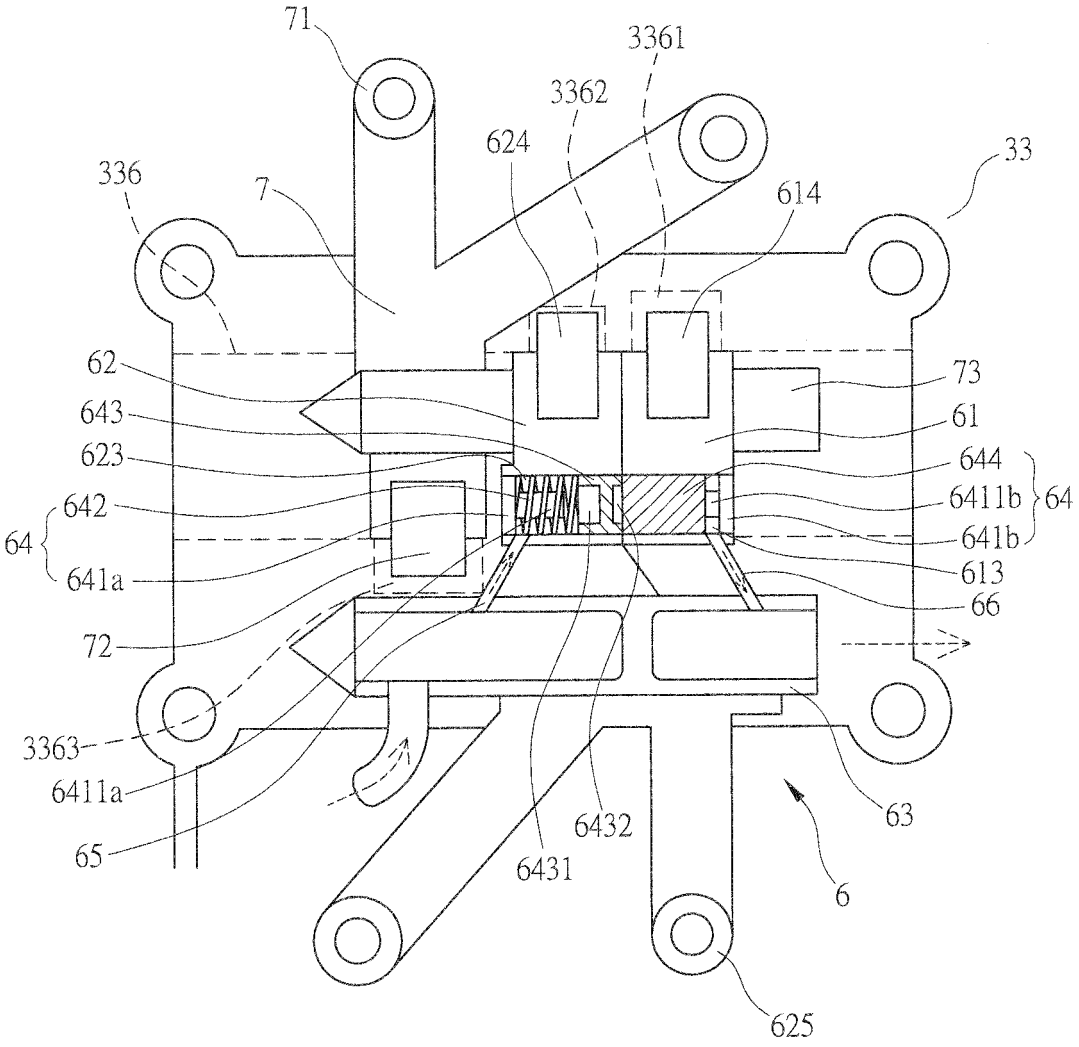
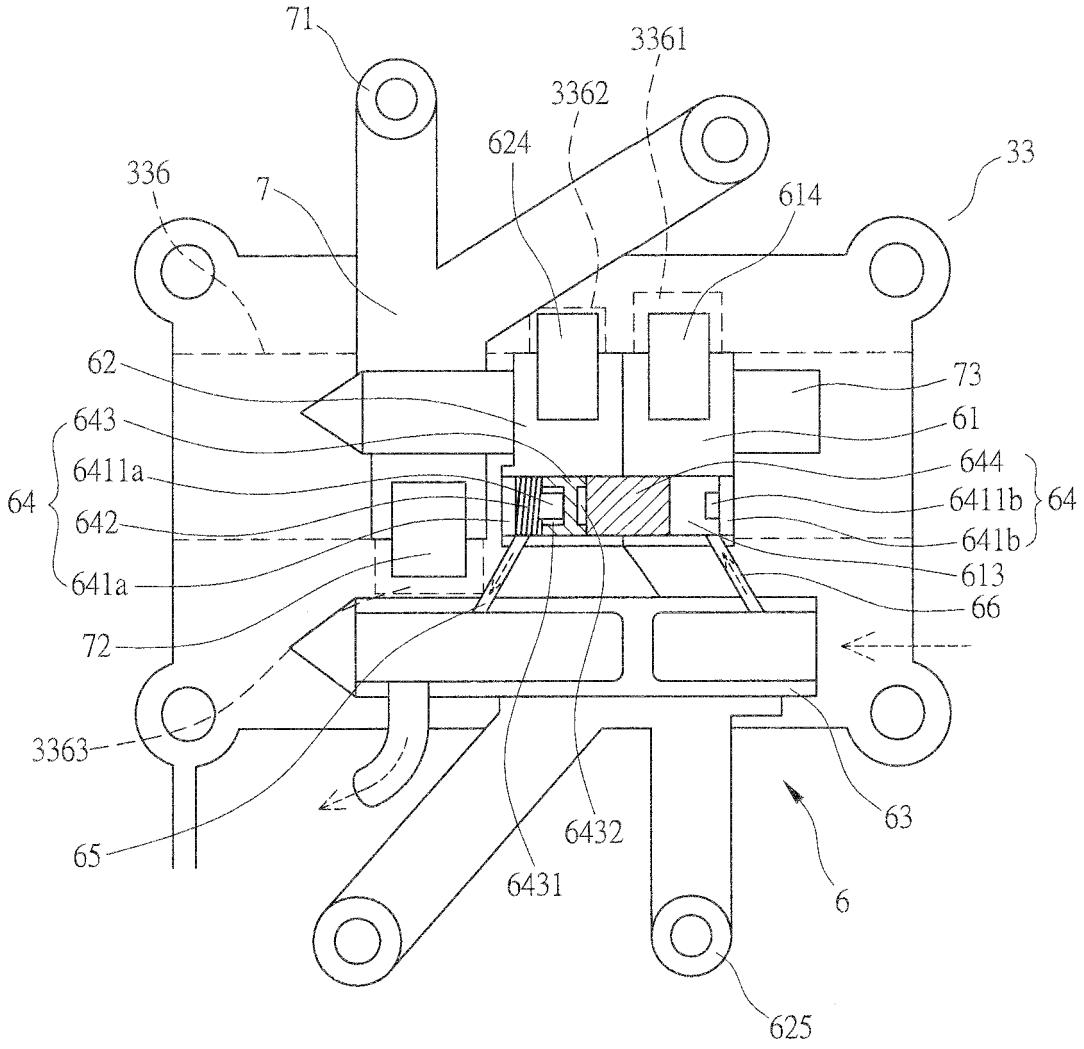

71
3361
3362
624
33
336
7
614
62
73
643
61
623
644
6411b
64
642
641b
64
641a
613
66
72
3363
6411a
63
6432
65
6431
6
625

FIG.8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3361
3362
624
33
336
7
614
62
73
643
61
6411a
644
64
642
6411b
64
641a
641b
613
66
72
3363
63
6432
65
6431
6
625

FIG.9

REFERENCES CITED IN THE DESCRIPTION

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