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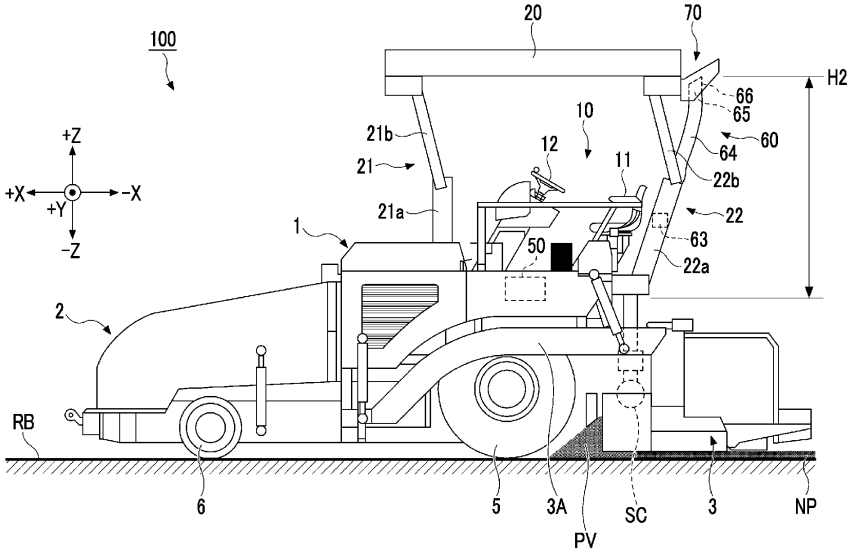
(54) MIXTURE LAYING MACHINE

(57) Provided is a mixture laying machine (100) capable of reducing a possibility that a malfunction occurs in a blower (63). There is provided a mixture laying machine 100 including: a traveling body 1; a hopper 2 mounted on the traveling body (1) and capable of accommodating a mixture; a driver seat 11 mounted on the traveling body (1); a movable roof 20 disposed above the driver seat (11); a blower 63 that blows gas; a flexible flow path member 64 that forms a flow path which communicates with the blower (63) and through which the gas flows; an exhaust port 66 that communicates with the flow path and exhausts the gas; a support unit 80 that is attached to the roof (20) and supports the exhaust port (66) to be able to change a direction of the exhaust port (66); and a cover 70 that covers the exhaust port (66) when the exhaust port (66) is present at a first height position H1, in which, when the exhaust port (66) is present at a second height position H2 that is above the driver seat (11) and higher than the first height position (H1), the exhaust port (66) is directed to a side opposite to the driver seat (11).

FIG. 1



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present disclosure relates to a mixture laying machine.

Description of Related Art

[0002] A paving machine having a blower and a chimney that disperse a gas released from an asphalt upward is known (for example, refer to PCT Japanese Translation Patent Publication No. 2001-526751).

SUMMARY OF THE INVENTION

[0003] In a state where the gas is not exhausted, foreign matter may enter from the gas exhaust port and the foreign matter may reach the blower. When the blower is operated in a state where the foreign matter is present in the blower, the foreign matter may cause a malfunction in the blower.

[0004] An object of the present disclosure is to provide a mixture laying machine capable of reducing a possibility that a malfunction occurs in a blower.

[0005] According to an aspect of the present disclosure, there is provided a mixture laying machine including: a traveling body; a hopper mounted on the traveling body and capable of accommodating a mixture; a driver seat mounted on the traveling body; a movable roof disposed above the driver seat; a blower that blows gas; a flexible flow path member that forms a flow path which communicates with the blower and through which the gas flows; an exhaust port that communicates with the flow path and exhausts the gas; a support unit that is attached to the roof and supports the exhaust port to be able to change a direction of the exhaust port; and a cover that covers the exhaust port when the exhaust port is present at a first height position, in which, when the exhaust port is present at a second height position that is above the driver seat and higher than the first height position, the exhaust port is directed to a side opposite to the driver seat.

[0006] According to the present disclosure, it is possible to provide a mixture laying machine capable of reducing a possibility that a malfunction occurs in a blower.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

Fig. 1 is a side view of an asphalt finisher according to an embodiment.

Fig. 2 is a side view of the asphalt finisher according to the embodiment.

Fig. 3 is a rear view showing a gas exhaust system.

Fig. 4 is a rear view showing a duct end portion, an exhaust port, and a cover.

Fig. 5 is a side view showing the duct end portion, the exhaust port, and the cover.

Fig. 6 is a side view showing the duct end portion, the exhaust port, and the cover, and is a view showing a state where the upward exhaust port is covered with the cover.

DETAILED DESCRIPTION OF THE INVENTION

[0008] Figs. 1 and 2 are side views of an asphalt finisher 100 according to an embodiment. The asphalt finisher 100 is an example of a mixture laying machine. The mixture laying machine may be a base paver, a tack paver, a multi-asphalt paver, or the like. The asphalt finisher 100 is mainly configured by a tractor 1, a hopper 2, and a screed 3.

Hereinafter, a direction of the hopper 2 viewed from the tractor 1 (+X direction) will be referred to as forward, and a direction of the screed 3 viewed from the tractor 1 (-X direction) will be referred to as rearward. The tractor 1 is an example of a traveling body. In the present specification, "front" and "rear" correspond to front and rear of the traveling body.

[0009] The tractor 1 is a mechanism for causing the asphalt finisher 100 to travel. In the present example, the tractor 1 rotates a rear wheel 5 using a rear wheel traveling hydraulic motor and rotates a front wheel 6 using a front wheel traveling hydraulic motor to move the asphalt finisher 100. The rear wheel traveling hydraulic motor and the front wheel traveling hydraulic motor rotate by receiving supply of a hydraulic oil from a hydraulic pump. The rear wheel 5 and the front wheel 6 may be replaced with a crawler.

[0010] The asphalt finisher 100 includes a controller 50. The controller 50 is a control device that controls the asphalt finisher 100. In the present example, the controller 50 is configured by a microcomputer including a CPU, a memory, a non-volatile storage device, and the like and is mounted on the tractor 1. Various types of functions of the controller 50 are realized, for example, as the CPU executes a program stored in the non-volatile storage medium.

[0011] The hopper 2 is a mechanism for receiving a paving material. The hopper 2 includes a container that can accommodate the paving material. The hopper 2 is installed on a front side of the tractor 1 and is configured to be capable of being opened and closed in a Y-axis direction (vehicle width direction) by a hopper cylinder. The asphalt finisher 100 usually receives a paving material (for example, an asphalt mixture) from a loading platform of a dump truck when the hopper 2 is in a fully open state. Asphalt is an example of a mixture.

[0012] Figs. 1 and 2 show that the hopper 2 is in a fully open state. The hopper 2 is closed when the paving material in the hopper 2 decreases, and the paving material near an inner wall of the hopper 2 is collected at a center

portion of the hopper 2. This is to enable a conveyor which is at the center portion of the hopper 2 to feed the paving material to the rear side of the tractor 1. The paving material fed to the rear side of the tractor 1 is spread in the vehicle width direction on the rear side of the tractor 1 and the front side of the screed 3 by a screw SC. In the present example, the screw SC is in a state where an extension screw is connected to the left and right. Figs. 1 and 2 show a paving material PV spread on a roadbed RB by the screw SC in a coarse dot pattern. Further, Figs. 1 and 2 show a new paving body NP formed by compacting the paving material PV with the screed 3 in a fine dot pattern.

[0013] The screed 3 is a mechanism for leveling the paving material PV. The screed 3 may include a front screed and a rear screed. The screed 3 is a floating screed pulled by the tractor 1 and is connected to the tractor 1 via a leveling arm 3A.

[0014] A guide rail 1G that can be used as a handrail by an operator of the asphalt finisher 100 is installed above the tractor 1.

[0015] An operator station 10 is provided in an upper portion on the rear side of the tractor 1. The operator station 10 is a section on the tractor 1 used by an operator when operating the asphalt finisher 100, and has a driver seat 11 and a handle 12. The handle 12 is disposed in front of the driver seat 11.

[0016] A movable roof 20 is provided above the driver seat 11 and the handle 12. The roof 20 is a member for protecting the operator from rain, sunlight, or the like, and is also called a canopy. The roof 20 can be raised and lowered. In Fig. 1, the roof 20 in a raised state is shown, and in Fig. 2, the roof 20 in a lowered state is shown. The roof 20 is supported by a plurality of columns 21 and 22. The columns 21 and 22 are disposed apart from each other in the frontrear direction of the tractor 1. The column 21 is disposed on the front side of the operator station 10, and the column 22 is disposed on the rear side of the operator station 10. The pair of columns 21 are disposed apart from each other in the vehicle width direction. Similarly, the pair of columns 22 are disposed apart from each other in the vehicle width direction. The roof 20 is supported by a total of four columns 21 and 22.

[0017] The column 21 has a first part 21a and a second part 21b. The first part 21a is fixed to the tractor 1 and extends upward. The lower end portion of the second part 21b is connected to the upper end portion of the first part 21a. The second part 21b is capable of oscillating with respect to the first part 21a. The roof 20 is connected to an upper end portion of the second part 21b. For example, a hydraulic cylinder for erecting the column 21 may be connected to the second part 21b.

[0018] Similarly, the column 22 has a first part 22a and a second part 22b. The first part 22a is fixed to the tractor 1 and extends upward. The first part 22a extends obliquely rearward. The upper end portion of the first part 22a is disposed at the rear part of the lower end portion. The lower end portion of the second part 22b is connected to the upper end portion of the first part 22a. The second part 22b is capable of oscillating with respect to the first part 22a. The roof 20 is connected to the upper end portion of the second part 22b. For example, a hydraulic cylinder for erecting the column 22 may be connected to the second part 22b. In addition, one of the hydraulic cylinder for erecting the column 21 and the hydraulic cylinder for erecting the column 22 may be omitted.

[0019] In the asphalt finisher 100, the operator can oscillate the second parts 21b and 22b of the columns 21 and 22 to raise and lower the roof 20 by driving the hydraulic cylinder. When the operation for lowering the roof 20 is performed, the asphalt finisher 100 is changed to a state where the roof 20 is lowered as shown in Fig. 2 from a state where the roof 20 is raised as shown in Fig. 1. Similarly, when the operation for raising the roof 20 is performed, the asphalt finisher 100 is changed to a state where the roof 20 is raised as shown in Fig. 1 from a state where the roof 20 is lowered as shown in Fig. 2.

[0020] Next, a gas exhaust system 60 will be described with reference to Figs. 3 to 6. Fig. 3 is a rear view showing the gas exhaust system 60. Fig. 4 is a rear view showing a duct end portion, an exhaust port, and a cover. Fig. 5 is a side view showing the duct end portion, the exhaust port, and the cover. Fig. 6 is a side view showing the duct end portion, the exhaust port, and the cover, and is a view showing a state where the upward exhaust port is covered with the cover.

[0021] As shown in Fig. 3, the asphalt finisher 100 includes the gas exhaust system 60. The gas exhaust system 60 exhausts the gas released from the mixture which is supplied to the rear side of the tractor 1 by the conveyor and dropped on the roadbed RB to a position higher than the driver seat 11. Asphalt, which is a mixture, is a petroleum distillation product, and is heated to generate hydrocarbon gas. The gas generated from the asphalt contains, for example, nitrogen, sulfur, benzene, and hydrocarbons. The gas exhaust system 60 exhausts the gas generated from the mixture to the side opposite to the driver seat 11. In the shown example, the gas exhaust system 60 exhausts the gas generated from the mixture to the rear side.

[0022] The gas exhaust system 60 includes a hood 61, a hose 62, a fan 63, a hose 64, an exhaust duct 65, and a cover 70. The asphalt finisher 100 includes a plurality of gas exhaust systems 60. The plurality of gas exhaust systems 60 are disposed apart from each other in the vehicle width direction. The asphalt finisher 100 may include one gas exhaust system 60.

[0023] The hood 61 is an example of a member for taking in the gas rising from the mixture spread in the vehicle width direction by the screw SC, and is disposed above the screw SC. The suction port of the hood 61 is directed downward. Specifically, the hose 62 is an example of a member for guiding the gas taken in by the hood 61 to the fan 63, and connects the hood 61 and the fan 63. The hose 62 is an example of a flow path member having flexibility. For example, a hydraulic cylinder for

moving the hood 61 up and down may be connected to the hood 61. The hood 61 is driven by a hydraulic cylinder and can be displaced in the up-down direction. The hose 62 is deformable according to the position of the hood 61. The hose 62 may expand and contract in the longitudinal direction.

[0024] The fan 63 is an example of a blower that blows gas. Specifically, the fan 63 is configured to suck in the gas taken in by the hood 61 and blow out the gas toward the exhaust port 66 of the exhaust duct 65. The hose 62 is connected to the upstream of the fan 63, and the hose 64 is connected to the downstream of the fan 63. The fan 63 is disposed above the hood 61. The fan 63 is disposed behind the driver seat 11 as shown in Figs. 1 and 2. The fan 63 is fixed to a part on the rear side of the tractor 1.

[0025] As shown in Fig. 3, the hose 64 is an example of a member for guiding the gas blown out by the fan 63 to the exhaust duct 65, and connects the fan 63 and the exhaust duct 65. Specifically, the hose 64 is an example of a flow path member having flexibility. The flow path member communicates with the blower to form a flow path through which the gas flows. The hose 64 is deformable according to the height position of the exhaust duct 65. The hose 64 is appropriately curved or expanded and contracted according to a distance between the fan 63 and the exhaust duct 65.

[0026] The exhaust duct 65 is an example of a member for guiding the gas passing through the hose 64 to the exhaust port 66. Specifically, the exhaust duct 65 is an example of a flow path member having no flexibility, and may be a short pipe. In the shown example, the exhaust duct 65 is formed of a metal pipe. As shown in Figs. 3 and 4, the exhaust port 66 is formed in the exhaust duct 65. The gas flowing inside the hose 64 flows inside the exhaust duct 65 and is exhausted from the exhaust port 66. When the gas exhaust system 60 is in operation, the exhaust port 66 is directed to a side opposite to the driver seat 11. In the shown example, the exhaust port 66 is disposed behind the driver seat 11 and is directed rearward.

[0027] As shown in Figs. 1 to 6, the cover 70 is an example of a member that covers the exhaust duct 65, and is disposed above the exhaust duct 65. In the shown example, the cover 70 includes a top plate 71, a pair of side plates 72, and a rear surface plate 73. The top plate 71 is an example of a member capable of covering the upper surface of the exhaust duct 65 in a state where the roof 20 is raised, and is disposed above the exhaust duct 65. In a state where the roof 20 is lowered, the top plate 71 can cover the exhaust port 66 of the exhaust duct 65. As shown in Fig. 5, the top plate 71 is inclined with respect to the X-axis direction. The rear end 71b of the top plate 71 is disposed above a front end 71a of the top plate 71.

[0028] The pair of side plates 72 is an example of a member for covering at least a part of each of the left side portion and the right side portion of the exhaust duct 65. As shown in Fig. 4, the pair of side plates 72 are disposed on both sides of the exhaust duct 65 in the vehicle width direction. The plate thickness direction of the side plate 72 is along the vehicle width direction. The side plate 72 extends downward from the top plate 71. The rear surface plate 73 is an example of a member that can cover the rear surface of the exhaust duct 65 in a state where the roof 20 is raised. The rear surface of the exhaust duct 65 means a surface on the opposite side (front side) of the exhaust port 66 in the state shown in Fig. 4. The front surface of the exhaust duct 65 means a surface on the side (rear side) to which the exhaust port 66 is directed in the state shown in Fig. 4. The rear surface plate 73 is disposed on the front side of the exhaust duct 65. Regarding the cover 70 and the exhaust duct 65, the side closer to the driver seat 11 may be the rear surface side, and the side far from the driver seat 11 may be the front surface side.

[0029] The cover 70 is attached to a rear part of the roof 20. The cover 70 is fixed to a frame 20a on the rear side of the roof 20. The cover 70 may be welded to the roof 20 or may be joined via a support such as an attaching bracket. The cover 70 moves integrally with the roof 20.

[0030] Next, a support unit 80 that supports the exhaust duct 65 to oscillate (rotate) with respect to the cover 70 will be described. As shown in Figs. 3 to 6, the gas exhaust system 60 includes a support unit 80 that rotatably supports the exhaust duct 65. The support unit 80 rotatably supports the exhaust duct 65 with respect to the cover 70. The support unit 80 supports the exhaust duct 65 such that the direction of the exhaust port 66 can be changed. The support unit 80 may directly support the exhaust duct 65, or may support the exhaust duct 65 via another member connected to the exhaust duct 65. For example, the support unit 80 may support the exhaust duct 65 connected to the upper end portion of the hose 64 by supporting the upper end portion of the hose 64. The direction of the exhaust port 66 is changed by changing the posture of the exhaust duct 65 supported by the support unit 80. In Figs. 3 to 5 showing a state when the roof 20 is raised, the exhaust port 66 is directed rearward. In Fig. 6, which shows a state when the roof 20 is lowered, the exhaust port 66 is directed upward.

[0031] As shown in Fig. 4, the support unit 80 has a rotary shaft 81 and supports 82 and 83. The rotary shaft 81 is a rotary shaft of the exhaust duct 65 rotatable with respect to the cover 70, and extends in the Y-axis direction. Both end portions of the rotary shaft 81 are rotatably supported by the pair of side plates 72. A through-hole is formed in the side plate 72. The rotary shaft 81 is inserted into a through-hole of the side plate 72. For example, the rotary shaft 81 is inserted into a sleeve with a flange, and the sleeve is held by the side plate 72. In the shown example, the sleeve with a flange functions as a retaining member for preventing the rotary shaft 81 from falling off from the pair of side plates 72. The rotary shaft 81 may be nonrotatably supported by the pair of side plates 72.

[0032] The support 82 is an example of a member fixed to the side surface of the exhaust duct 65, and extends along a center axial line L64 of the hose 64 as shown in Figs. 4 and 5. For example, the support 82 may be a plate having a predetermined width and length. As shown in Fig. 4, the supports 82 are disposed on both sides of the exhaust duct 65 in the Y-axis direction. The exhaust port 66 is disposed between the pair of supports 82. As shown in Fig. 5, the lower end portion of the support 82 is joined to the exhaust duct 65, and the upper end portion of the support 82 extends above the exhaust duct 65.

[0033] As shown in Fig. 4, the support 83 extends in the Y-axis direction and connects the upper end portions of the pair of supports 82. The supports 82 and 83 can be formed by bending the strip-shaped plate material into a U shape. The support 83 connects the pair of supports 82 to the outside of the exhaust duct 65.

[0034] In addition, through-holes through which the rotary shaft 81 is inserted are formed in the pair of supports 82. The rotary shaft 81 penetrates the pair of supports 82 and the side plates 72. The supports 82 and 83 rotate around the rotary shaft 81. In other words, the exhaust duct 65 and the exhaust port 66 rotate around the rotary shaft 81. In Fig. 6, which shows a state when the roof 20 is lowered, the support 82 extends in the X-axis direction, and the exhaust port 66 faces upward. In a state where the exhaust port 66 faces upward, the exhaust port 66 is covered with the top plate 71 from above.

[0035] Next, a posture of the hose 64 and a direction of the exhaust port 66 will be described. The posture of the hose 64 and the direction of the exhaust port 66 change depending on the height position of the roof 20 (exhaust duct 65). The posture of the exhaust duct 65 shown in Figs. 4 and 5 corresponds to the posture of the exhaust duct 65 in a state where the roof 20 shown in Fig. 1 is raised. The posture of the exhaust duct 65 shown in Fig. 6 corresponds to the posture of the exhaust duct 65 in a state where the roof 20 shown in Fig. 2 is lowered.

[0036] The position of the exhaust duct 65 shown in Fig. 2 is referred to as a first height position H1, and the position of the exhaust duct 65 shown in Fig. 1 is referred to as a second height position H2. The second height position H2 is a position higher than the first height position H1. The height reference position of the first height position H1 and the second height position H2 may be the position of the road surface, the specific position of the tractor 1, or the position of the fan 63. The respective heights of the first height position H1 and the second height position H2 may be a distance between the position of the fan 63 and the position of the exhaust port 66 of the exhaust duct 65 in the Z-axis direction.

[0037] As shown in Fig. 1, when the exhaust duct 65 is present at the second height position H2, the hose 64 is disposed to extend upward from the fan 63. The lower part of the hose 64 is disposed along the first part 22a of the column 22. The upper part of the hose 64 extends upward from the first part 22a.

[0038] When the exhaust duct 65 is present at the second height position H2, the exhaust port 66 is directed to the rear side of the tractor 1 as shown in Figs. 4 and 5. In this state, the gas exhaust system exhausts the gas. The direction in which a center axial line L65 of the exhaust duct 65 extends is inclined with respect to the direction in which the center axial line L64 of the hose 64 extends. The gas flowing through the exhaust duct 65 flows obliquely upward. The gas exhausted from the exhaust port 66 is exhausted obliquely upward.

[0039] In the asphalt finisher 100, when the mixture is laid, the roof 20 can be raised and the exhaust port 66 can be directed to the rear part of the tractor 1 as shown in Fig. 1. At this time, the exhaust port 66 is disposed at the second height position H2, which is a position above the driver seat 11.

[0040] In the gas exhaust system 60, the gas generated from the mixture can be sucked from the hood 61 by rotating the fan 63 in this state. The gas sucked from the hood 61 flows inside the hose 62, the fan 63, the hose 64, and the exhaust duct 65, and is exhausted from the exhaust port 66. The gas generated from the mixture is exhausted rearward at the second height position H2. In the gas exhaust system, the gas generated from the mixture can be exhausted to a side opposite to the driver seat 11 above the driver seat 11.

[0041] In the asphalt finisher 100, the roof 20 can be lowered as shown in Fig. 2 when the operation is stopped without laying the mixture. By lowering the roof 20, the cover 70 approaches the fan 63 and moves forward. In conjunction with this movement, the hose 64 is deformed to be curved, and accordingly, a part of the hose 64 near the exhaust duct 65 is disposed along the X-axis direction. Since the exhaust duct 65 is rotatably supported with respect to the cover 70, the exhaust duct 65 changes to the posture shown in Fig. 6. The exhaust port 66 at this time is disposed at the first height position H1 shown in Fig. 2.

[0042] In the gas exhaust system 60, in a state where the roof 20 is lowered, as shown in Fig. 6, the exhaust port 66 is covered with the top plate 71. Since the upward exhaust port 66 is covered with the top plate 71, the entry of foreign matter into the flow path in the hose 64 is suppressed. As a result, the entry of foreign matter into the fan 63 is suppressed. Therefore, it is possible to suppress the occurrence of a malfunction of the fan 63 when the fan 63 is operated. As a result, the reliability of the gas exhaust system 60 can be improved.

[Related Art]

[0043] Next, problems of the related art will be described. In the asphalt finisher according to the related art, there is a fixed type in which the exhaust port is fixed to the roof and the posture does not change. In the case of the fixed type, since the posture of the exhaust duct does not change, there arises a problem that the length of the hose must be increased in order to follow the movement of the roof. When the hose is long, there arises a

problem that the pressure loss of the gas flowing in the flow path increases. Therefore, the efficiency of the gas exhaust system is lowered.

[0044] In the asphalt finisher according to the related art, there is a rotary type in which the exhaust port is rotatably supported with respect to the roof. In the case of the rotary type, when the gas exhaust system is stopped, the exhaust port is disposed upward. Therefore, foreign matter may enter the inside of the hose from the exhaust port, and the foreign matter may reach the internal flow path of the blower. When the blower rotating at a high speed is operated, foreign matter may damage the blades.

[0045] In the asphalt finisher according to the related art, there is a type in which an exhaust duct is attached and detached in accordance with an upright (raised state) and a stowed (lowered state) roof. As described above, in the case of the attachment and detachment type, there is a problem that the work load of the operator is increased.

[Action and Effect of Asphalt Finisher 100]

[0046] In the asphalt finisher 100 according to the embodiment, when the exhaust port 66 is present at the second height position H2 which is above the driver seat 11 and higher than the first height position H1, the exhaust port 66 is directed to the side opposite to the driver seat 11. In this manner, the asphalt finisher 100 can exhaust the gas above the driver seat 11 and on the side opposite to the driver seat 11, and accordingly, it is possible to prevent the gas generated from the mixture from hitting the operator. That is, the asphalt finisher 100 can suppress the influence of the gas on the operator.

[0047] In the asphalt finisher 100, the direction of the exhaust port 66 can be changed according to the height of the roof 20. Since it is not necessary to excessively deform the hose 64 by changing the direction of the exhaust port 66, the length of the hose 64 can be shortened. Accordingly, the asphalt finisher 100 can suppress a pressure loss of the gas flowing in the hose 64, and can suppress a decrease in efficiency of the gas exhaust system 60. Further, in the asphalt finisher 100, by providing the cover 70, it is possible to suppress the entry of foreign matter into the hose 64 from the exhaust port 66. Therefore, damage to the fan 63 can be suppressed.

[0048] In the asphalt finisher 100, the cover 70 has the top plate 71 that covers the exhaust port 66 from above, and the pair of side plates 72 that are disposed on both sides of the exhaust port 66 in the vehicle width direction of the tractor 1. According to the asphalt finisher 100 having this configuration, when the roof 20 is lowered, the upward exhaust port 66 is covered with the top plate 71, and accordingly, the entry of foreign matter into the hose 64 from the exhaust port 66 is suppressed. In the asphalt finisher 100, the entry of foreign matter into the fan 63 can be suppressed, and the occurrence of a malfunction in the fan 63 can be suppressed.

[0049] In the asphalt finisher 100, when the exhaust port 66 is present at the second height position H2, the top plate 71 protrudes rearward from the exhaust port 66. According to the asphalt finisher 100 having such a configuration, the top plate 71 can rectify the flow of external air not to interfere with the exhaust of the gas.

[0050] In the asphalt finisher 100, as shown in Fig. 5, when viewed in the vehicle width direction (Y-axis direction) of the tractor 1, the top plate 71 is inclined with respect to the horizontal direction (X-axis direction), and the rear end 71b of the top plate 71 is disposed at a position higher than the front end 71a of the top plate 71. In the asphalt finisher 100 having this configuration, the gas exhausted from the exhaust port 66 easily flows along the top plate 71, and the gas exhaust efficiency in the gas exhaust system 60 can be improved.

[0051] In the asphalt finisher 100, the support unit 80 has the rotary shaft 81 extending in the vehicle width direction of the tractor 1, and the support 82 that extends in the radial direction (Z-axis direction) of the rotary shaft 81 and connects the rotary shaft 81 and the exhaust duct 65. According to the asphalt finisher 100 having this configuration, the direction of the exhaust port 66 can be easily changed by rotating the support 82 and the exhaust duct 65 around the rotary shaft 81. That is, the direction of the exhaust port 66 can be changed by changing the posture of the exhaust duct 65 in accordance with the movement of the roof 20. Therefore, in the asphalt finisher 100, the hose 64 can be easily routed. Therefore, it is not necessary to lengthen the hose 64, and the pressure loss can be reduced.

[0052] In the asphalt finisher 100, the roof 20 is capable of being raised and lowered, in a state where the roof 20 is lowered, the exhaust port 66 is present at the first height position H1 and faces upward, and in a state where the roof 20 is raised, the exhaust port 66 is present at the second height position H2 and is directed to a side opposite to the driver seat 11. According to the asphalt finisher 100 having this configuration, the gas can be exhausted to the side opposite to the driver seat 11 at the second height position H2 during operation. In the asphalt finisher 100, the roof 20 can be lowered and stowed. In this state, the exhaust port 66 can be disposed at the first height position H1 such that the exhaust port 66 faces upward. Since the exhaust port 66 is covered with the cover 70 when the roof 20 is stowed, the cover 70 can suppress the entry of foreign matter into the inside of the hose 64. Further, in a state where the roof 20 is raised and stands upright, the exhaust port 66 can be disposed at the second height position, and the direction of the exhaust port 66 can be directed to the side opposite to the driver seat 11.

[0053] In the asphalt finisher 100, when the exhaust port 66 is present at the second height position H2, the exhaust port 66 is disposed at the rear part (obliquely upper and rear part) of the driver seat 11 and is directed to the rear part. According to the asphalt finisher 100 having this configuration, when the gas exhaust system

60 is in operation, by raising the roof 20, in a state where the exhaust port 66 is disposed at the second height position H2 and the exhaust port 66 is disposed at the rear part (obliquely upper and rear part) of the driver seat 11, the gas can be exhausted to the rear part of the tractor 1, and the possibility that the gas flows into the driver seat 11 is reduced. Therefore, the influence of the gas on the operator is further suppressed.

[0054] The preferable embodiment of the present invention has been described in detail hereinbefore. However, the present invention is not limited to the embodiment described above. Various modifications, substitutions, or the like can be applied to the embodiment described above without departing from the scope of the present invention. In addition, characteristics described separately can be combined insofar as technical inconsistencies do not occur.

[0055] In the above-described embodiment, a case where the cover 70 and the exhaust duct 65 are installed at the rear end of the roof 20 is shown. However, the cover 70 and the exhaust duct 65 may be disposed outside the roof 20 in the Y-axis direction, and may be disposed at other positions. Further, the exhaust port 66 may be directed to the rear part of the traveling body 1, and may be directed to the side opposite to the driver seat 11 in the Y-axis direction, for example.

Brief Description of the Reference Symbols

[0056]

100	Asphalt finisher (mixture laying machine)
1	Tractor (traveling body)
2	Hopper
11	Driver seat
20	Roof
63	Fan (blower)
64	Hose (flow path member)
66	Exhaust port
70	Cover
71	Top plate
72	Side plate
80	Support unit
81	Rotary shaft
82	Support
SC	Screw
H1	First height position
H2	Second height position
X	X-axis direction
Y	Y-axis direction (width direction)
Z	Z-axis direction

Claims

1. A mixture laying machine (100) comprising:

a traveling body (1);
a hopper (2) mounted on the traveling body (1) and capable of accommodating a mixture;
a driver seat (11) mounted on the traveling body (1);
a movable roof (20) disposed above the driver seat (11) ;
a blower (63) that blows gas;
a flexible flow path member (64) that forms a flow path which communicates with the blower (63) and through which the gas flows;
an exhaust port (66) that communicates with the flow path and exhausts the gas;
a support unit (80) that is attached to the roof (20) and supports the exhaust port (66) to be able to change a direction of the exhaust port (66); and
a cover (70) that covers the exhaust port (66) when the exhaust port (66) is present at a first height position (H1), wherein
when the exhaust port (66) is present at a second height position (H2) that is above the driver seat (11) and higher than the first height position (H1), the exhaust port (66) is directed to a side opposite to the driver seat (11) .

2. The mixture laying machine (100) according to claim 1, wherein
the cover (70) includes

a top plate (71) that covers the exhaust port (66) from above, and
a pair of side plates (72) disposed on both sides of the exhaust port (66) in a width direction of the traveling body (1).

3. The mixture laying machine (100) according to claim 2, wherein
when the exhaust port (66) is present at the second height position (H2), the top plate (71) protrudes rearward from the exhaust port (66).

4. The mixture laying machine (100) according to claim 2, wherein

when viewed in the width direction of the traveling body (1), the top plate (71) is inclined with respect to a horizontal direction, and
a rear end of the top plate (71) is disposed at a position higher than a front end of the top plate (71).

5. The mixture laying machine (100) according to claim 1, wherein
the support unit (80) includes

a rotary shaft (81) extending in a width direction of the traveling body (1), and
a support (82) extending in a radial direction of

the rotary shaft (81) and connecting the rotary shaft (81) to the flow path member (64).

6. The mixture laying machine (100) according to claim 1, wherein

the roof (20) is capable of being raised and lowered,
in a state where the roof (20) is lowered, the exhaust port (66) is present at the first height position (H1) and faces upward, and
in a state where the roof (20) is raised, the exhaust port (66) is present at the second height position (H2) and is directed to the side opposite to the driver seat (11).

7. The mixture laying machine (100) according to claim 1, wherein
when the exhaust port (66) is present at the second height position (H2), the exhaust port (66) is disposed behind the driver seat (11) and is directed rearward.

FIG. 1

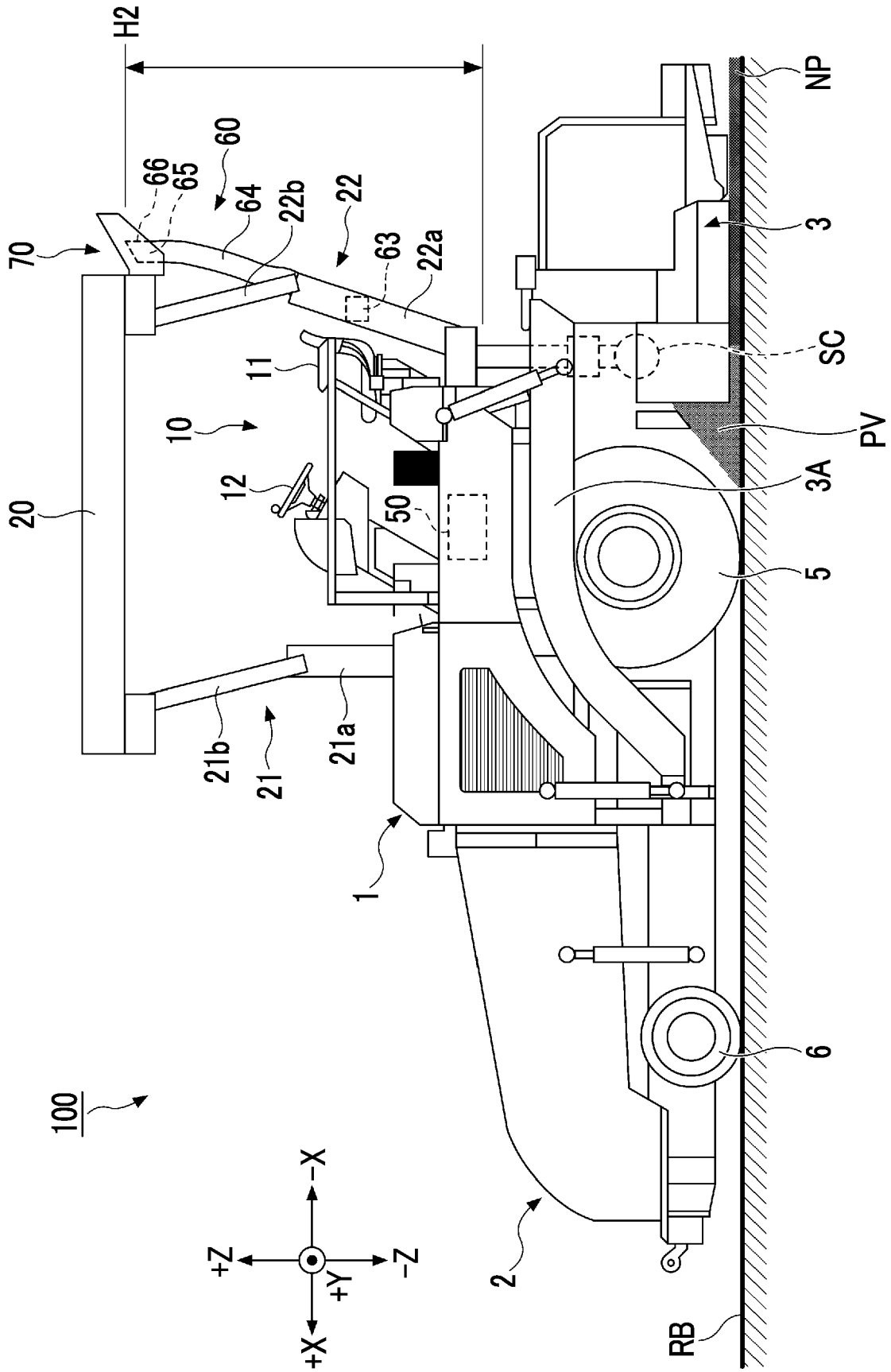

H2
60
66
65
64
22b
22
63
22a
70
NP
3
SC
11
10
PV
12
3A
20
50
5
21b
21
21a
1
100
6
+Z
-X
+Y
-Z
+X
2
RB

FIG. 2

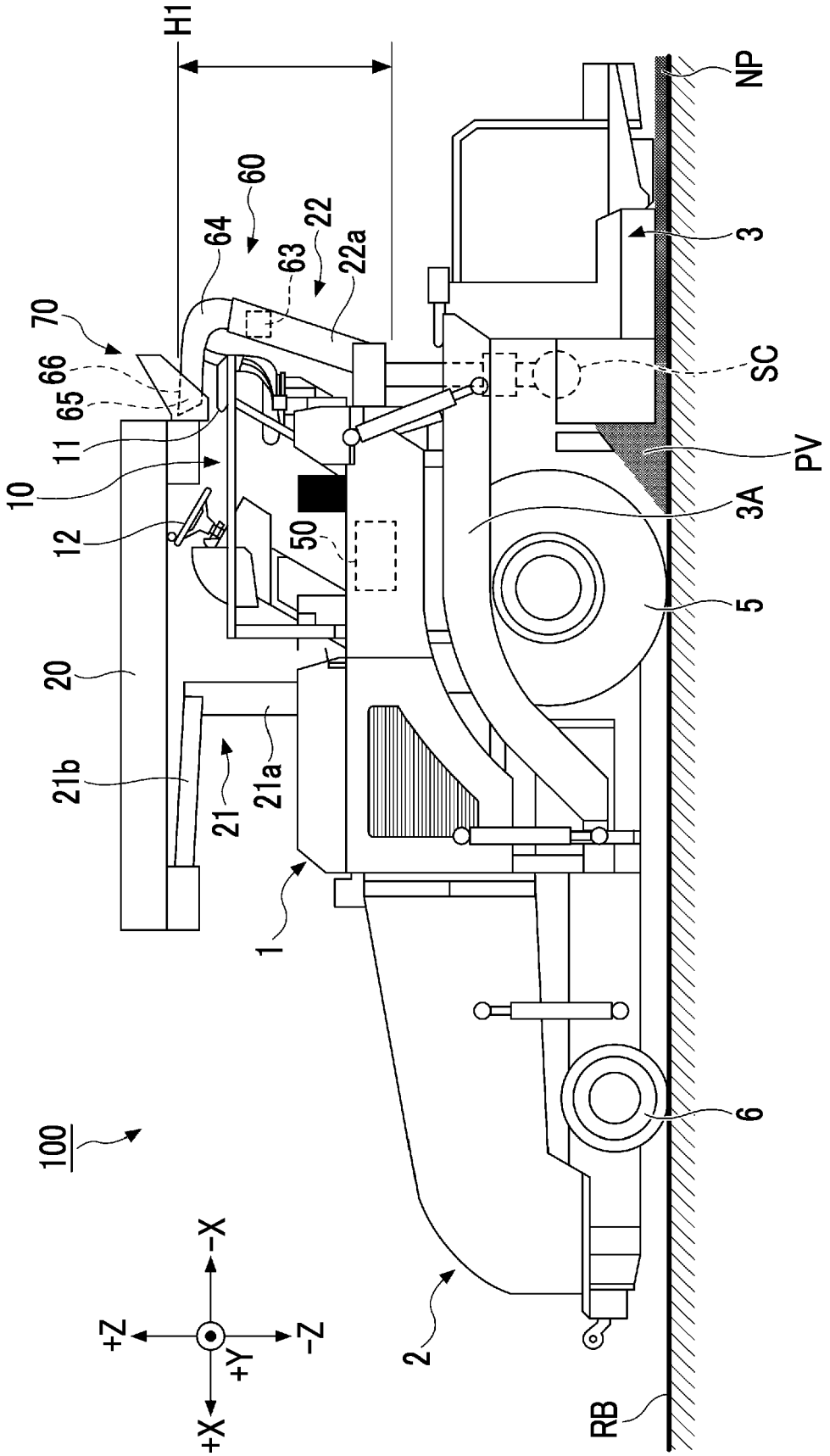

H1
60
64
63
22
22a
70
66
65
11
10
12
50
20
21b
21
21a
1
100
+Z
-Z
+Y
+X
-X
2
RB
NP
3
SC
PV
3A
5
6

FIG. 3

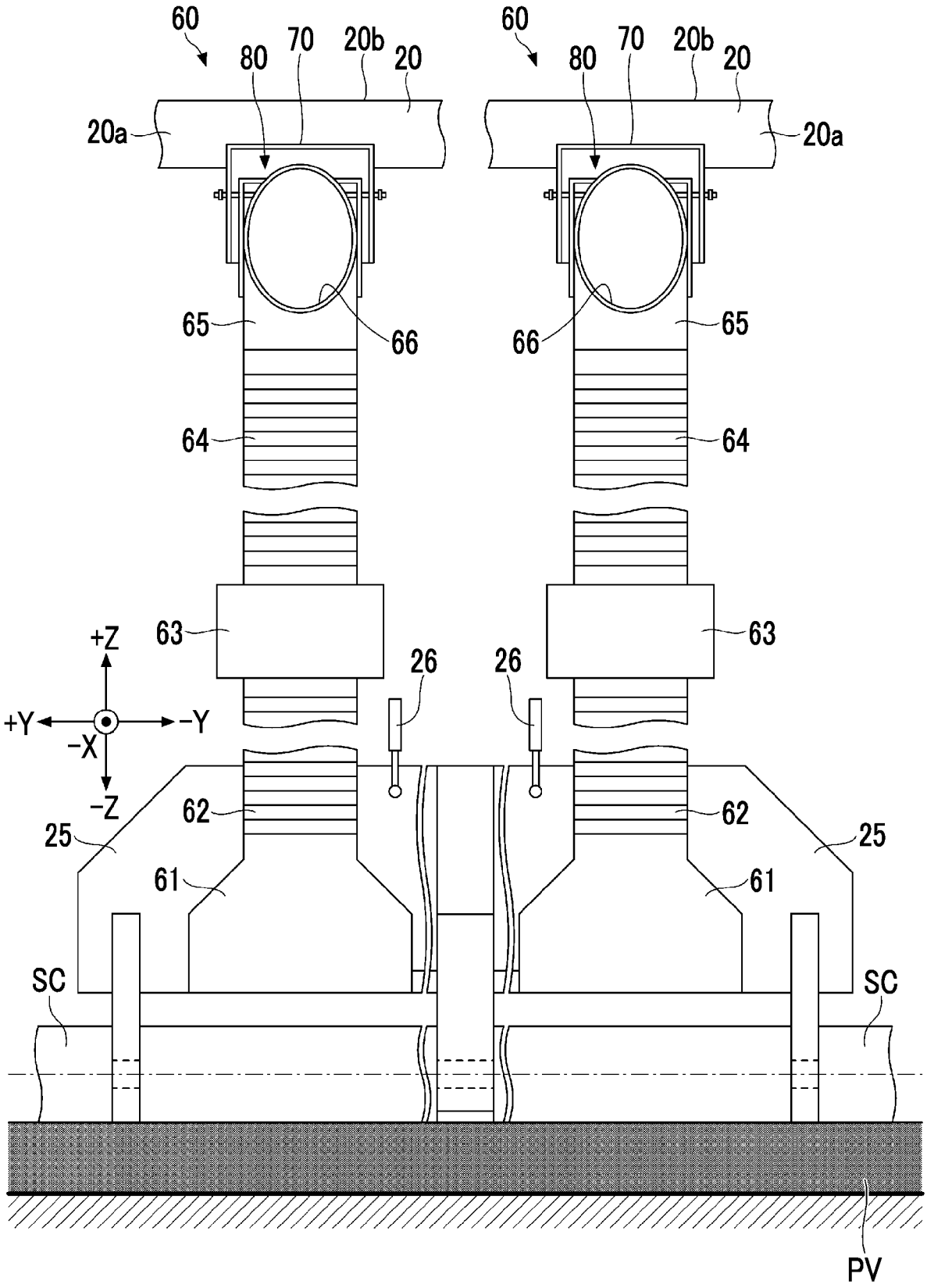


FIG. 4

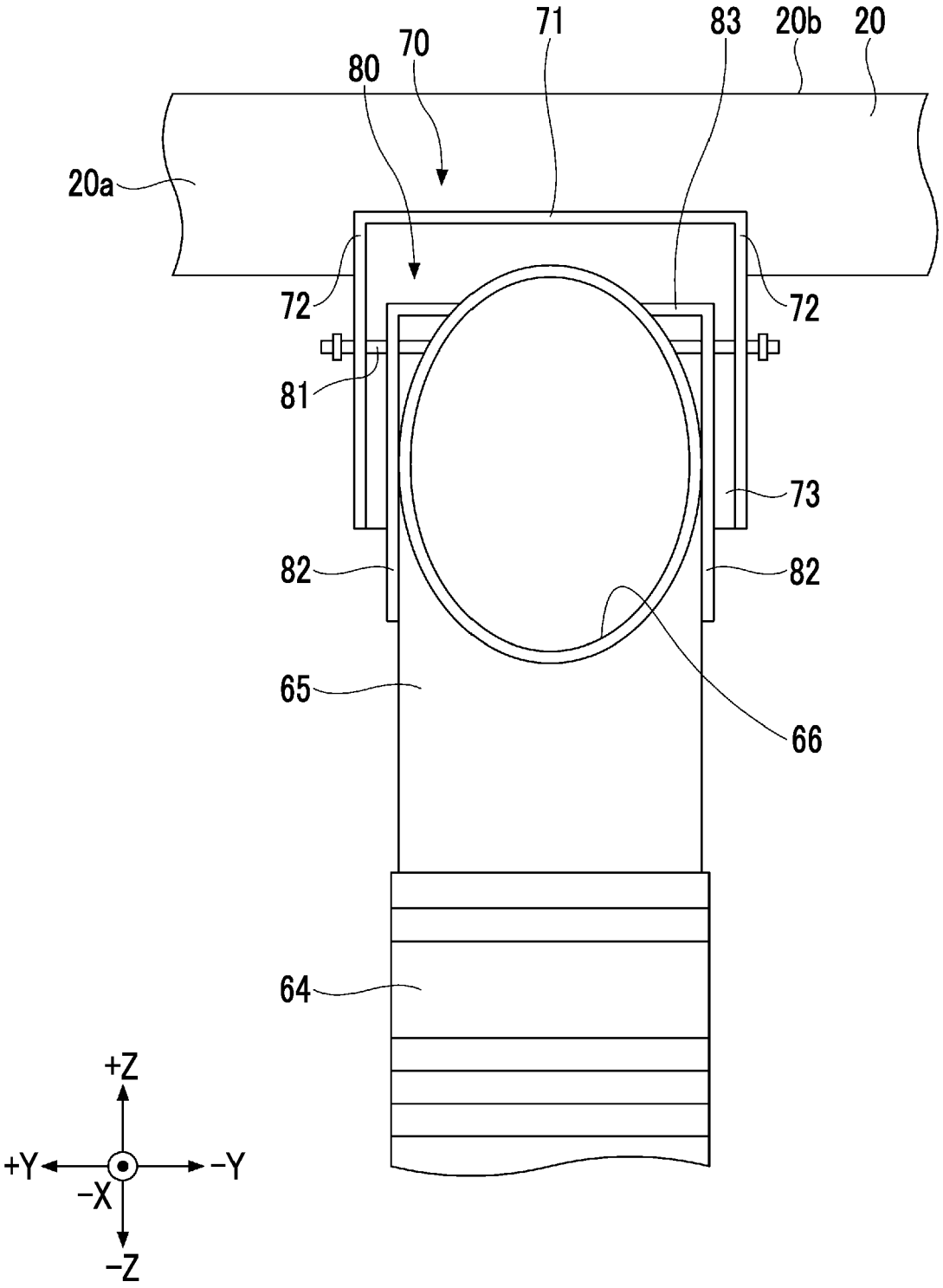


FIG. 5

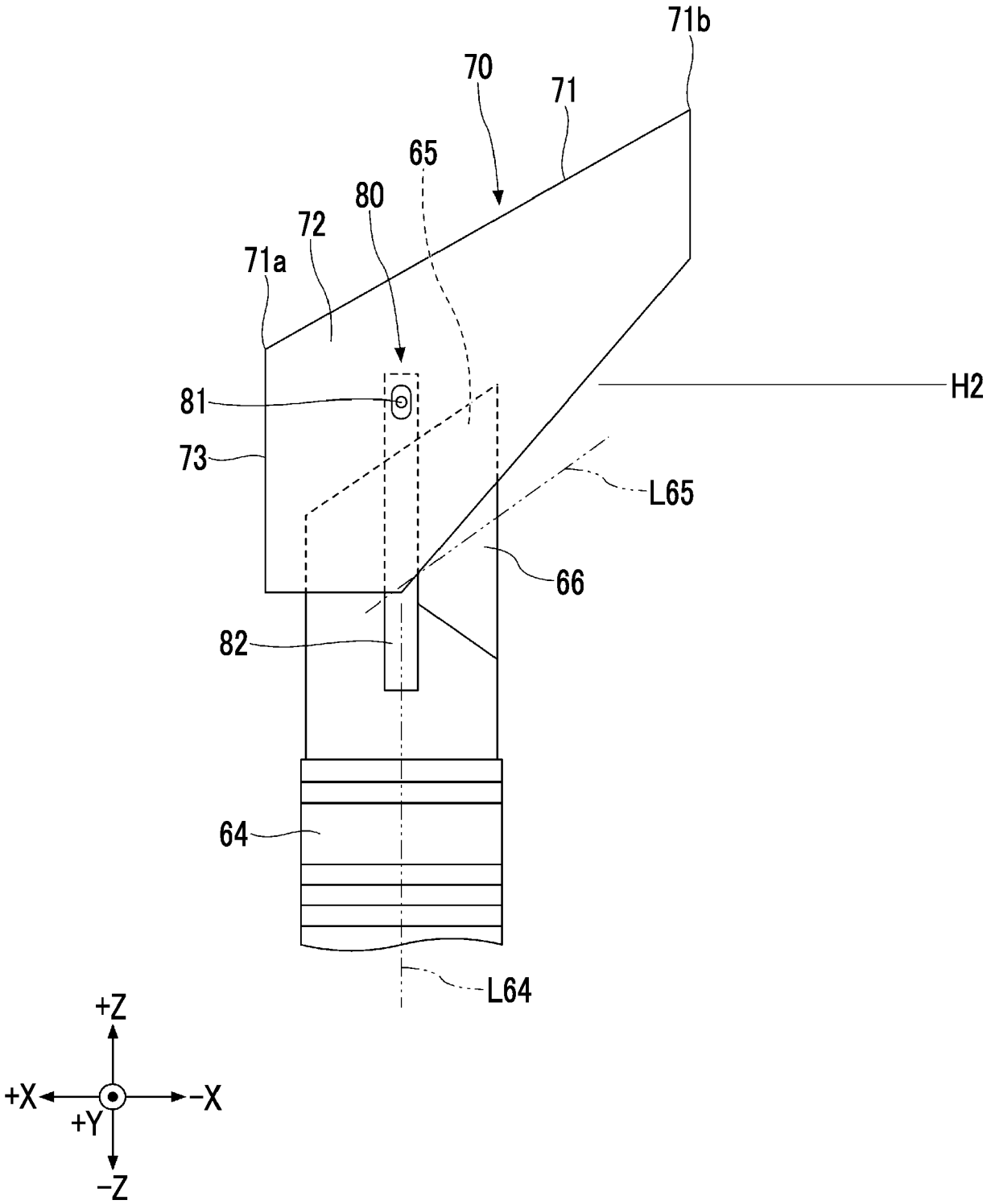
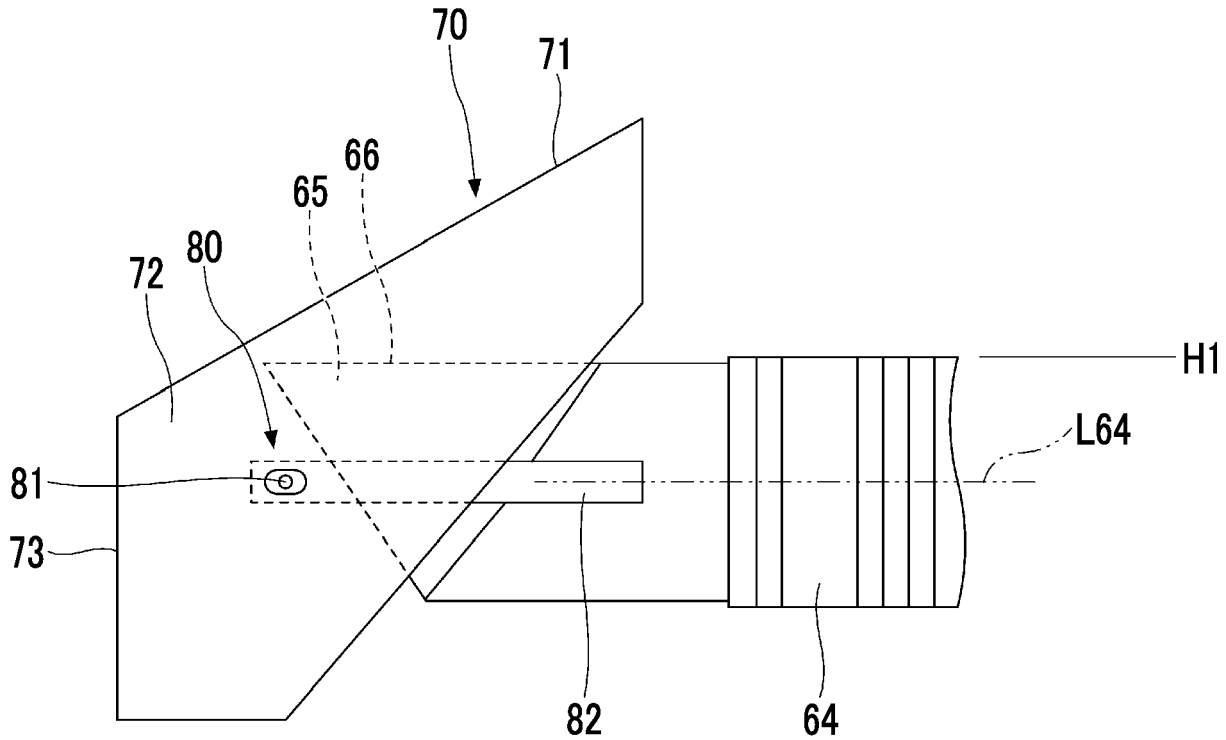
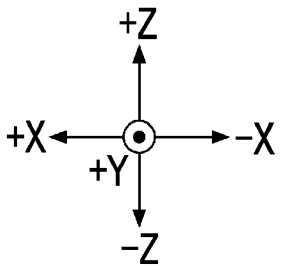


FIG. 6





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EUROPEAN SEARCH REPORT

Application Number
EP 23 19 3796

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	JP 6 883853 B2 (HANDA KIKAI KK) 9 June 2021 (2021-06-09) * paragraphs [0001], [0008], [0015], [0016], [0017], [0034], [0037] - [0040], [0059] - [0070] * * figures 11-18 *	1-7	INV. E01C19/48
A	US 2015/152607 A1 (KAPPEL MARC [DE]) 4 June 2015 (2015-06-04) * paragraphs [0001], [0005], [0006], [0025] - [0036] * * figures 1,2,4,5,11 *	1-7	
A	EP 2 642 027 A1 (DYNAPAC GMBH [DE]) 25 September 2013 (2013-09-25) * paragraphs [0001], [0008], [0012], [0013], [0018], [0020], [0023], [0028] - [0032] * * figures 1-4 *	1-7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E01C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 February 2024	Kremsler, Stefan

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09-02-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 6883853 B2	09-06-2021	JP 6883853 B2	09-06-2021
		JP 2019007248 A	17-01-2019
US 2015152607 A1	04-06-2015	CN 104812961 A	29-07-2015
		DE 102012011693 A1	12-12-2013
		EP 2880220 A1	10-06-2015
		US 2015152607 A1	04-06-2015
		WO 2013185867 A1	19-12-2013
EP 2642027 A1	25-09-2013	DE 102012007869 A1	26-09-2013
		EP 2642027 A1	25-09-2013

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Patent documents cited in the description

- JP 2001526751 W **[0002]**