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(71) Applicant: **KUBOTA CORPORATION**
Osaka-shi, Osaka 556-8601 (JP)

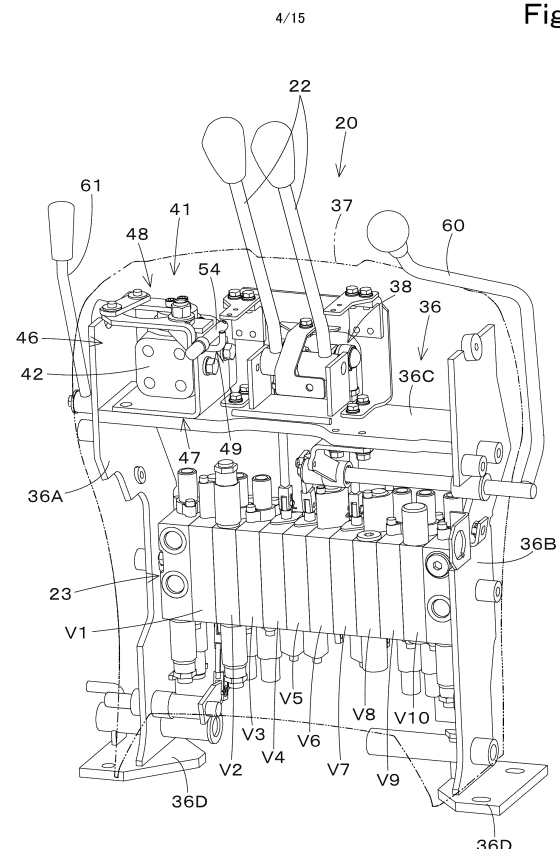
(72) Inventor: **SHIIGUCHI, Suguru**
Sakai-shi, Osaka 590-0823 (JP)

(74) Representative: **Cabinet Beau de Loménie**
158, rue de l'Université
75340 Paris Cedex 07 (FR)

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(54) **WORK MACHINE**

(57) Provided is a working machine which has space for placement of a pattern switch (41) even if the working machine is compact. A working machine is a working machine provided with a plurality of hydraulic actuators (15, 16, 17, M1), the working machine including a machine body (2), an operator's seat (5) on the machine body (2), a console (20) extending upward from the machine body (2) in front of the operator's seat (5), a manual operator (31) to operate the plurality of hydraulic actuators (15, 16, 17, M1), and a pattern switch (41) to switch an operation pattern in which the manual operator (31) is used to operate the plurality of hydraulic actuators (15, 16, 17, M1) between a plurality of operation patterns. The console (20) includes therein a switch placement portion (46) for placement of the pattern switch (41).



Description

Technical Field

[0001] The present invention relates to a working machine.

Background Art

[0002] A working machine disclosed in Patent Literature 1 (PTL 1) is known.

[0003] The working machine disclosed in PTL 1 is provided with a plurality of hydraulic actuators. A manual operator that operates the plurality of hydraulic actuators is provided beside an operator's seat mounted on a machine body. Furthermore, a pattern switch that switches an operation pattern of the manual operator for the plurality of hydraulic actuators between a plurality of operation patterns is provided on the machine body. The pattern switch is provided below the operator's seat.

Citation List

Patent Literature

[0004] PTL 1: Japanese Unexamined Patent Application Publication No. 2014-32462

Summary of Invention

Technical Problem

[0005] Compact working machines have an issue in that it is difficult to place the pattern switch below the operator's seat in terms of space.

[0006] In view of the above-described issue, an object of the present invention is to provide a working machine which has space for placement of a pattern switch even if the working machine is compact.

Solution to Problem

[0007] A working machine according to an aspect of the present invention is a working machine provided with a plurality of hydraulic actuators, the working machine including a machine body, an operator's seat on the machine body, a console extending upward from the machine body in front of the operator's seat; a manual operator to operate the plurality of hydraulic actuators, and a pattern switch to switch an operation pattern in which the manual operator is used to operate the plurality of hydraulic actuators between a plurality of operation patterns, wherein the console includes therein a switch placement portion for placement of the pattern switch.

[0008] The working machine may further include a traveling device to support the machine body such that the machine body is allowed to travel, and a traveling lever to operate the traveling device, the traveling lever

being provided at a substantially central portion in a machine-body width direction of an upper portion of the console. The console may include a support frame attached to the machine body, a cover member to cover the support frame, and a traveling lever support provided at an upper portion of the support frame to support the traveling lever. The switch placement portion may be located, inside the cover member, at the upper portion of the support frame such that the switch placement portion is located beside the traveling lever support in the machine-body width direction.

[0009] The working machine may further include a control valve unit including a plurality of control valves to control the plurality of hydraulic actuators. The support frame may include a first side plate and a second side plate facing each other with a space therebetween in the machine-body width direction, and a coupling plate to connect upper portions of the first side plate and the second side plate. The control valve unit may be located below the coupling plate such that the control valve unit is located between the first side plate and the second side plate. The traveling lever support may be provided at a substantially central portion in the machine-body width direction of the coupling plate. The switch placement portion may be provided between the traveling lever support and the first side plate or the second side plate on the coupling plate.

[0010] The console may include, in the cover member, an opening at a position corresponding to the pattern switch, and a lid member to open and close the opening. The plurality of operation patterns may include a first operation pattern and a second operation pattern that differs from the first operation pattern. The pattern switch may include a switching lever pivotable between a first operation position in which the first operation pattern is selected and a second operation position in which the second operation pattern is selected. The switching lever may be, in each of the first and second operation positions, movable between an extended state in which the switching lever projects through the opening and a retracted state in which the switching lever is retracted within the lid member.

[0011] A working machine according to an aspect of the present invention is a working machine provided with a plurality of hydraulic actuators, the working machine including a machine body, a cover member on the machine body, a manual operator to operate the plurality of hydraulic actuators, and a pattern switch to switch an operation pattern in which the manual operator is used to operate the plurality of hydraulic actuators between a plurality of operation patterns, the pattern switch being housed inside the cover member, wherein the cover member includes an opening at a position corresponding to the pattern switch, and a lid member to open and close the opening, the plurality of operation patterns include a first operation pattern and a second operation pattern, the pattern switch includes a switching lever pivotable between a first operation position in which the first oper-

ation pattern is selected and a second operation position in which the second operation pattern is selected, and the switching lever is, in each of the first and second operation positions, movable between an extended state in which the switching lever projects through the opening and a retracted state in which the switching lever is retracted within the lid member.

[0012] The working machine may further include a contact member to, when the switching lever is within a pivoting range between the first operation position and the second operation position and is moved in a direction from the extended state toward the retracted state, come into contact with the switching lever such that the switching lever projects through the opening to stop the switching lever from moving.

[0013] The working machine may further include a plurality of control valves to be pilot-operated by the manual operator, the plurality of control valves being provided such that the plurality of control valves correspond to the plurality of hydraulic actuators. The pattern switch may include a pattern switching valve to switch between the plurality of operation patterns by changing a direction of a flow of pilot fluid to pilot-operate the control valves by operation of the manual operator, a pivot shaft about which the switching lever is to be pivoted, a swing arm supported such that the swing arm is pivotable about the pivot shaft and including a switching lever support to support the switching lever such that the switching lever is movable between the extended state and the retracted state, and an interlock mechanism to interlock the swing arm and a valve element of the pattern switching valve.

Advantageous Effects of Invention

[0014] With the above-described working machine, it is possible to save space for placement of a pattern switch even if the working machine is compact.

Brief Description of Drawings

[0015]

[FIG. 1] FIG. 1 is a side view of a working machine.

[FIG. 2] FIG. 2 is a perspective view of an operator's seat and the vicinity of the operator's seat.

[FIG. 3] FIG. 3 is a perspective view of a console.

[FIG. 4] FIG. 4 is a perspective view of the inside of the console.

[FIG. 5] FIG. 5 is a fluid circuit diagram.

[FIG. 6] FIG. 6 illustrates examples of operation patterns.

[FIG. 7] FIG. 7 is a perspective view of a pattern switch as viewed from the front.

[FIG. 8] FIG. 8 is a perspective view of the pattern switch as viewed from the rear.

[FIG. 9] FIG. 9 is a side sectional view of the portion where the pattern switch is provided.

[FIG. 10] FIG. 10 is a plan view of the pattern switch when a first operation pattern is elected.

[FIG. 11] FIG. 11 is a plan view of the pattern switch when a second operation pattern is selected.

[FIG. 12] FIG. 12 is a perspective view of the console with a lid member open.

[FIG. 13] FIG. 13 is a plan view illustrating positions of a switching lever.

[FIG. 14] FIG. 14 is a plan view of a pattern switch according to another embodiment.

[FIG. 15] FIG. 15 is a perspective view of the pattern switch according to another embodiment.

Description of Embodiments

[0016] The following description discusses embodiments of the present invention with reference to the drawings as appropriate.

[0017] FIG. 1 is a schematic side view of a working machine 1 according to the present embodiment. In the present embodiment, a compact backhoe, which is a swivel working machine, is illustrated as an example of the working machine 1.

[0018] As illustrated in FIG. 1, the working machine 1 includes a travel unit 1A and a working device 4 provided on the travel unit 1A. The travel unit 1A includes a traveling device 3 and a machine body (swivel base) 2 on the traveling device 3. An operator's seat 5 on which an operator is seated is provided on the machine body 2.

[0019] In the present embodiment, the front (direction of arrow K1 in FIG. 1) of the operator seated on the operator's seat 5 is described as forward, the rear (direction of arrow K2 in FIG. 1) of the operator is described as rearward, the left (near side in FIG. 1) of the operator is described as leftward, and the right (far side in FIG. 1) of the operator is described as rightward. Also, the direction along arrow K3 in FIG. 1 is described as a front-rear direction (machine-body front-rear direction), and a horizontal direction perpendicular to the front-rear direction K3 is described as a machine-body width direction (width direction of the machine body 2). A direction from a central portion to a right portion or to a left portion along the width direction of the machine body 2 is described as a machine-body outward side (an outward side in the machine-body width direction). That is, the machine-body outward direction is one of the machine-body width directions and is a direction away from the widthwise center of the machine body 2. A direction opposite to the machine-body outward direction is described as a machine-body inward direction (inward direction along the machine-body width direction). That is, the machine-body inward direction is one of the machine-body width directions and is a direction toward the widthwise center of the machine body 2.

[0020] As illustrated in FIG. 1, the machine body 2 is supported by the traveling device 3 such that the machine body 2 is rotatable about a vertical axis (an axis extending in an up-down direction). The machine body 2 includes

a swivel base plate 6 that defines a bottom portion of the machine body 2, and a weight 7 attached to a rear portion of the swivel base plate 6. The swivel base plate 6 is supported on a frame of the traveling device 3 via a bearing body 19 such that the swivel base plate 6 is rotatable about the vertical axis, and rotates leftward or rightward by being driven by a turning motor M1 including a hydraulic motor (hydraulic actuator). A step plate 26 on which the operator seated on the operator's seat 5 places their foot is located above the swivel base plate 6. The space between the swivel base plate 6 and the step plate 26 is covered with a side cover 27. The working device 4 is attached to a front portion of the machine body 2. The weight 7 is a counterweight to balance the weight with the working device 4. A ROPS 24 to protect the operator seated on the operator's seat 5 is provided above the machine body 2.

[0021] A hood 8 is located above a rear portion of the machine body 2. The operator's seat 5 is located above the hood 8. As indicated by dot-dot-dash lines in FIG. 1, the hood 8 can open by rotating rearward. The hood 8 houses therein a prime mover 10 as a drive source, a hydraulic fluid tank 9 which stores a hydraulic fluid to drive hydraulic actuators such as hydraulic cylinder(s), hydraulic motor(s), and/or the like provided in the working machine 1, a hydraulic pump (not illustrated) to suck and deliver the hydraulic fluid from the hydraulic fluid tank 9, and the like. Note that a diesel engine is used as the prime mover 10 in the present embodiment, however the prime mover 10 is not limited to the diesel engine. For example, the prime mover 10 may be another internal combustion engine such as a gasoline engine, or may include an electric motor and/or the like.

[0022] As illustrated in FIG. 1, the traveling device 3 is a crawler traveling device and is provided below each of right and left portions of the machine body 2. Such traveling devices 3 are driven by traveling motors 28 including hydraulic motors. A dozer 11 is provided at front portions of the traveling devices 3. The dozer 11 is driven by a dozer cylinder (not illustrated).

[0023] As illustrated in FIG. 1, the working device 4 includes a boom 12, an arm 13, and a bucket 14 as a working tool. The working device 4 further includes, as mechanisms to drive the boom and the like, a boom cylinder 15, an arm cylinder 16, and a bucket cylinder 17 as a working tool cylinder. The boom cylinder 15, the arm cylinder 16, the bucket cylinder 17, and the dozer cylinder include hydraulic cylinders (hydraulic actuators). These hydraulic cylinders are driven by hydraulic fluid supplied from the hydraulic fluid tank 9 via the hydraulic pump. The working device 4 is operated using a manipulating lever 31 (described later).

[0024] A proximal end portion of the boom 12 is pivotally supported by a swing bracket 18 provided at the front portion of the machine body 2 such that the boom 12 is swingable about a horizontal axis. The swing bracket 18 is pivotally supported by a support bracket 29 provided at the machine body 2 such that the swing bracket 18 is

swingable about a vertical axis. A swing cylinder (not illustrated) including a hydraulic cylinder is attached to the machine body 2, and the swing bracket 18 swings by being driven by the swing cylinder. A proximal end portion of the arm 13 is pivotally supported by a distal end portion of the boom 12 such that the arm 13 is swingable about a horizontal axis. The bucket 14 is attached to a distal end portion of the arm 13.

[0025] The boom cylinder 15 couples the swing bracket 18 and a middle portion of the boom 12. The boom 12 swings upward/downward by extension/retraction of the boom cylinder 15. In the present embodiment, the boom 12 swings in a boom raising direction D1 by the retraction of the boom cylinder 15, and the boom 12 swings in a boom lowering direction D2 by the extension of the boom cylinder 15.

[0026] The arm cylinder 16 couples the middle portion of the boom 12 and the proximal end portion of the arm 13. The arm 13 swings upward/downward by extension/retraction of the arm cylinder 16. In the present embodiment, the arm 13 swings in an arm raising direction (arm dump direction) D3 by the retraction of the arm cylinder 16, and swings in an arm lowering direction (arm crowd direction) D4 by the extension of the arm cylinder 16.

[0027] The bucket cylinder 17 couples the proximal end portion of the arm 13 and an attachment of the bucket 14. The bucket 14 performs shoveling/dumping by extension/retraction of the bucket cylinder 17. In the present embodiment, the bucket 14 swings in a dump direction (bucket dump direction) D5 by the retraction of the bucket cylinder 17, and the bucket 14 swings in a shovel direction (bucket crowd direction) D6 by the extension of the bucket cylinder 17.

[0028] As illustrated in FIG. 2, manipulator bases 30 are provided on the left and right sides of the operator's seat 5. The manipulator base 30 located leftward of the operator's seat 5 is referred to as a first manipulator base 30L, and the manipulator base 30 located rightward of the operator's seat 5 is referred to as a second manipulator base 30R.

[0029] The first manipulator base 30L has attached thereto a manual operator 31 (first manipulating lever 31L) to operate a plurality of hydraulic actuators, a remote control valve 21 (first remote control valve 21L) that is a pilot valve operated by the first manipulating lever 31L, and a first operating lever 43L to swing the first manipulator base 30L in the up-down direction.

[0030] The first manipulating lever 31L can be used to operate two objects provided in the working machine 1. Specifically, the first manipulating lever 31L can be pivoted forward, rearward, leftward, and rightward, and is used to operate one object by the forward/rearward pivot and operate another object by the leftward/rightward pivot. The first manipulating lever 31L is operable to, by operating the first remote control valve 21L, pilot-operate a control valve (pilot-operated switching valve) to control the corresponding object. Specifically, by pivoting the first

manipulating lever 31L forward/rearward or rightward/leftward, a pilot fluid corresponding to the pivot amount (degree of pivot of the lever) is output from the first remote control valve 21L to the control valve to control the corresponding object.

[0031] The second manipulator base 30R has attached thereto a manual operator 31 (second manipulating lever 31R) to operate a plurality of hydraulic actuators, a remote control valve 21 (second remote control valve 21R) that is a pilot valve operated by the second manipulating lever 31R, and a second operating lever 43R to swing the second manipulator base 30R in the up-down direction.

[0032] The second manipulating lever 31R also can be used to operate two objects provided in the working machine 1. Specifically, the second manipulating lever 31R also can be pivoted forward, rearward, leftward, and rightward, and is used to operate one object by the forward/rearward pivot and operate another object by the leftward/rightward pivot. The second manipulating lever 31R is operable to, by operating the second remote control valve 21R, pilot-operate a control valve (pilot-operated switching valve) to control the corresponding object. Specifically, by pivoting the second manipulating lever 31R forward/rearward or rightward/leftward, a pilot fluid corresponding to the pivot amount is output from the second remote control valve 21R to the control valve that controls the corresponding object.

[0033] The objects to be operated by the first manipulating lever 31L and the second manipulating lever 31R are, for example, the turning motor M1 (machine body 2), the boom cylinder 15 (boom 12), the arm cylinder 16 (arm 13), and the bucket cylinder 17 (bucket 14). That is, the manual operator 31 can be used to rotate the machine body 2, swing the boom 12, swing the arm 13, and swing the bucket 14.

[0034] As illustrated in FIG. 1, a console 20 is provided at a front portion of the step plate 26. The console 20 extends upward from the machine body 2 in front of the operator's seat 5 and the hood 8. Various operation members (operators) are attached to the console 20.

[0035] As illustrated in FIG. 3, the various operation members include a pair of traveling levers 22, a dozer lever 60, an accelerator lever 61, a swing pedal 32, a speed-change pedal 33, an SP pedal 34, and/or the like. The pair of traveling levers 22 are used to operate the traveling devices 3 (traveling motors 28). The dozer lever 60 is used to operate the dozer 11 (dozer cylinder). The accelerator lever 61 is used to control rotation of the prime mover 10. The swing pedal 32 is used to operate the swing bracket 18 (swing cylinder). The speed-change pedal 33 is used to change the speed stage of the traveling devices 3 between a first speed stage and a second speed stage higher than the first speed. The SP pedal 34 is a pedal used to operate another working tool (hydraulic attachment) which is attached instead of or in addition to the bucket 14 and which can be driven by a hydraulic actuator.

[0036] As illustrated in FIG. 4, the console 20 includes a support frame 36 attached to the machine body 2, and a cover member 37 to cover the support frame 36.

[0037] The support frame 36 includes a first side plate 36A, a second side plate 36B, a coupling plate 36C, and fixed plates 36D. The first side plate 36A and the second side plate 36B are formed of plate members elongated in the up-down direction, and are arranged such that they face each other with a space therebetween in the machine-body width direction with their plate surfaces facing in the machine-body width direction. The coupling plate 36C is located between upper portions of the first side plate 36A and the second side plate 36B, and couples the upper portions of the first side plate 36A and the second side plate 36B to each other. The fixed plates 36D are fixed to a lower end of the first side plate 36A and a lower end of the second side plate 36B, and are fixed to the machine body 2 (step plate 26) by bolt(s) and/or the like.

[0038] As illustrated in FIG. 3, the cover member 37 includes two portions, that is, a front cover 37A and a rear cover 37B.

[0039] As illustrated in FIG. 4, the pair of traveling levers 22 are arranged in the machine-body width direction at a substantially central portion in the machine-body width direction of the console 20. The proximal portions of the traveling levers 22 are located in the cover member 37, and are supported by a traveling lever support 38 provided at a substantially central portion in the machine-body width direction of the coupling plate 36C (console 20) such that the traveling levers 22 are swingable in the front-rear direction K3. The upper portions of the pair of traveling levers 22 project upward from the cover member 37.

[0040] A control valve unit 23 is provided inside the console 20. The control valve unit 23 is located below the coupling plate 36C such that the control valve unit 23 is located between the first side plate 36A and the second side plate 36B, and is attached to the first side plate 36A and the second side plate 36B. That is, the control valve unit 23 is attached to the support frame 36.

[0041] The control valve unit 23 is an assembly of a plurality of control valves V1 to V10 to control hydraulic actuators provided in or on the working machine 1 (including hydraulic actuator(s) provided later). Specifically, the control valve unit 23 is a valve unit including the plurality of control valves V1 to V10 arranged in the machine-body width direction and connected to each other. Note that the control valve unit 23 may include a common valve body and a plurality of control valves incorporated in the common valve body.

[0042] The control valves included in the control valve unit 23 are direct-acting spool direction switching valves to change the direction of hydraulic fluid to actuate hydraulic actuator(s). Specifically, the control include a speed-change control valve V1, a turn control valve V2, an arm control valve V3, a first travel control valve V4, a dozer control valve V5, an auxiliary control valve V6, a

second travel control valve V7, a swing control valve V8, a bucket control valve V9, and a boom control valve V10.

[0043] The speed-change control valve V1 is operated by the speed-change pedal 33 to control, for example, a swash plate angle cylinder to change the tilt angle of the swash plate of the traveling motor 28. The turn control valve V2 controls the turning motor M1. The arm control valve V3 controls the arm cylinder 16. The first travel control valve V4 is operated by the left traveling lever 22 to control the traveling motor 28 of the left traveling device 3. The dozer control valve V5 is operated by the dozer lever 60 to control the dozer cylinder. The auxiliary control valve V6 is operated by the SP pedal 34 to control a hydraulic attachment. The second travel control valve V7 is operated by the right traveling lever 22 to control the traveling motor 28 of the right traveling device 3. The swing control valve V8 is operated by the swing pedal 32 to control the swing cylinder. The bucket control valve V9 controls the bucket cylinder 17. The boom control valve V10 controls the boom cylinder 15.

[0044] The turn control valve V2, the arm control valve V3, the bucket control valve V9, and the boom control valve V10 are pilot-operated switching valves to be pilot-operated by the first manipulating lever 31L (first remote control valve 21L) and the second manipulating lever 31R (second remote control valve 21R).

[0045] The speed-change control valve V1, the first travel control valve V4, the dozer control valve V5, the auxiliary control valve V6, the second travel control valve V7, and the swing control valve V8 are control valves (other control valves) to control the objects to be operated using operation members (speed-change pedal 33, traveling lever 22, dozer lever 60, SP pedal 34, swing pedal 32) attached to the console 20.

[0046] Note that the arrangement of the control valves in the control valve unit 23 is an example, and is not limited to the example illustrated in the drawings.

[0047] As illustrated in FIG. 2, a first tube 39A and a second tube 39B which are flexible tubes are guided at a lower end of a left portion of the hood 8. The first tube 39A extends from a back surface of the first remote control valve 21L, and is guided to a lower end of a left portion of the console 20 through the inside of the machine body 2 (see FIG. 3). A plurality of pilot hoses connected to the first remote control valve 21L are bundled and inserted (housed) in the first tube 39A. The second tube 39B extends from a back surface of the second remote control valve 21R, and is guided to the lower end of the left portion of the console 20 through the inside of the machine body 2 (see FIG. 3). A plurality of pilot hoses connected to the second remote control valve 21R are bundled and inserted (housed) in the second tube 39B.

[0048] As illustrated in FIGS. 3 and 4, the console 20 houses therein a pattern switch 41 to switch a pattern in which the manual operator 31 (first manipulating lever 31L, second manipulating lever 31R) is used to operate a plurality of hydraulic actuators (boom cylinder 15, arm cylinder 16, bucket cylinder 17, turning motor M1) (such

a pattern is hereinafter referred to as "operation pattern") between a plurality of operation patterns. The pattern switch 41 includes a pattern switching valve 42 to switch the operation pattern by changing the direction of the flow of pilot fluid caused by the manual operator 31 to pilot-operate the control valve.

[0049] As illustrated in FIG. 5, in the present embodiment, the pattern switching valve 42 is provided at an intermediate portion of a pilot circuit connecting the first remote control valve 21L and the second remote control valve 21R with the boom control valve V10 and the arm control valve V3. Specifically, the first remote control valve 21L is connected to the pattern switching valve 42 by a first pilot fluid passage F1 and a second pilot fluid passage F2. The second remote control valve 21R is connected to the pattern switching valve 42 by a third pilot fluid passage F3 and a fourth pilot fluid passage F4. The arm control valve V3 includes a dump pressure receiver 44a and a crowd pressure receiver 44b, the dump pressure receiver 44a is connected to the pattern switching valve 42 via a fifth pilot fluid passage F5, and the crowd pressure receiver 44b is connected to the pattern switching valve 42 via a sixth pilot fluid passage F6. The boom control valve V10 includes a lowering pressure receiver 45a and a raising pressure receiver 45b, the lowering pressure receiver 45a is connected to the pattern switching valve 42 via a seventh pilot fluid passage F7, and the raising pressure receiver 45b is connected to the pattern switching valve 42 via an eighth pilot fluid passage F8.

[0050] In the present embodiment, the operation patterns to be switched by the pattern switch 41 include a first operation pattern and a second operation pattern illustrated in FIG. 6.

[0051] As illustrated in FIG. 6, in the first operation pattern, the arm 13 is caused to swing by pivoting the first manipulating lever 31L forward or rearward, and the machine body 2 is caused to turn by pivoting the first manipulating lever 31L leftward or rightward. The boom 12 is caused to swing by pivoting the second manipulating lever 31R forward or rearward, and the bucket 14 is caused to swing by pivoting the second manipulating lever 31R leftward or rightward.

[0052] In the second operation pattern, the boom 12 is caused to swing by pivoting the first manipulating lever 31L forward or rearward, and the machine body 2 is caused to turn by pivoting the first manipulating lever 31L leftward or rightward. The arm 13 is caused to swing by pivoting the second manipulating lever 31R forward or rearward, and the bucket 14 is caused to swing by pivoting the second manipulating lever 31R leftward or rightward.

[0053] As described above, in the present embodiment, in the first operation pattern, the arm 13 is operated by pivoting the first manipulating lever 31L forward or rearward, and the boom 12 is operated by pivoting the second manipulating lever 31R forward or rearward, whereas in the second operation pattern, the boom 12

is operated by pivoting the first manipulating lever 31L forward or rearward, and the arm 13 is operated by pivoting the second manipulating lever 31R forward or rearward.

[0054] Specifically, in the first operation pattern, when the first manipulating lever 31L is pivoted forward, a pilot pressure acts on the dump pressure receiver 44a through the first pilot fluid passage F1, the pattern switching valve 42, and then the fifth pilot fluid passage F5, so that the arm cylinder 16 retracts and the arm 13 performs a dumping action. When the first manipulating lever 31L is pivoted rearward, the pilot pressure acts on the crowd pressure receiver 44b through the second pilot fluid passage F2, the pattern switching valve 42, and then the sixth pilot fluid passage F6, so that the arm cylinder 16 extends and the arm 13 performs a crowding action. When the second manipulating lever 31R is pivoted forward, the pilot pressure acts on the lowering pressure receiver 45a through the third pilot fluid passage F3, the pattern switching valve 42, and then the seventh pilot fluid passage F7, so that the boom cylinder 15 extends and the boom is lowered. When the second manipulating lever 31R is pivoted rearward, the pilot pressure acts on the raising pressure receiver 45b through the fourth pilot fluid passage F4, the pattern switching valve 42, and then the eighth pilot fluid passage F8, so that the boom cylinder 15 retracts and the boom 12 is raised.

[0055] In the second operation pattern, when the first manipulating lever 31L is pivoted forward, the pilot pressure acts on the lowering pressure receiver 45a through the first pilot fluid passage F1, the pattern switching valve 42, and then the seventh pilot fluid passage F7, so that the boom cylinder 15 extends and the boom 12 is lowered. When the first manipulating lever 31L is pivoted rearward, the pilot pressure acts on the raising pressure receiver 45b through the second pilot fluid passage F2, the pattern switching valve 42, and then the eighth pilot fluid passage F8, so that the boom cylinder 15 retracts and the boom 12 is raised. When the second manipulating lever 31R is pivoted forward, the pilot pressure acts on the dump pressure receiver 44a through the third pilot fluid passage F3, the pattern switching valve 42, and then the fifth pilot fluid passage F5, so that the arm cylinder 16 retracts and the arm 13 performs a dumping action. When the second manipulating lever 31R is pivoted rearward, the pilot pressure acts on the crowd pressure receiver 44b through the fourth pilot fluid passage F4, the pattern switching valve 42, and then the sixth pilot fluid passage F6, so that the arm cylinder 16 extends and the arm 13 performs a crowding action.

[0056] Note that the number of operation patterns to be switched by the pattern switch 41 may be three or more, and the control valves switched by the pattern switch 41 are not limited to the boom control valve V10 and the arm control valve V3.

[0057] As illustrated in FIGS. 3 and 4, the pattern switch 41 is provided at an upper portion of the console 20. In the present embodiment, since the pilot hoses guided

from the first remote control valve 21L and the second remote control valve 21R to the console 20 are inserted through the lower end of the left portion of the console 20, the pattern switch 41 is provided at a left portion of the upper portion of the console 20 so that the pilot hoses can be easily guided. However, the pattern switch 41 may be provided at a right portion of the upper portion of the console 20.

[0058] As illustrated in FIG. 4, the pattern switch 41 is provided at an upper portion of the support frame 36 inside the cover member 37 such that the pattern switch 41 is located beside the traveling lever support 38 in the machine-body width direction. In other words, the console 20 includes therein a switch placement portion 46 for placement of the pattern switch 41, and the switch placement portion 46 is located, inside the cover member 37, at the upper portion of the support frame 36 such that the switch placement portion 46 is located beside the traveling lever support 38 in the machine-body width direction. Specifically, the switch placement portion 46 is provided between the traveling lever support 38 and the first side plate 36A, on the coupling plate 36C. The switch placement portion 46 may be provided between the traveling lever support 38 and the second side plate 36B, on the coupling plate 36C.

[0059] As illustrated in FIGS. 7 and 8, the pattern switch 41 includes a valve bracket 47 to which the pattern switching valve 42 is attached, the pattern switching valve 42, an operation mechanism 48 to operate the pattern switching valve 42, and a contact member 49.

[0060] The valve bracket 47 includes an attachment wall 47a located on the coupling plate 36C and attached to the coupling plate 36C by bolt(s) and/or the like, and a vertical wall 47b extending upward from a right edge (one of the edges closer to the traveling lever support 38) of the attachment wall 47a.

[0061] As illustrated in FIG. 9, the pattern switching valve 42 includes a rotary valve, and includes a valve body 42a and a valve element 42b.

[0062] As illustrated in FIGS. 7 and 8, the valve body 42a is located above the attachment wall 47a and leftward of the vertical wall 47b of the valve bracket 47, and is fixed to the vertical wall 47b by bolt(s) and/or the like.

[0063] As illustrated in FIG. 9, the valve element 42b is in a substantially columnar shape and is inserted in the valve body 42a such that the valve element 42b is rotatable about an axis extending in the up-down direction. An upper portion of the valve element 42b projects upward from the valve body 42a.

[0064] As illustrated in FIG. 7, the valve body 42a includes, in a front surface thereof, ports (first port P1, second port P2, third port P3, and fourth port P4) connected to the remote control valve(s) 21 (first remote control valve 21L, second remote control valve 21R). For example, as illustrated in FIG. 5, the first pilot fluid passage F1 is connected to the first port P1, the second pilot fluid passage F2 is connected to the second port P2, and the third pilot fluid passage F3 is connected to the third port

P3. The fourth pilot fluid passage F4 is connected to the fourth port P4.

[0065] As illustrated in FIG. 8, the valve body 42a includes, in a back surface thereof, ports (fifth port P5, sixth port P6, seventh port P7, and eighth port P8) connected to the control valves (boom control valve V10, arm control valve V3). For example, as illustrated in FIG. 5, the fifth pilot fluid passage F5 is connected to the fifth port P5, the sixth pilot fluid passage F6 is connected to the sixth port P6, the seventh pilot fluid passage F7 is connected to the seventh port P7, and the eighth pilot fluid passage F8 is connected to the eighth port P8.

[0066] As illustrated in FIG. 7, a first restrictor 50A and a second restrictor 50B are provided on an upper surface of the valve body 42a. The first restrictor 50A and the second restrictor 50B each include a pin. The first restrictor 50A is provided on a front portion of the upper surface of the valve body 42a (forward of an upper portion of the valve element 42b). The second restrictor 50B is provided on a right portion of the upper surface of the valve body 42a (rightward of the upper portion of the valve element 42b).

[0067] As illustrated in FIG. 7, a contact portion 51 is provided at the upper portion of the valve element 42b. The contact portion 51 includes a pin. The contact portion 51 is provided such that it projects radially outward from the valve element 42b. As illustrated in FIG. 10, the contact portion 51 comes into contact with the first restrictor 50A from the right to restrict counterclockwise rotation of the valve element 42b. Also, as illustrated in FIG. 11, the contact portion 51 comes into contact with the second restrictor 50B from the front to restrict clockwise rotation of the valve element 42b. Thus, the valve element 42b can be switched between a position in which the contact portion 51 is in contact with the first restrictor 50A and a position in which the contact portion 51 is in contact with the second restrictor 50B. FIG. 10 illustrates the state of the pattern switch 41 when the operation pattern is the first operation pattern, and FIG. 11 illustrates the state of the pattern switch 41 when the operation pattern is the second operation pattern.

[0068] As illustrated in FIGS. 7 and 8, the operation mechanism 48 includes a pivot shaft 52, a swing arm 53, a switching lever 54, and an interlock mechanism 55.

[0069] As illustrated in FIGS. 10 and 11, the pivot shaft 52 is located above a rear right portion of the pattern switching valve 42 such that it extends in the up-down direction. A lower portion of the pivot shaft 52 is fixed to a support stay 56 fixed to an upper portion of the vertical wall 47b of the valve bracket 47 (see FIG. 9).

[0070] As illustrated in FIGS. 7, 8, and 10, the swing arm 53 includes a support piece 53a, a switching lever support 53b, and an arm portion 53c. The support piece 53a is supported by the pivot shaft 52 such that it is rotatable about an axis of the pivot shaft 52. Thus, the swing arm 53 can swing forward and rearward about the axis of the pivot shaft 52. The support piece 53a has a rotational resistance applied thereto by a disk spring 57 fitted

on the pivot shaft 52 and superposed on the support piece 53a and by a lock nut 58 screwed onto the pivot shaft 52 above the disk spring 57.

[0071] As illustrated in FIG. 8, the switching lever support 53b is provided at a lower end of an extension 53d extending downward from the support piece 53a. The switching lever support 53b is in a tubular shape (cylindrical shape).

[0072] As illustrated in FIGS. 7 and 8, the arm portion 53c extends from the support piece 53a toward the first side plate 36A.

[0073] As illustrated in FIGS. 7, 8, and 10, the switching lever 54 is an operation member used to switch the operation pattern between the first operation pattern and the second operation pattern. The switching lever 54 includes a lever shaft 54A and a lever grip 54B. The lever shaft 54A includes a rod member (round rod member) and is inserted in the switching lever support 53b such that it is movable in an axial direction. The lever grip 54B is provided on a rear portion (proximal portion) of the lever shaft 54A. A stopper 59 is provided at a distal end portion of the lever shaft 54A. The stopper 59 comes into contact with the switching lever support 53b to prevent the lever shaft 54A from coming off the switching lever support 53b.

[0074] As illustrated in FIGS. 7, 8, and 10, the interlock mechanism 55 includes a first link 55A and a second link 55B. One end portion of the first link 55A is pivotally coupled to a left end portion of the arm portion 53c of the swing arm 53 via a first pivot 62A. One end portion of the second link 55B is fixed to an upper surface of the valve element 42b by bolt(s) 63. The opposite portion of the first link 55A and the opposite end portion of the second link 55B are pivotally coupled together via a second pivot 62B.

[0075] As illustrated in FIGS. 7, 8, and 10, the contact member 49 is located at an upper rear portion of a right side surface of the vertical wall 47b of the valve bracket 47. The contact member 49 includes a rod member (round rod member) and includes a first portion 49a and a second portion 49b. The first portion 49a is fixed to the right side surface of the vertical wall 47b and extends in the machine-body width direction (rightward from the vertical wall 47b). The second portion 49b extends upward from the right end of the first portion 49a. The second portion 49b and the vertical wall 47b define a space which allows passage of the lever shaft 54A of the switching lever 54.

[0076] As illustrated in FIGS. 9, 10, and 11, the console 20 has, in the cover member 37, an opening 64 at a position corresponding to the pattern switch 41, and a lid member 65 to open and close the opening 64. In the present embodiment, as illustrated in FIG. 3, the opening 64 and the lid member 65 are provided in an upper left portion of a back surface (the surface facing the operator's seat 5) of the cover member 37. A lower portion of the lid member 65 is supported by a support 66 such that the lid member 65 is rotatable about an axis of a support

shaft 67 extending in the machine-body width direction. An upper portion of the lid member 65 is held in a closed state by a fixing member 68 that is screwed to the cover member 37 when in the closed state. Thus, as indicated by a dot-dot-dash line in FIG. 12, the lid member 65 is rotated downward to open the opening 64 by removing the fixing member 68.

[0077] As illustrated in FIG. 10, the pattern switch 41 is configured such that, when the first operation pattern is selected, the switching lever 54 is in a first operation position 70A in which the switching lever 54 extends in the front-rear direction. In the first operation position 70A, the switching lever 54 is movable between an extended state (first extended state) 71A in which the switching lever 54 is extended rearward to a position in which the stopper 59 is in contact with the switching lever support 53b as indicated by solid lines in FIG. 10, and a retracted state (first retracted state) 72A in which the switching lever 54 is retracted forward to a position in which the lever grip 54B is in contact with the switching lever support 53b as indicated by dot-dot-dash lines in FIG. 10.

[0078] As illustrated in FIGS. 10 and 12, the switching lever 54 projects through the opening 64 in the first extended state 71A. Thus, it is possible to easily switch operation patterns (operate the lever). As illustrated in FIG. 10, the switching lever 54 is housed inside the lid member 65 (in the cover member 37) in the first retracted state 72A. Thus, the switching lever 54 does not hinder the operator from getting on/off the working machine 1 or using operation members attached to the console 20. Furthermore, in the first retracted state 72A, the switching lever 54 extends between the second portion 49b of the contact member 49 and the vertical wall 47b, and an end of the switching lever 54 is located forward of the contact member 49.

[0079] In the state illustrated in FIG. 10, the arm portion 53c extends leftward from the pivot shaft 52, the first link 55A is inclined rightward as the first link 55A extends forward, and the second link 55B projects leftward from the valve element 42b (extends in the machine-body width direction). The contact portion 51 is in contact with the first restrictor 50A from the right.

[0080] When the switching lever 54 is pivoted leftward about the axis of the pivot shaft 52 to a position (second operation position 70B) indicated by dot-dot-dash lines X1 from the state illustrated in FIG. 10, the arm portion 53c swings forward about the axis of the pivot shaft 52 to push the first link 55A forward as illustrated in FIG. 11. Then, the first link 55A pushes the opposite end of the second link 55B forward, and the valve element 42b rotates clockwise. Then, when the contact portion 51 comes into contact with the second restrictor 50B from the front, the rotation of the valve element 42b, the swing of the swing arm 53, and the pivot of the switching lever 54 are restricted. With this, the operation pattern is switched from the first operation pattern to the second operation pattern.

[0081] As illustrated in FIG. 11, the pattern switch 41

is configured such that, when the second operation pattern is selected, the switching lever 54 is in the second operation position 70B in which the switching lever 54 extends diagonally forward and rightward. In the second operation position 70B, the switching lever 54 is movable between an extended state (second extended state) 71B in which the switching lever 54 is pulled rearward to a position in which the stopper 59 is in contact with the switching lever support 53b as indicated by solid lines in FIG. 11, and a retracted state (second retracted state) 72B in which the switching lever 54 is pushed forward to a position in which the lever grip 54B is in contact with the switching lever support 53b as indicated by dot-dot-dash lines in FIG. 11.

[0082] As illustrated in FIGS. 11 and 12, the switching lever 54 projects through the opening 64 in the second extended state 71B. Thus, it is possible to easily switch between operation patterns (operate the lever). As illustrated in FIG. 11, the switching lever 54 is housed inside the lid member 65 (in the cover member 37) in the second retracted state 72B. With this, the switching lever 54 does not hinder the operator from getting on/off the working machine 1 or using operation members attached to the console 20. Furthermore, in the second retracted state 72B, an end portion of the switching lever 54 is located rightward of the second portion 49b of the contact member 49.

[0083] When the switching lever 54 is pivoted leftward about the axis of the pivot shaft 52 to the first operation position 70A indicated by the dot-dot-dash lines from the state illustrated in FIG. 11, the operation pattern is switched from the second operation pattern to the first operation pattern.

[0084] Note that the switching between the first operation pattern and the second operation pattern is not performed at the point in time at which the switching lever 54 reached the first operation position 70A or the second operation position 70B, but is performed before the switching lever 54 reaches the first operation position 70A or the second operation position 70B. That is, when the switching lever 54 is pivoted from the first operation position 70A to the second operation position 70B, the first operation pattern is switched to the second operation pattern before the switching lever 54 reaches the second operation position 70B, and when the switching lever 54 is pivoted from the second operation position 70B to the first operation position 70A, the second operation pattern is switched to the first operation pattern before the switching lever 54 reaches the first operation position 70A.

[0085] As illustrated in FIG. 13, when the switching lever 54 is in the first operation position 70A or the second operation position 70B, the switching lever 54 does not come into contact with the contact member 49 (second portion 49b) even when the switching lever 54 enters the retracted state (first retracted state 72A, second retracted state 72B). However, when the switching lever 54 is within a pivoting range 73 between the first operation position 70A and the second operation position 70B (on the same

side of the first operation position 70A as the second operation position 70B, and on the same side of the second operation position 70B as the first operation position 70A) and is moved in a direction 74 from the extended state to the retracted state, the switching lever 54 comes into contact with the contact member 49 (second portion 49b) such that the switching lever 54 projects through the opening 64 to stop the switching lever 54 from moving. Thus, when the switching lever 54 is located at a position between the first operation position 70A and the second operation position 70B, the switching lever 54 is not brought into the retracted state, and the lid member 65 cannot be closed. That is, while the operation patterns are being switched, the switching lever 54 cannot be housed in the cover member 37, and the lid member 65 cannot be closed. Thus, it is possible to allow the operator to recognize that the operation patterns are being switched.

[0086] FIGS. 14 and 15 illustrate another embodiment of the pattern switch 41.

[0087] The pattern switch 41 according to another embodiment is substantially the same as the pattern switch 41 according to the above-described embodiment, except that the switching lever 54 is attachable and detachable to and from the switching lever support 53b.

[0088] Specifically, the switching lever support 53b is in a rectangular block shape, and includes a screw hole 75 (a hole having an internal thread in an inner peripheral surface). The switching lever 54 includes an external thread portion 76 (a portion having an external thread in an outer peripheral surface) at an end portion thereof. The switching lever 54 can be attached to the switching lever support 53b by screwing the external thread portion 76 into the screw hole 75. When the switching lever 54 is attached to the switching lever support 53b, the switching lever 54 projects through the opening 64. By rotating the switching lever 54 to unthread the threaded portions, the switching lever 54 can be removed from the switching lever support 53b, so that the opening 64 can be closed by the lid member 65. In such a case, for example, a holder to hold the switching lever 54 is provided at the cover member 37 or the like.

[0089] A working machine 1 according to one or more embodiments is a working machine 1 provided with a plurality of hydraulic actuators (turning motor M1, boom cylinder 15, arm cylinder 16, bucket cylinder 17), the working machine 1 including a machine body 2, an operator's seat 5 on the machine body 2, a console 20 extending upward from the machine body 2 in front of the operator's seat 5, a manual operator 31 to operate the plurality of hydraulic actuators, and a pattern switch 41 to switch an operation pattern in which the manual operator 31 is used to operate the plurality of hydraulic actuators between a plurality of operation patterns, wherein the console 20 includes therein a switch placement portion 46 for placement of the pattern switch 41.

[0090] With this configuration, it is possible to make room for placement of the pattern switch 41 even in a

compact working machine 1.

[0091] The working machine 1 further includes a traveling device 3 to support the machine body 2 such that the machine body 2 is allowed to travel, and a traveling lever 22 to operate the traveling device 3, the traveling lever 22 being provided at a substantially central portion in a machine-body width direction of an upper portion of the console 20. The console 20 includes a support frame 36 attached to the machine body 2, a cover member 37 to cover the support frame 36, and a traveling lever support 38 provided at an upper portion of the support frame 36 to support the traveling lever 22. The switch placement portion 46 is located, inside the cover member 37, at the upper portion of the support frame 36 such that the switch placement portion 46 is located beside the traveling lever support 38 in the machine-body width direction.

[0092] With this configuration, it is possible to make room for the pattern switch 41 within the console 20.

[0093] The working machine 1 further includes a control valve unit 23 including a plurality of control valves (turn control valve V2, arm control valve V3, bucket control valve V9, boom control valve V10) to control the plurality of hydraulic actuators. The support frame 36 includes a first side plate 36A and a second side plate 36B facing each other with a space therebetween in the machine-body width direction, and a coupling plate 36C to connect upper portions of the first side plate 36A and the second side plate 36B. The control valve unit 23 is located below the coupling plate 36C such that the control valve unit 23 is located between the first side plate 36A and the second side plate 36B. The traveling lever support 38 is provided at a substantially central portion in the machine-body width direction of the coupling plate 36C. The switch placement portion 46 is provided between the traveling lever support 38 and the first side plate 36A or the second side plate 36B on the coupling plate 36C.

[0094] With this configuration, it is easy to guide hydraulic hoses connecting the pattern switch 41 and the control valves.

[0095] The console 20 includes, in the cover member 37, an opening 64 at a position corresponding to the pattern switch 41, and a lid member 65 to open and close the opening 64. The plurality of operation patterns include a first operation pattern and a second operation pattern that differs from the first operation pattern. The pattern switch 41 includes a switching lever 54 pivotable between a first operation position 70A in which the first operation pattern is selected and a second operation position 70B in which the second operation pattern is selected. The switching lever 54 is, in each of the first and second operation positions 70A and 70B, movable between an extended state (first extended state 71A, second extended state 71B) in which the switching lever 54 projects through the opening 64 and a retracted state (first retracted state 72A, second retracted state 72B) in which the switching lever 54 is retracted within the lid member 65.

[0096] With this configuration, it is possible to easily

move the pattern switch 41 provided in the cover member 37 and, after switching operation patterns, possible to eliminate or reduce the likelihood that the switching lever 54 will obstruct the operator.

[0097] A working machine 1 is a working machine 1 provided with a plurality of hydraulic actuators (turning motor M1, boom cylinder 15, arm cylinder 16, bucket cylinder 17), the working machine 1 including a machine body 2, a cover member 37 on the machine body 2, a manual operator 31 to operate the plurality of hydraulic actuators, and a pattern switch 41 to switch an operation pattern in which the manual operator 31 is used to operate the plurality of hydraulic actuators between a plurality of operation patterns, the pattern switch 41 being housed inside the cover member 37, the cover member 37 includes an opening 64 at a position corresponding to the pattern switch 41, and a lid member 65 to open and close the opening 64, the plurality of operation patterns include a first operation pattern and a second operation pattern, the pattern switch 41 includes a switching lever 54 pivotable between a first operation position 70A in which the first operation pattern is selected and a second operation position 70B in which the second operation pattern is selected, and the switching lever 54 is, in each of the first and second operation positions 70A and 70B, movable between an extended state (first extended state 71A, second extended state 71B) in which the switching lever 54 projects through the opening 64 and a retracted state (first retracted state 72A, second retracted state 72B) in which the switching lever 54 is retracted within the lid member 65.

[0098] With this configuration, it is possible to easily move the pattern switch 41 provided in the cover member 37 and, after switching operation patterns, possible to eliminate or reduce the likelihood that the switching lever 54 will obstruct the operator.

[0099] The working machine 1 further includes a contact member 49 to, when the switching lever 54 is within a pivoting range 73 between the first operation position 70A and the second operation position 70B and is moved in a direction 74 from the extended state toward the retracted state, come into contact with the switching lever 54 such that the switching lever 54 projects through the opening 64 to stop the switching lever 54 from moving.

[0100] With this configuration, while the operation pattern is being switched, the switching lever 54 cannot be housed in the cover member 37, and the lid member 65 cannot be closed. Thus, it is possible to allow the operator to recognize that the operation pattern is being switched.

[0101] The working machine 1 further includes a plurality of control valves to be pilot-operated by the manual operator 31, the plurality of control valves being provided such that the plurality of control valves correspond to the plurality of hydraulic actuators to control the plurality of hydraulic actuators. The pattern switch 41 includes a pattern switching valve 42 to switch between the plurality of operation patterns by changing a direction of a flow of pilot fluid to pilot-operate the control valves by operation

of the manual operator 31, a pivot shaft 52 about which the switching lever 54 is to be pivoted, a swing arm 53 supported such that the swing arm 53 is pivotable about the pivot shaft 52 and including a switching lever support 53b to support the switching lever 54 such that the switching lever 54 is movable between the extended state and the retracted state, and an interlock mechanism 55 to interlock the swing arm 53 and a valve element 42b of the pattern switching valve 42.

[0102] With this, it is possible to achieve a simple configuration of the operation mechanism to operate the pattern switching valve 42.

[0103] While embodiments of the present invention have been described above, it is to be understood that the embodiments disclosed herein are considered as examples in all aspects and are not considered as limitations. The scope of the present invention is to be determined not by the foregoing description but by the claims, and is intended to include all variations and modifications within the scope of the claims and their equivalents.

Reference Signs List

[0104]

2	machine body
3	traveling device
5	operator's seat
15	hydraulic actuator (boom cylinder)
16	hydraulic actuator (arm cylinder)
17	hydraulic actuator (bucket cylinder)
20	console
22	traveling lever
23	control valve unit
31	manual operator
36	support frame
36A	first side plate
36B	second side plate
36C	coupling plate
37	cover member
38	traveling lever support
41	pattern switch
42	pattern switching valve
42b	valve element
46	switch placement portion
49	contact member
52	pivot shaft
53	swing arm
53b	switching lever support
54	switching lever
55	interlock mechanism
64	opening
65	lid member
70A	first operation position
70B	second operation position
71A	extended state (first extended state)
71B	extended state (second extended state)
72A	retracted state (first retracted state)

72B retracted state (second retracted state)
 73 pivoting range
 74 direction
 M1 hydraulic actuator (turning motor)
 V2 control valve (turn control valve)
 V3 control valve (arm control valve)
 V9 control valve (bucket control valve)
 V10 control valve (boom control valve)

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Claims

1. A working machine provided with a plurality of hydraulic actuators, the working machine comprising:

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a machine body;
 an operator's seat on the machine body;
 a console extending upward from the machine body in front of the operator's seat;
 a manual operator to operate the plurality of hydraulic actuators; and
 a pattern switch to switch an operation pattern in which the manual operator is used to operate the plurality of hydraulic actuators between a plurality of operation patterns; wherein
 the console includes therein a switch placement portion for placement of the pattern switch.

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2. The working machine according to claim 1, further comprising:

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a traveling device to support the machine body such that the machine body is allowed to travel; and
 a traveling lever to operate the traveling device, the traveling lever being provided at a substantially central portion in a machine-body width direction of an upper portion of the console; wherein
 the console includes:

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a support frame attached to the machine body;
 a cover member to cover the support frame; and
 a traveling lever support provided at an upper portion of the support frame to support the traveling lever; and

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the switch placement portion is located, inside the cover member, at the upper portion of the support frame such that the switch placement portion is located beside the traveling lever support in the machine-body width direction.

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3. The working machine according to claim 2, further comprising:

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a control valve unit including a plurality of control valves to control the plurality of hydraulic actuators; wherein
 the support frame includes:

a first side plate and a second side plate facing each other with a space therebetween in the machine-body width direction; and
 a coupling plate to connect upper portions of the first side plate and the second side plate;

the control valve unit is located below the coupling plate such that the control valve unit is located between the first side plate and the second side plate,
 the traveling lever support is provided at a substantially central portion in the machine-body width direction of the coupling plate, and
 the switch placement portion is provided between the traveling lever support and the first side plate or the second side plate on the coupling plate.

4. The working machine according to claim 2 or 3, wherein

the console includes:

in the cover member, an opening at a position corresponding to the pattern switch; and
 a lid member to open and close the opening;

the plurality of operation patterns include a first operation pattern and a second operation pattern that differs from the first operation pattern; the pattern switch includes a switching lever pivotable between a first operation position in which the first operation pattern is selected and a second operation position in which the second operation pattern is selected; and
 the switching lever is, in each of the first and second operation positions, movable between an extended state in which the switching lever projects through the opening and a retracted state in which the switching lever is retracted within the lid member.

5. A working machine provided with a plurality of hydraulic actuators, the working machine comprising:

a machine body;
 a cover member on the machine body;
 a manual operator to operate the plurality of hydraulic actuators; and
 a pattern switch to switch an operation pattern

in which the manual operator is used to operate the plurality of hydraulic actuators between a plurality of operation patterns, the pattern switch being housed inside the cover member; wherein the cover member includes:

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an opening at a position corresponding to the pattern switch; and
a lid member to open and close the opening;

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the plurality of operation patterns include a first operation pattern and a second operation pattern;

the pattern switch includes a switching lever pivotable between a first operation position in which the first operation pattern is selected and a second operation position in which the second operation pattern is selected; and

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the switching lever is, in each of the first and second operation positions, movable between an extended state in which the switching lever projects through the opening and a retracted state in which the switching lever is retracted within the lid member.

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6. The working machine according to claim 4 or 5, further comprising a contact member to, when the switching lever is within a pivoting range between the first operation position and the second operation position and is moved in a direction from the extended state toward the retracted state, come into contact with the switching lever such that the switching lever projects through the opening to stop the switching lever from moving.

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7. The working machine according to any one of claims 4 to 6, further comprising:

a plurality of control valves to be pilot-operated by the manual operator, the plurality of control valves being provided such that the plurality of control valves correspond to the plurality of hydraulic actuators to control the plurality of hydraulic actuators; wherein the pattern switch includes:

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a pattern switching valve to switch between the plurality of operation patterns by changing a direction of a flow of pilot fluid to pilot-operate the control valves by operation of the manual operator;

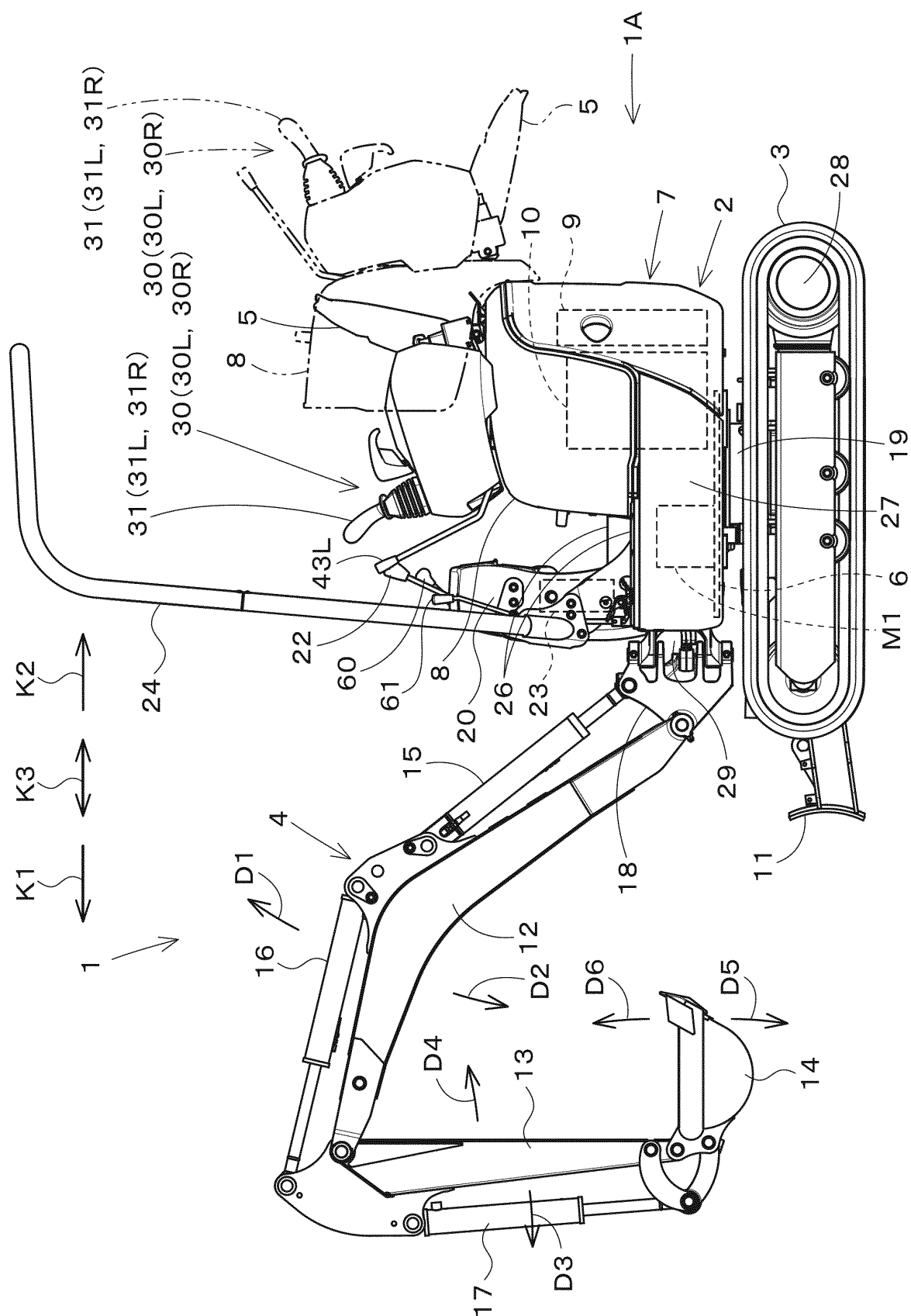
50

a pivot shaft about which the switching lever is to be pivoted;

a swing arm supported such that the swing arm is pivotable about the pivot shaft and including a switching lever support to support the switching lever such that the switching lever is movable between the extended

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state and the retracted state; and
an interlock mechanism to interlock the swing arm and a valve element of the pattern switching valve.



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Fig.2

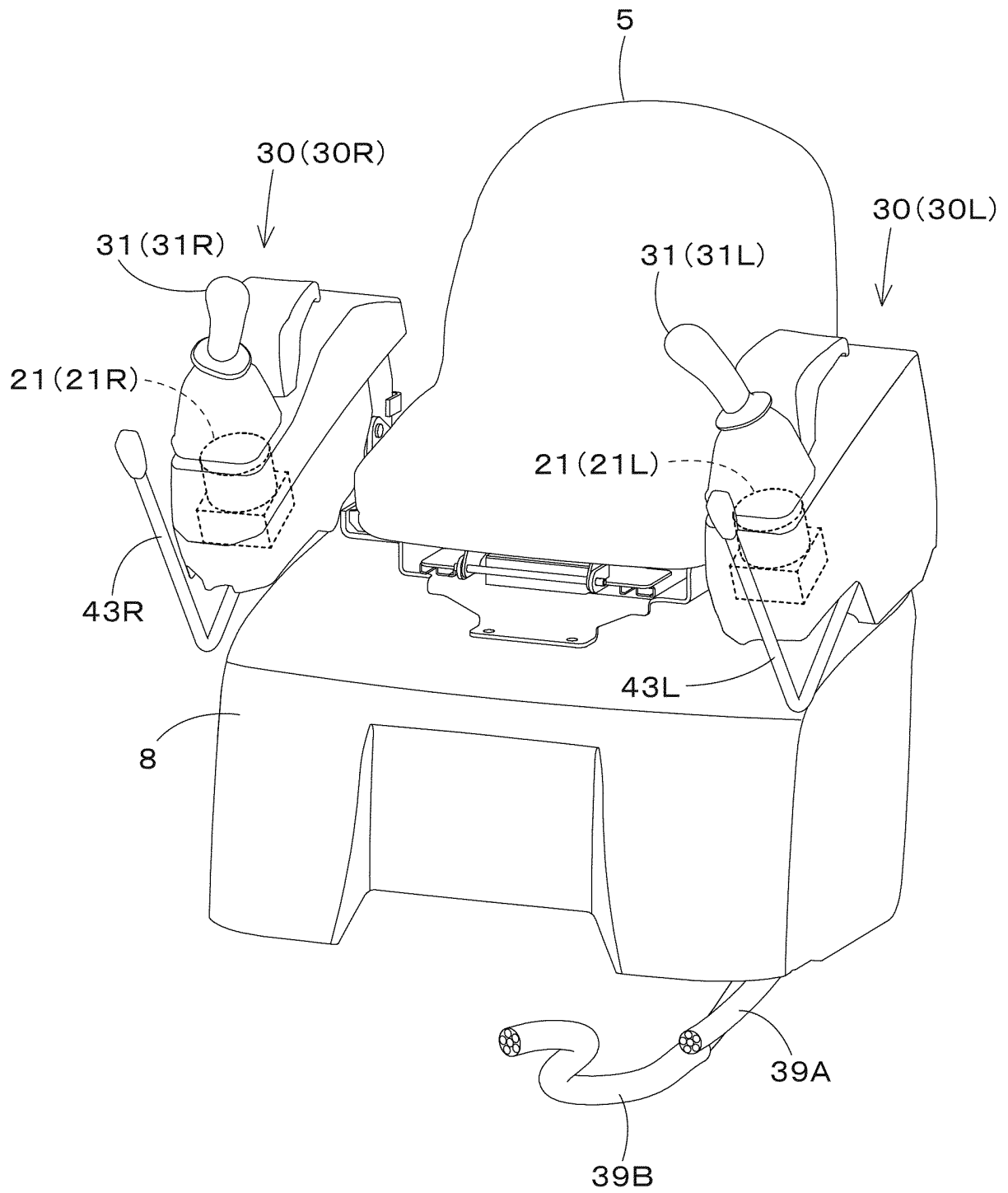


Fig.3

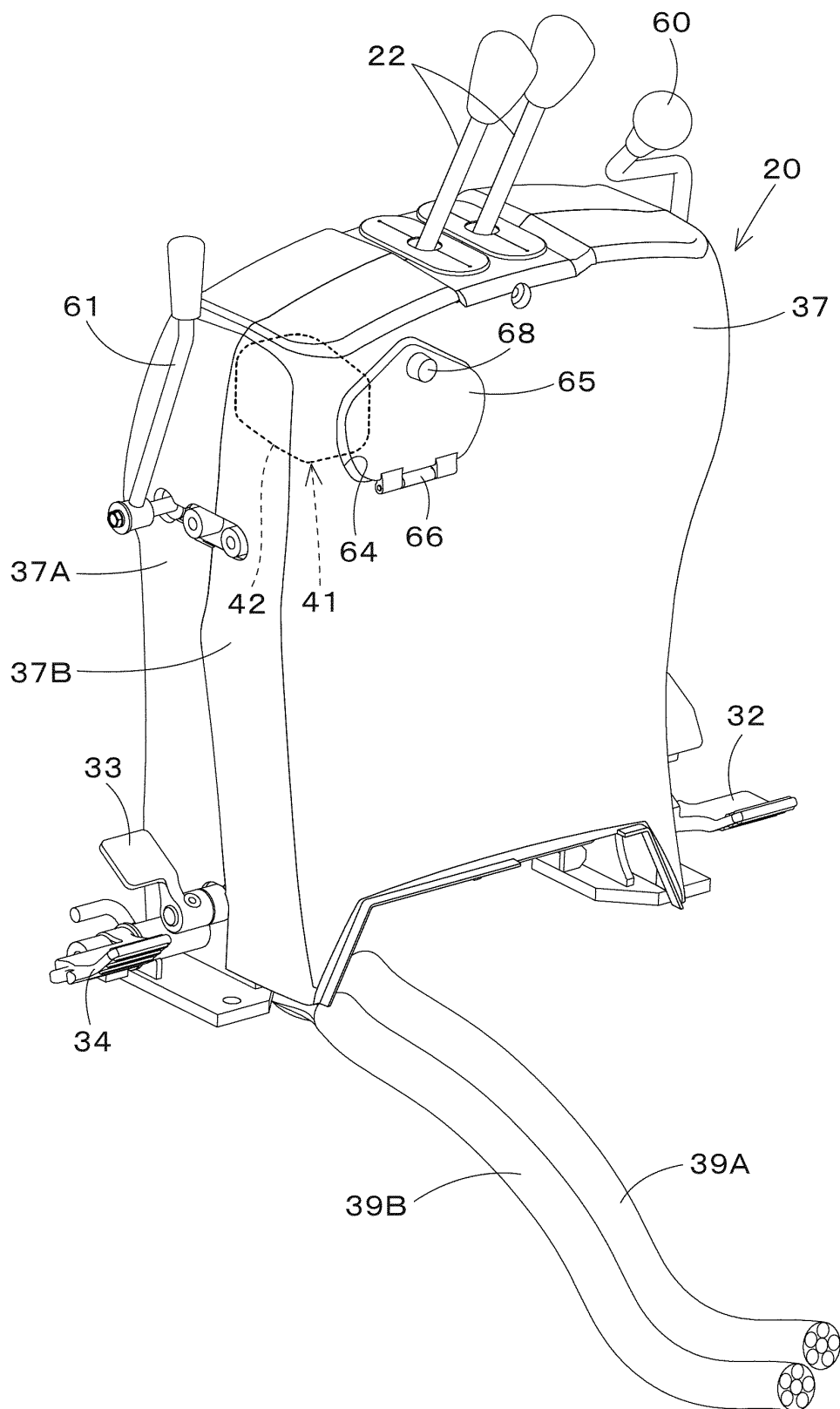


Fig.4

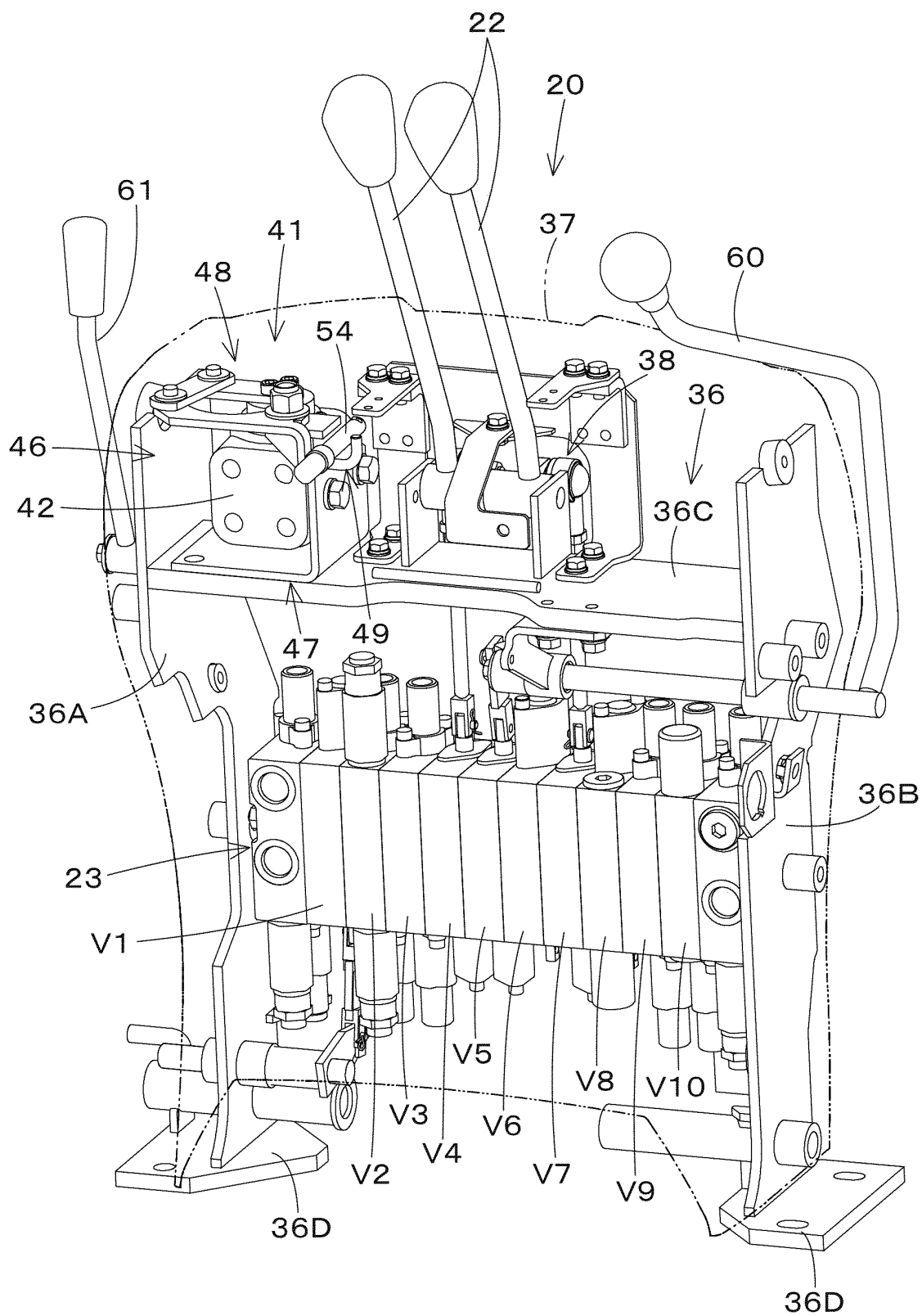
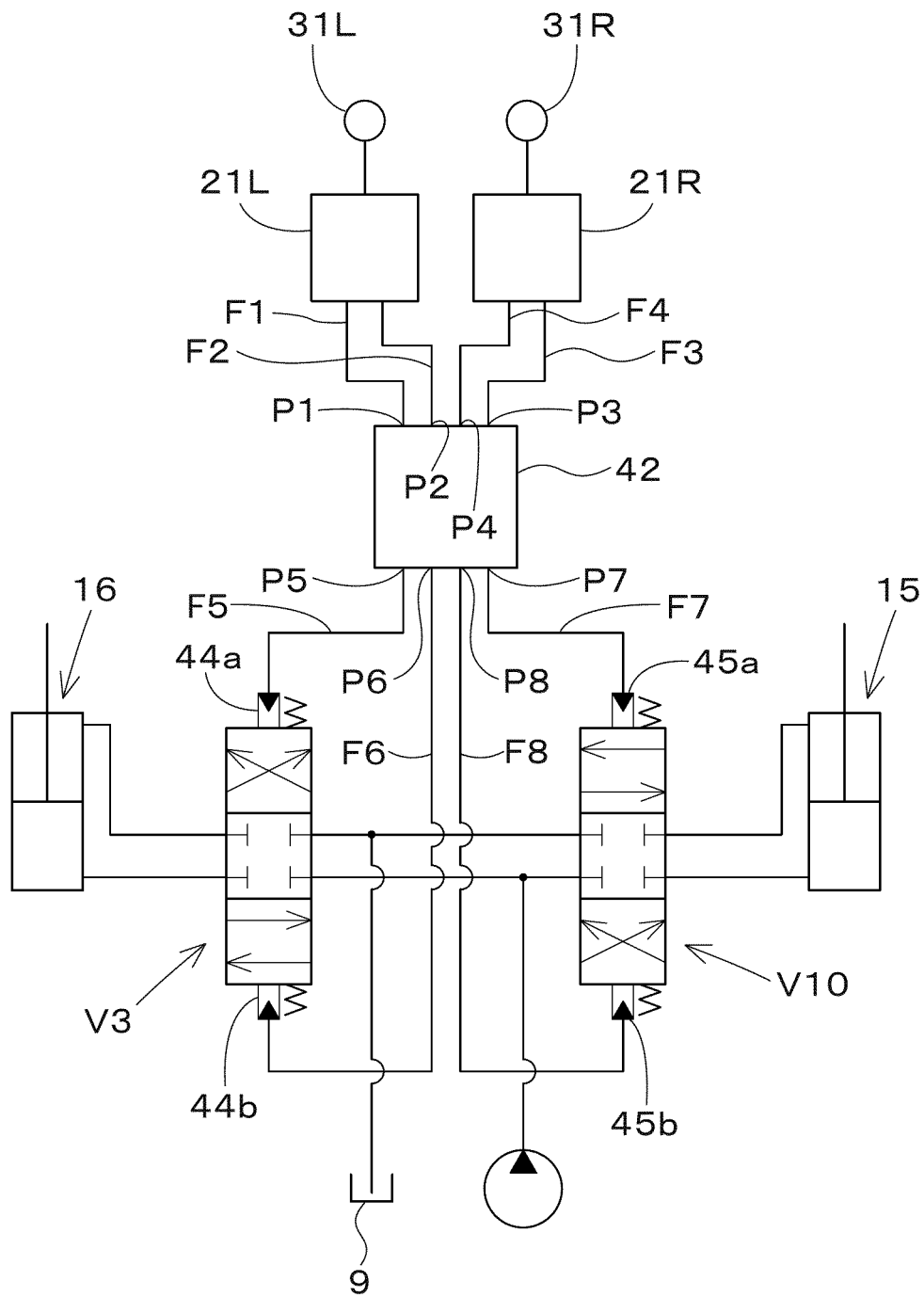


Fig.5



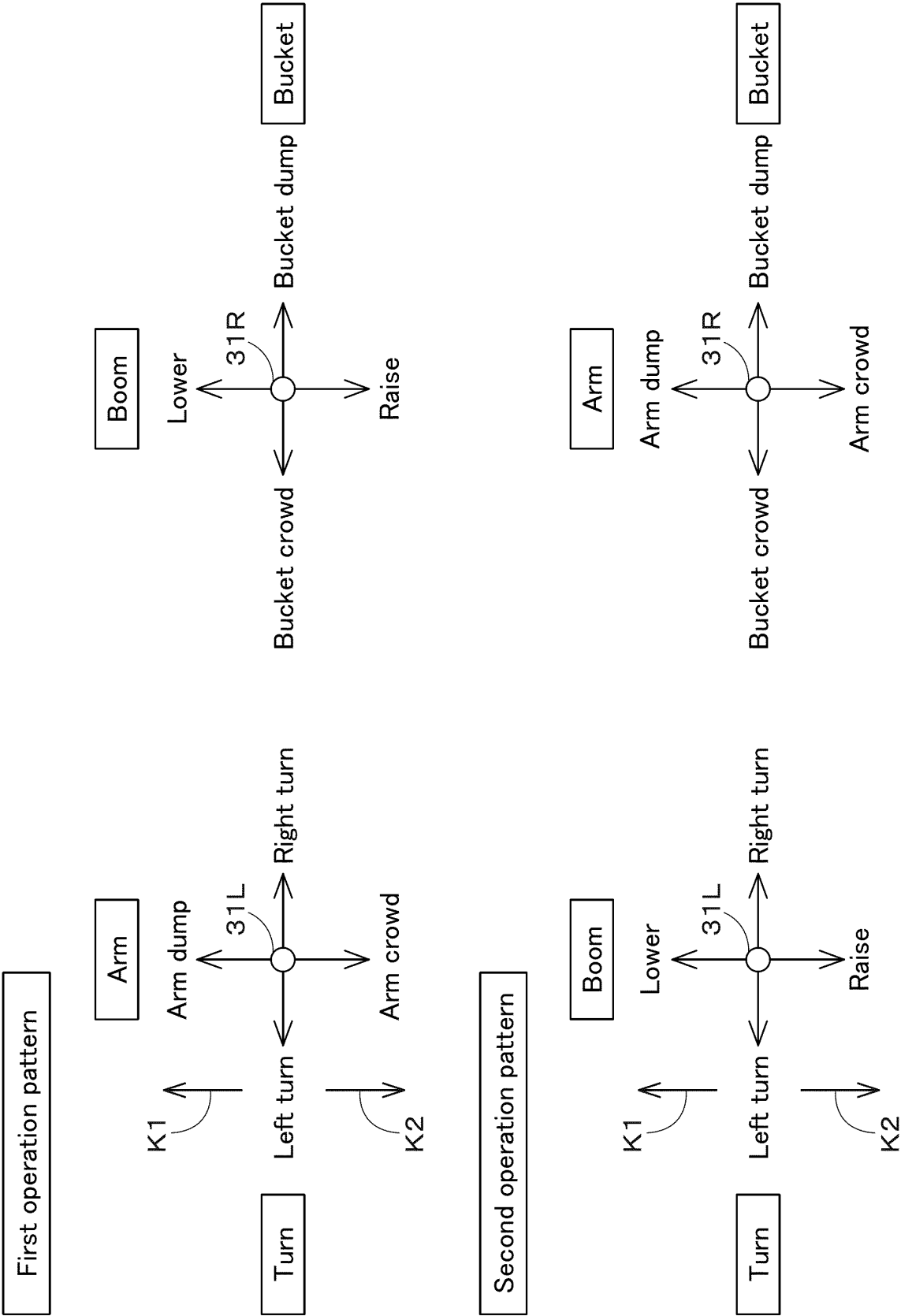


Fig.6

Fig.7

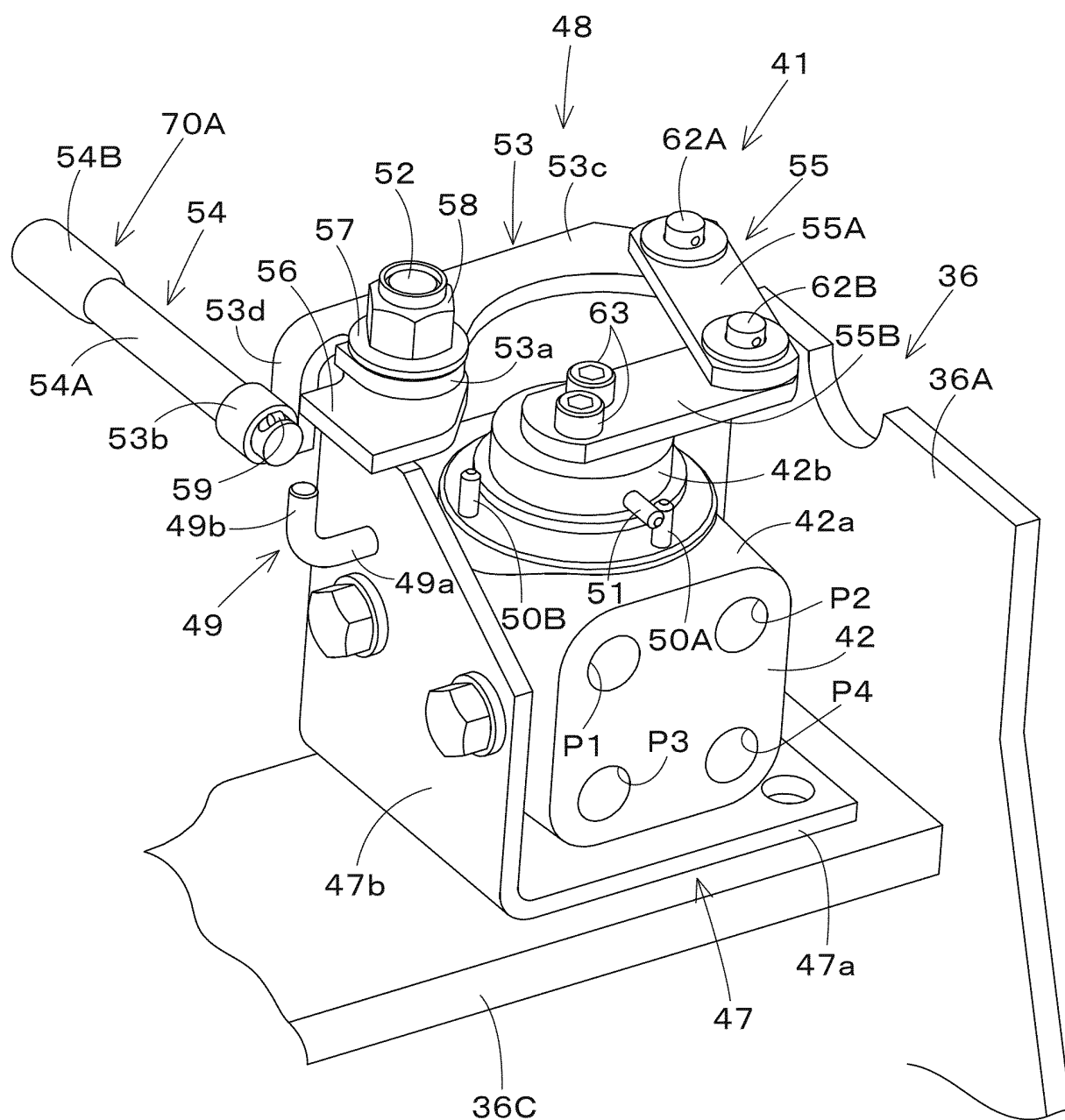
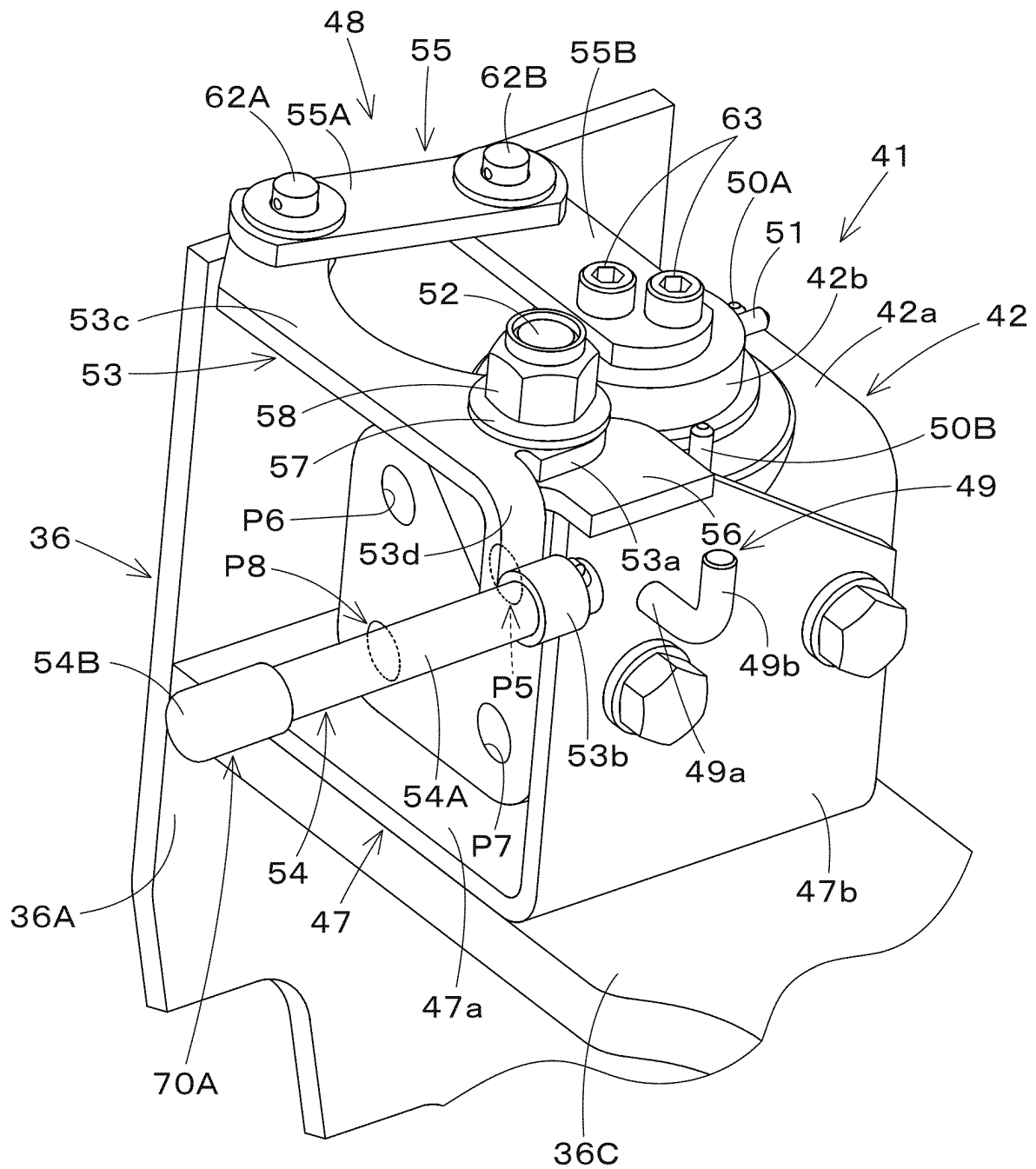


Fig.8



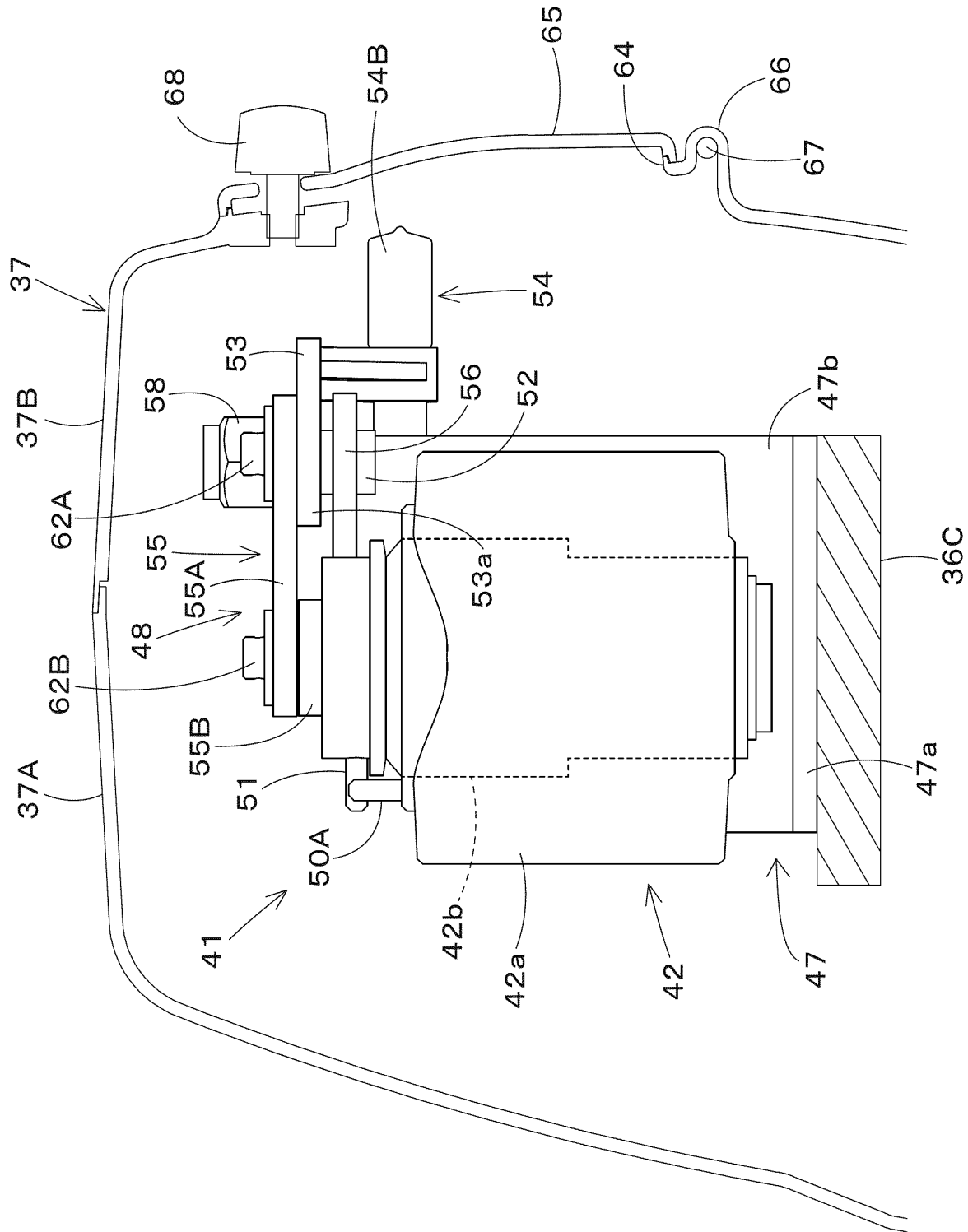


Fig. 9

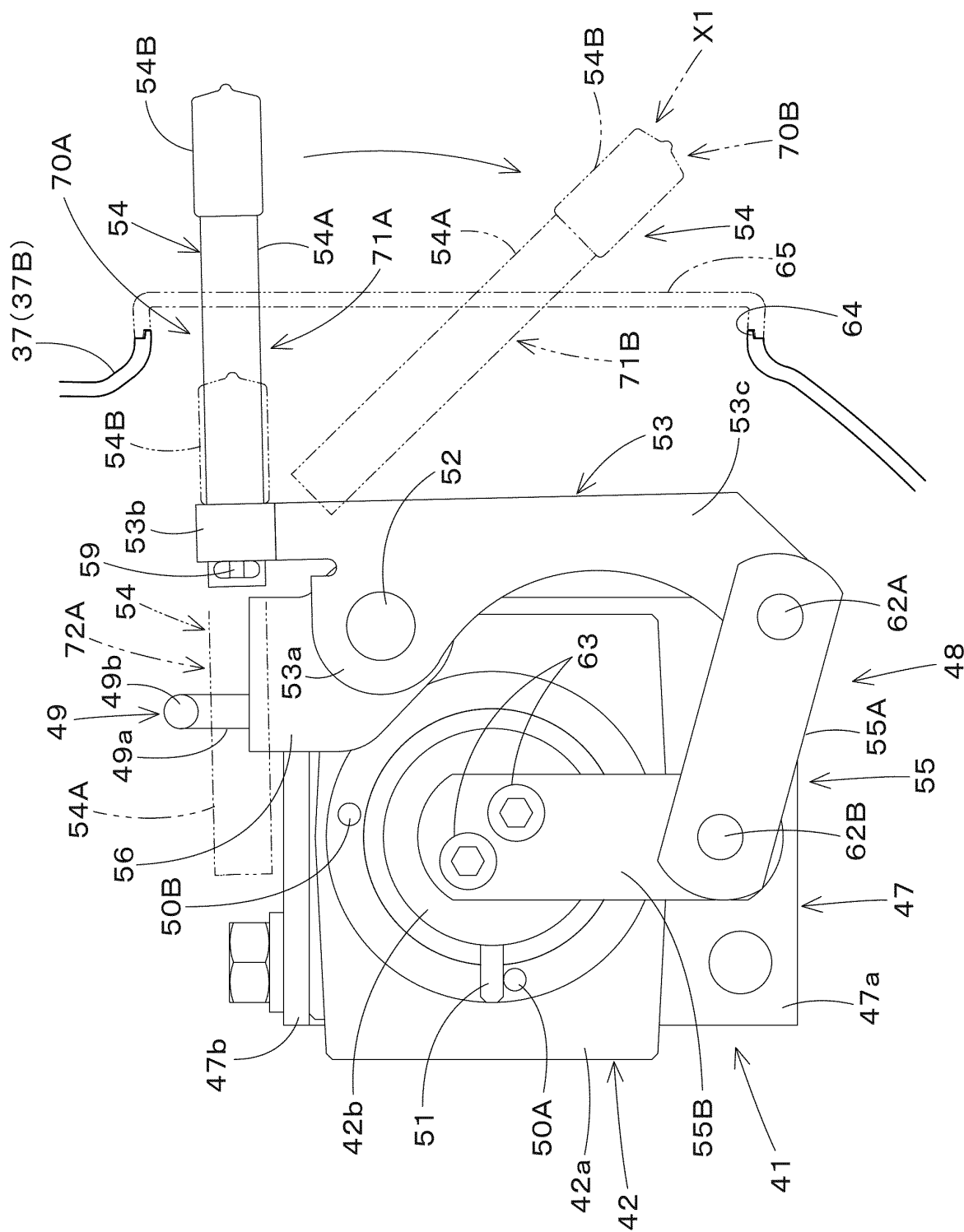


Fig.10

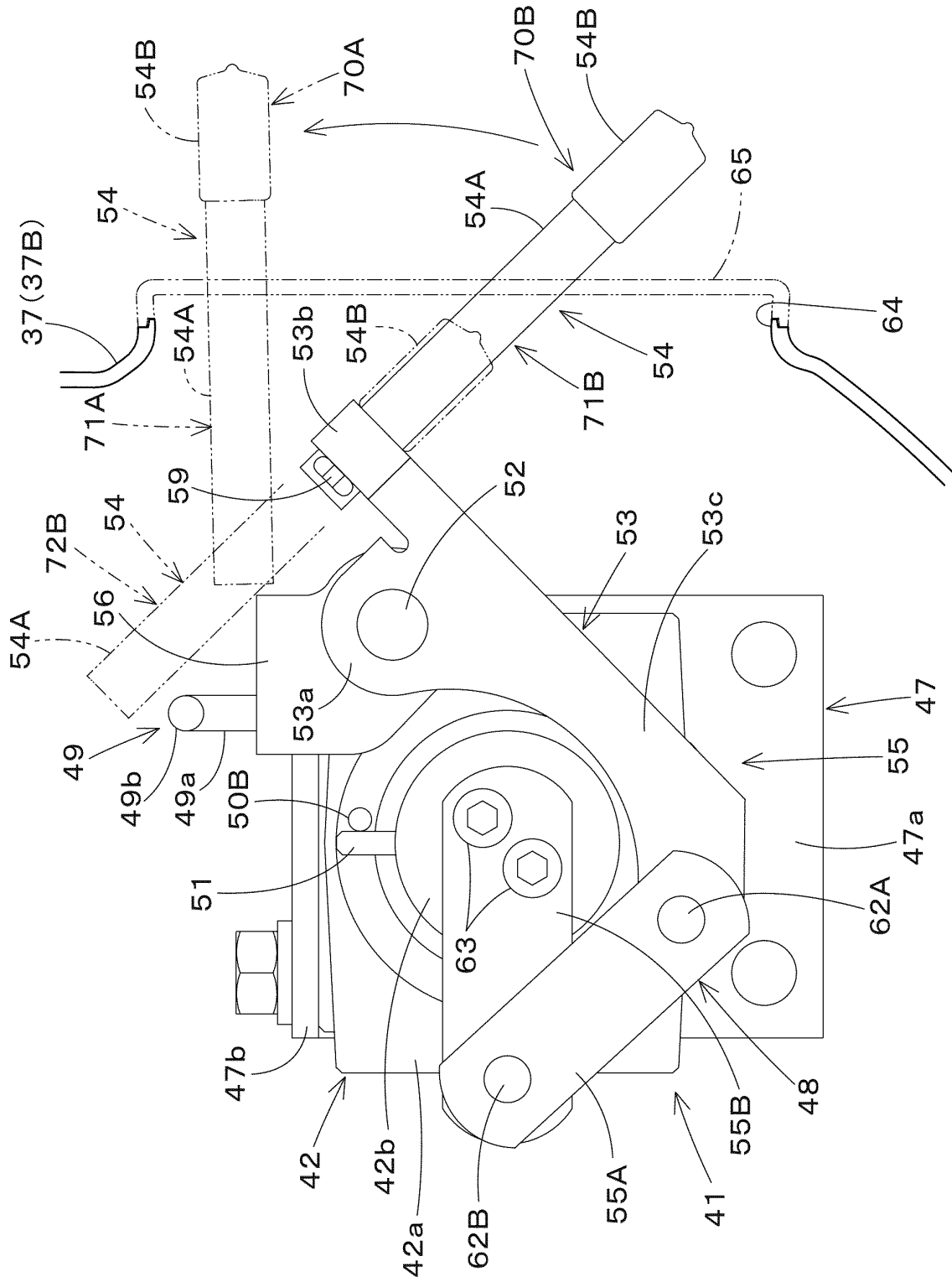


Fig.11

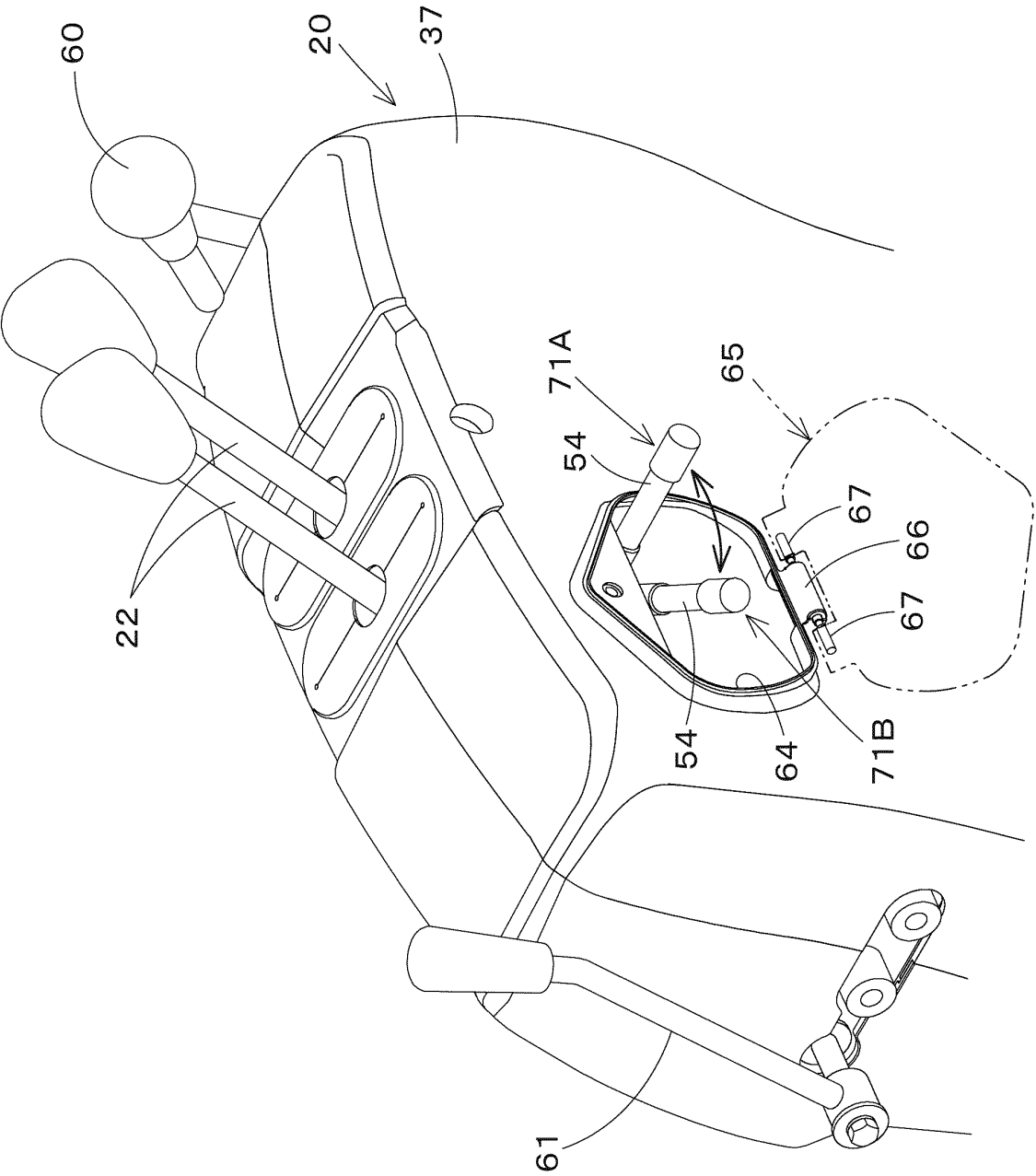
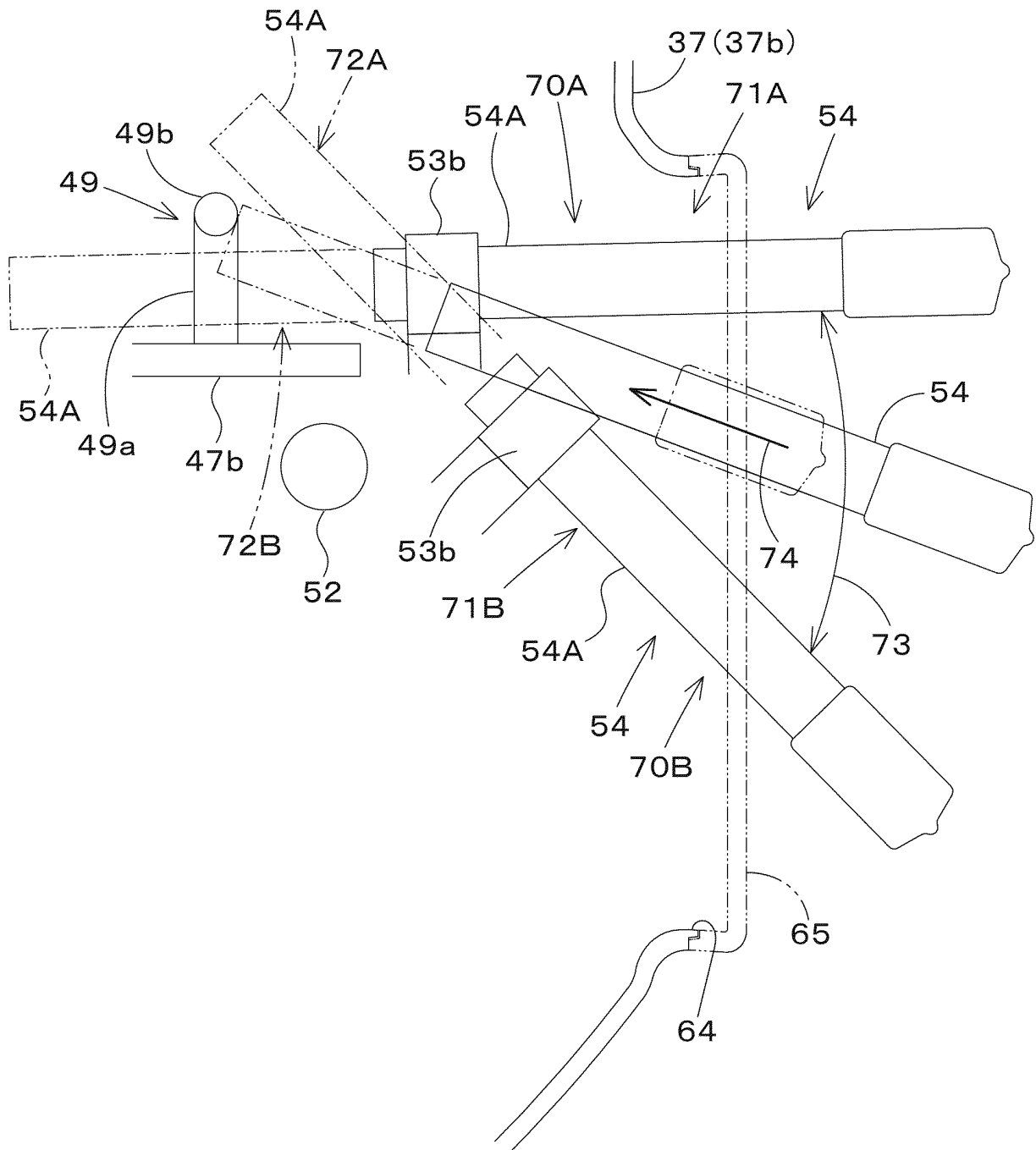


Fig.12

Fig.13



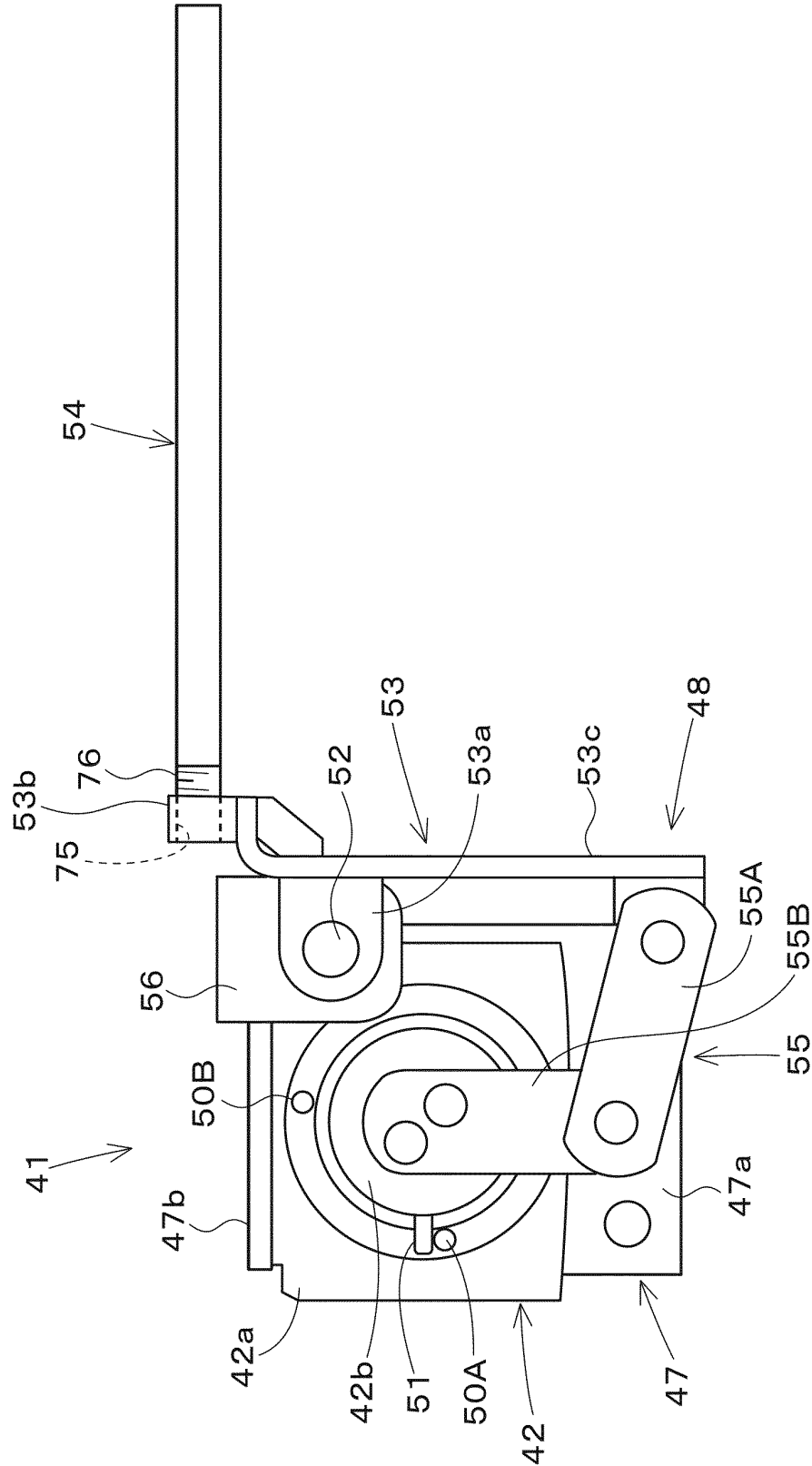
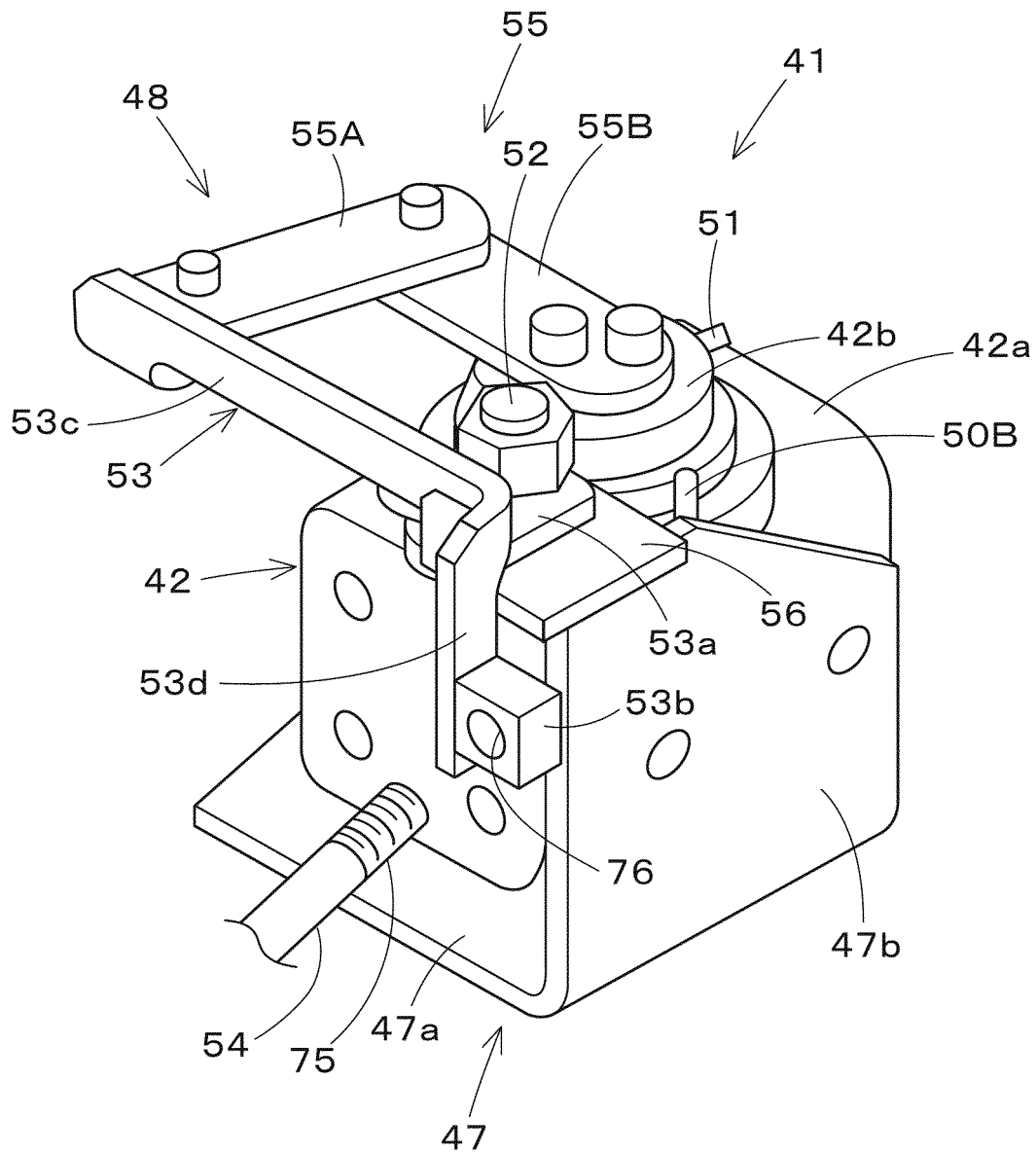


Fig.14

Fig.15



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2022/038429

A. CLASSIFICATION OF SUBJECT MATTER

E02F 9/16(2006.01)i

FI: E02F9/16 H

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E02F1/00-9/28

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

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2022
 Registered utility model specifications of Japan 1996-2022
 Published registered utility model applications of Japan 1994-2022

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 10-195928 A (HITACHI CONSTRUCTION MACHINERY CO., LTD.) 28 July 1998 (1998-07-28) paragraphs [0002]-[0007], [0054]-[0061], fig. 1-3	1
A	paragraphs [0002]-[0007], [0054]-[0061], fig. 1-3	2-7
X	JP 11-100866 A (KUBOTA CORP) 13 April 1999 (1999-04-13) paragraphs [0013]-[0028], fig. 1-5	1
A	paragraphs [0013]-[0028], fig. 1-5	2-7
A	JP 3622889 B2 (KOBE STEEL LTD) 23 February 2005 (2005-02-23) paragraphs [0017]-[0022], fig. 1	1-7
A	JP 4727527 B2 (HITACHI CONSTRUCTION MACHINERY CO., LTD.) 20 July 2011 (2011-07-20) paragraphs [0029]-[0030], fig. 7-9	1-7

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

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Date of the actual completion of the international search

02 November 2022

Date of mailing of the international search report

15 November 2022

Name and mailing address of the ISA/JP

Japan Patent Office (ISA/JP)
 3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915
 Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2022/038429

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Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 10-195928 A	28 July 1998	(Family: none)	
JP 11-100866 A	13 April 1999	(Family: none)	
JP 3622889 B2	23 February 2005	(Family: none)	
JP 4727527 B2	20 July 2011	US 2008/0022733 A1 paragraphs [0057]-[0058], fig. 7-9	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2014032462 A [0004]