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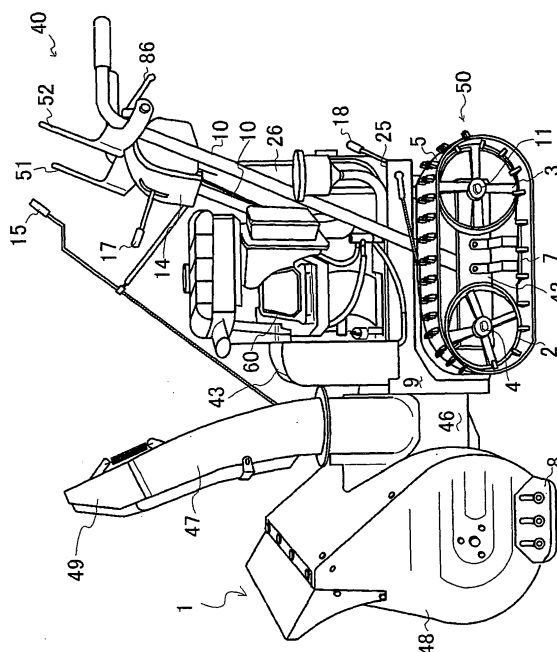
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(54) **Snow blower having improved height control device**

(57) A snow blower comprises a travelling device (50) having a front-wheel support shaft (4), a main frame (9) vertically rotatable around the front-wheel support shaft (4) relative to the travelling device (50), a snow-removing unit (1) disposed at a front portion of the main frame (9), and an operation unit (40) having a handle (10) provided at the rear portion of the main frame (9). The height of the snow-removing unit (1) can be adjusted by rotating the main body (9) relative to the travelling device (50). A height control lever (86) is provided near a grip of the handle (10), a latch (73) is provided at the rear portion of the main frame (9) in connection with the height control lever (86), and a lifting guide plate (72) is provided at the rear portion of the travelling device (50). A plurality of notches (72a) are formed in the lifting guide plate (72) at predetermined intervals. By operating the height control lever (86) to insert the latch (73) into selected one of the notches (72a), the main body (9) is fixed to the traveling device (50). By operating the height control lever (86) to separate the latch (73) from the notch (72a), the main body (9) becomes vertically rotatable relative to the traveling device (50).

Fig. 1



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Description

Field of the invention

[0001] The present invention relates to a snow blower provided at the front portion thereof with its snow-removing unit (especially its auger head) easily adjustable in height by operating a lever or the like.

Background Art

[0002] Conventionally, a well-known snow blower whose main body with an engine and the like thereon is supported over a travelling device (e.g., a crawler type travelling device) is provided with an auger head and a blower continuously formed in front of the main body so as to serve as a snow-removing unit, and with an operation unit for driving and snow-removing in the rear portion of the main body.

[0003] The auger head is adjustable in height so as to get the suitable plowing depth of its auger in the snow and to suitably level the snow (ground) surface. In detail, as indicated in the Japanese Patent Laid Open Gazette 2002-173922 for example, the whole of the main body (together with the snow-removing unit) is vertically rotatably supported on a front-wheel support shaft, and it is usually locked to the shaft. When the height of snow-removing unit is changed, the main body is unlocked from the shaft and vertically rotated around the shaft.

[0004] Conventionally, a locking lever for locking/unlocking the main body to and from the driving front-wheel is disposed near a rear handle for controlling the travelling direction of the snow blower. To lower the auger head (the snow-removing unit) and insert the plowing auger deeply into the snow, an operator behind the snow blower lifts up the rear handle with his/her both hands. Then, he needs to operate the locking lever for locking the body by one hand. Then, the locking lever must be operated for locking the body by one hand while supporting the lifted heavy main body by only the other hand gripping the handle. It may occur that the handle falls down to some degree from its required height so as to raise the plowing auger unexpectedly. The conventional snow blower has such difficulty in exactly adjusting its auger head to desired height.

Disclosure of the Invention

[0005] An object of the present invention is to provide a snow blower whose vertically rotatable body can be locked and unlocked without detaching a hand from a handle so as to ensure accurate and easy height control of its snow-removing unit.

[0006] To achieve the object, a snow blower according to the present invention comprises a travelling device having a fulcrum axis, a main body vertically rotatable around the fulcrum axis relative to the travelling device, a snow-removing unit disposed at the front portion

of the main body, and an operation unit provided at the rear portion of the main body. The height of the snow-removing unit can be adjusted by rotating the main body relative to the travelling device. The snow blower according to the present invention is characterized by a height control operation member provided near the operation unit, a first engaging member provided at the rear portion of the main body in connection with the height control operation member, and a second engaging member provided at the rear portion of the travelling device, wherein, by operating the height control operation member to engage the first engaging member with the second engaging member, the main body is fixed to the travelling device, and by operating the height control operation member to disengage the first engaging member from the second engaging member, the main body becomes rotatable relative to the travelling device.

[0007] Therefore, in the snow blower, the height of the snow-removing unit can be easily changed and fixed.

The main body of the snow blower can be easily locked and unlocked by the height control operation member so as to ensure easy switching operation for locking/unlocking of the main body to or from the travelling device.

[0008] Moreover, a plurality of notches are formed in the second engaging member at predetermined intervals so that the first engaging member is selectively inserted into one of the notches of the second engaging member, thereby being engaged with the second engaging member.

[0009] Therefore, such a simple and inexpensive structure for locking/unlocking the main body to and from the travelling device facilitates for easy height control of the snow-removing unit. Additionally, the snow-removing unit can be changed and fixed to arbitrary height by steps.

[0010] Moreover, the operation unit further comprises a handle, and a lever serving as the height control operation member is disposed near a grip of the handle.

[0011] Therefore, the lever can be operated for height control of the snow-removing unit by a hand holding the handle, so that the height control of the snow-removing unit can be adjusted immediately in case of need while the snow-removing unit is stably supported by the hand holding the handle without stopping of the snow-removing work for adjusting the snow-removing height.

[0012] The above and further objects and features and effects of the invention will more appear from the following description taken in connection with the accompanying drawing.

Brief Description of the Drawings

[0013]

Fig. 1 is an entire side view of a snow blower according to the present invention.

Fig. 2 is a perspective rear view of the same.

Fig. 3 is a perspective right rear view of the snow

blower, showing a locking mechanism.

Fig. 4 is a perspective left rear view of the same.

Fig. 5 is a side view of the same.

Fig. 6 is a plan view of the same.

Fig. 7 is a side view of the snow blower, showing another locking mechanism.

Best Mode for Carrying out the Invention

[0014] In accordance with Fig. 1 and 2, description will be given of the whole construction of a snow blower. A snow-removing unit 1 is provided in the front portion of a main frame 9. In the snow-removing unit 1, a blower cover 46 incorporating a blower is formed forward from the front end of the main frame 9. An upwardly projecting chute 47 is laterally swivelably provided on the top of the blower cover 46. An auger cover 48 including a plowing auger is disposed at a front portion of the blower cover 46 so as to constitute an auger head.

[0015] The plowing auger and the blower are driven simultaneously so that snow is plowed and augered in by the rotating plowing auger and blown upward by the blower. Snow blown by the blower can be exhausted in any direction from the chute 47.

[0016] A lateral chute angle control handle 15 for changing the lateral snow-throwing direction of the chute 47 is provided behind the chute 47 and interlockingly connected to the chute 47. By manipulating the handle 15, the chute 47 is swiveled on the blower cover 46 and adjusted to the desired direction.

[0017] Alternatively, the chute may be rotated by a motor. In this case, while a swivel seat formed in a crown-like shape is integrally provided on the bottom edge of the chute so as to rotatably engage with the blower cover, a swivel motor having an output gear is disposed beside the swivel seat of the chute so that the gear meshes with a toothing formed on the outer periphery of the swivel seat.

[0018] A snow throwing cap 49 is vertically rotatably provided at the upper end of the snow throwing chute 47. An operation box 14 having a vertical chute angle control lever 17 is disposed behind the chute 47, and the lever 17 is operatively connected to the snow throwing cap 49. By operating the lever 17, the snow throwing cap 49 is vertically rotated so as to change the vertical snow throwing angle, thereby controlling the snow throwing distance.

[0019] Sleds 8 are laterally symmetrically fixed to the lower ends of both side surfaces of the auger cover 48 so that the bottom surfaces of the sleds 8 contact the ground (snow) surface, thereby stabilizing the posture of the snow-removing unit 1.

[0020] Alternatively, rollers may be pivotally provided on the lower end of the auger cover 48 instead of the sleds 8. In this case, while the stability of the snow-removing unit 1 is enhanced, the running resistance of the snow blower is decreased, thereby enabling smooth travelling in the snow-removing work.

[0021] The sleds 8 are fixed to the side surface of the auger cover 48 by bolting. The vertical position of the sleds 8 with respect to the auger cover 48 is adjustable so as to finely adjust the bottom height of the snow-removing unit 1 from the snow (ground) surface.

[0022] A pair of left and right handles 10 protrude upwardly rearward from the rear portion of the main frame 9 so as to constitute an operation unit 40 at the upper portion of the handles 10. In the operation unit 40, the operation box 14 is disposed between the upper portions of the handles 10, and a travelling clutch lever 52 and a snow-removing clutch lever 51 are provided above the respective handles 10 on both sides of the operation box 14. Each of the travelling clutch lever 52 and the snow-removing clutch lever 51 is a deadman clutch lever, which engages the corresponding clutch only when being gripped, and disengages the clutch when being released from a hand.

[0023] Moreover, a later-discussed lifting lever (height control lever) 86 is provided near a grip of one of the handles (the right handle) 10, more specifically, just under the grip of the handle 10 opposite to the snow-removing clutch lever 51 above the grip. The lifting lever 86 is rotatably attached to the handle 10 so as to be rotated for locking/unlocking operation of a later-discussed locking mechanism of a height control device for the snow-removing unit 1.

[0024] A travelling gearshift lever, a throttle lever, the vertical chute angle control lever 17, etc. are intensively provided on the right side of the operation box 14 so as to be operated easily.

[0025] An engine 60 having a forward projecting output shaft is mounted on the main frame 9. Below the engine 60, the main frame 9 incorporates a transmission, i.e., a hydrostatic transmission (HST), for driving a travelling device 50, while the snow-removing unit 1 including the auger head and the blower is extended forward from the main frame 9. The output shaft of the engine 60 with a pulley thereon is disposed in a belt-cover 43 over the main frame 9 so as to distribute power of the engine 60 through belts between the transmission and the snow-removing unit 1.

[0026] Left and right track frames 42 of the travelling device 50 are disposed oppositely with respect to the main frame 9. A front-wheel support shaft 4 serving a travel driving shaft projects toward both lateral sides from the transmission, and penetrates the main frame 9 and the left and right track frames 42. The main frame 9 is vertically rotatably supported on the front-wheel support shaft 4. The front-wheel support shaft 4 is supported at both sides thereof by the track frames 42, and left and right driving front sprockets 2 are fixed onto both ends of the front-wheel support shaft 4, respectively. A rear-wheel support shaft 11 is laterally spanned between the rear portions of the left and right track frames 42 through a tension device behind the rear end of the main body 9, and left and right driven rear sprockets 3 are pivotally provided on both ends of the rear-wheel

support shaft 11. Each of left and right crawler belts 5 is wound around the front and rear sprockets 2 and 3.

[0027] In this way, the crawler type travelling device 50 is constituted by the left and right track frames 42 supporting the driving front sprockets 2 and the driven rear sprockets 3 bound with the crawler belts 5, etc.

[0028] Each of the crawler belts 5 has a bottom surface of the length between the front and rear sprockets 2 and 3 in contact with the ground (snow) surface. Crawler guides 7 are fixed to the lower ends of the left and right track frames 42 so as to press down the bottom surfaces of the crawler belts 5 against the ground (snow) surface.

[0029] Accordingly, the crawler guides 7 ensure the rigidity of the crawler belts 5 contacting the ground. Therefore, each of the crawler belts 5 is hard to be separated from the sprocket 2 or 3, thereby preventing the main body from turning over even when the vertical height of the snow-removing unit 1 is roughly adjusted.

[0030] As shown in Fig. 2, a battery 26 is loaded on a battery loading rack 25 protruded rearward from the rear surface of the main frame 9 below the handles 10. A battery cover 27 is placed on the top of the battery 26 and fastened to the rack 25 through a binding rod 27 so as to fix the battery 26 to the rack 25. The rear portion of the main body loaded with the battery 26 is balanced in weight with the front portion of the main body serving as the snow-removing unit 1. Alternatively, the battery 26 may be disposed at the front or lateral side of the main body in consideration of balancing the main body.

[0031] A handbrake lever 18 for applying a parking brake is disposed in the rear of the main frame 9.

[0032] Next, description will be given of a height control device of the snow-removing unit 1.

[0033] The height control device for the snow-removing unit 1 comprises a vertical rotating mechanism for vertically rotating the main body (integral with the snow-removing unit 1) relative to the travelling device 50, and a locking mechanism for locking/unlocking the main body with/from the travelling device 50. More specifically, the vertical rotating mechanism rotates the main body (the main frame 9) vertically relative to the travelling device 50 so as to change the vertical position of the snow-removing unit 1, and the locking mechanism locks the main body (the main frame 9) to the travelling device 50 so as to fix the vertical position of the snow-removing unit 1, or unlocks the main body from the travelling device 50 so as to allow the main body to rotate relative to the travelling device 50. The adjustable range of the snow-removing unit 1 in vertical location with the height control device is ensured larger than that with the above-mentioned sleds 8.

[0034] As mentioned above, the front snow-removing unit 1 and the rear handles 10 are integrated with the main frame 9 vertically rotatable around the front-wheel support shaft 4, whereby the vertical position of the auger head of the snow-removing unit 1 can be adjusted by vertical movement of the rear handles 10. This is the

vertical rotating mechanism of the height control device for the snow-removing unit 1.

[0035] Next, in the height control device for the snow-removing unit 1, the locking mechanism for locking/unlocking the main body (main frame 9) with/from the travelling device will be described in accordance with Figs. 3-6. The locking mechanism is disposed near the rear-wheel support shaft 11 provided in the lower rear portion of the main body, and an operation member for operating the locking mechanism, i.e., the lifting lever 86 is disposed near the handles 10 above the locking mechanism so as to shorten wire connecting the operation member and the locking mechanism as much as possible. The locking mechanism is so constructed as to adjust the vertical position of the snow-removing unit 1 by steps.

[0036] The locking mechanism and the battery 26 are laterally juxtaposed behind the main frame 9 so as to reduce the longitudinal length of the snow blower. Alternatively, the locking mechanism and the battery 26 may be exchanged in lateral location in the snow blower.

[0037] In the crawler type travelling device 50, the rear-wheel support shaft 11 is extended laterally between the rear portions of the left and right track frames 42. An upright lifting guide plate 72 is pivotally supported at the bottom end thereof on the rear-wheel support shaft 11.

[0038] A plurality of notches 72a are formed on the front edge of the lifting guide plate 72 in a vertical row at predetermined intervals. The main frame 9 is vertically moved relative to the lifting guide plate 72 so as to adjust the height of the snow-removing unit 1 and a later-discussed latch 73 is selectively fitted into one of the notches 72a, thereby fixing the height of the snow-removing unit 1.

[0039] As shown in Fig. 5, each notch 72a is U-like shaped in a side view. When the lifting guide plate 72 is disposed vertically, the lower edge of each notch 72a (facing upward) is horizontal and the upper edge thereof (facing downward) is inclined outwardly (forwardly) upward, so that the latch 73 can be easily inserted into each notch 72a. In addition, each forward projection of the lifting guide plate 72 between the neighboring upper and lower notches 72a has a root of a vertical width A (as shown in Fig. 5), which is extended by inclination of the upper edge of the lower notch 72a while the lower edge of the upper notch 72a being horizontal, thereby being reinforced so as to prevent the notches 72a from being broken.

[0040] Preferably, the lifting guide plate 72 and the latch 73 are strengthened by hardening, carburization, etc. so as to be prevented from being broken, thereby surely locking the large and heavy main body having the snow-removing unit 1 to the travelling device 50.

[0041] In this embodiment, the notches 72a are forwardly open on the front edge of the lifting guide plate 72 so that the latch 73 may be inserted into the notch 72a from ahead of the lifting guide plate 72. Alternative-

ly, the notches 72a may be rearwardly open on the rear edge of the lifting guide plate 72, and the latch 73 may be inserted into the notch 72a from the rear of the lifting guide plate 72.

[0042] As shown in Figs. 3 and 6, the main frame 9 is fixedly provided with a bracket 74 for supporting the latch 73 and guiding the lifting guide plate 72.

[0043] The bracket 74 is integrally formed with a vertically and laterally extended fixture plate 71, vertically and rearwardly extended left and right side guide plates 75 and 76, and a horizontally and laterally extended latch support plate 79. The fixture plate 71 is disposed along the rear end surface of the main frame 9 and fastened thereto. The parallel side guide plates 75 and 76 project rearward from the fixture plate 71 so as to guide the relatively vertically moving lifting guide plate 72 therebetween when rotating the main body relative to the travelling device 50. The latch support plate 79 projects laterally from one of the side guide plates 75 and 76 (in this embodiment, the right side guide plate 76).

[0044] A front guide roller 77 is pivotally disposed in front of the lifting guide plate 72 between the side guide plates 75 and 76 so as to prevent the latch 73 from unexpectedly entering the notch 72a when unlocking the main body from the travelling device 50. More specifically, since the diameter of the front guide roller 77 is larger than the vertical width of the notch 72a, the front guide roller 77 contacts the front edge of the lifting guide plate 72 so as to restrict forward movement of the lifting guide plate 72 relative to the bracket 74, thereby preventing the latch 73 from entering one of the notches 72a when unlocking the main body from the travelling device 50. The front guide roller 77 contacting the front edge of the lifting guide plate 72 rolls so as to facilitate for easy vertical rotation of the bracket 74 together with the main body relative to the lifting guide plate 72 of the travelling device 50, thereby changing the vertical position of the snow-removing unit 1 easily.

[0045] A laterally horizontal rear guide pin 78 is interposed between the side guide plates 75 and 76 behind the lifting guide plate 72 so as to restrict rearward movement of the lifting guide plate 72 relative to the bracket 74.

[0046] Alternatively, for the purpose of restricting movement of the lifting guide plate 72 relative to the main body (main frame 9) in the longitudinal and lateral directions of the snow blower, a horizontal plate having a slot elongated in the longitudinal direction of the snow blower may be disposed so that the lifting guide plate 72 is passed through the slot and biased rearward by a torsion spring extended from the rear-wheel support shaft 11.

[0047] As shown in Fig. 5, a forwardly projecting upper retaining portion 72b is formed at the top edge of the lifting guide plate 72. In the longitudinal direction of the snow blower, the maximum length of the upper retaining portion 72b is larger than the maximum length of the notched portion of the lifting guide plate 72 with the

notches 72a below the upper retaining portion 72b. More specifically, in the longitudinal direction of the snow blower, the upper retaining portion 72b is longer than a distance B between the front guide roller 77 and the rear guide pin 78. Therefore, even if the lifting guide plate 72 is going excessively downward relative to the bracket 74, the lower edge of the upper retaining portion 72b comes to contact the guide roller 77, thereby preventing the lifting guide plate 72 from downwardly escaping from the space between the guide roller 77 and the guide pin 78. Thus, the upper retaining portion 72b defines the upper limit position of the bracket 74, i.e., the lower limit position of the snow-removing unit 1.

[0048] The lower portion of the lifting guide plate 72 below the notched portion thereof with the notches 72a serves as a lower retaining portion 72c. In the longitudinal direction of the snow blower, the length of the lower retaining portion 72c is larger than the maximum length of the notched portion of the lifting guide plate 72. Therefore, even if the lifting guide plate 72 is going excessively upward relative to the bracket 74, the upper edge of the lower retaining portion 72c comes to contact the latch 73, thereby preventing the lifting guide plate 72 from excessively upwardly projecting from the space between the guide roller 77 and the guide pin 78. Thus, the lower retaining portion 72c defines the lower limit position of the bracket 74, i.e., the upper limit position of the snow-removing unit 1.

[0049] In this way, the vertical rotation of the main body (main frame 9) relative to the travelling device 50 is limited.

[0050] Fig. 7 illustrates an alternative locking mechanism having a lifting guide plate 92 and a bracket 94. Similar to the lifting guide plate 72, the upright lifting guide plate 92 is pivotally supported at the lower end thereof on the rear-wheel support shaft 11, and provided on the front edge thereof with a plurality of notches 92a so that the latch 73 may be inserted into selected one of the notches 92a.

[0051] A vertically long slot 92d is formed in the lifting guide 92. Similar to the bracket 74 having the side guide plates 75 and 76, the bracket 94 fixed onto the rear surface of the main frame 9 has parallel left and right side guide plates 95 and 96 projecting rearward from the rear end of the main frame 9. The lifting guide plate 92 is passed between the side guide plates 95 and 96. A pair of left and right holes 95c and 96c are formed in the respective side guide plates 95 and 96 and disposed oppositely to each other with respect to the slot 92d of the lifting guide plate 92. A guide pin 89 is passed through the slot 92d and fitted at both ends thereof into the holes 95c and 96c, thereby allowing the vertical movement of the lifting guide plate 92 relative to the bracket 94 (the main frame 9) while preventing movement of the lifting guide plate 92 relative to the bracket 94 in the longitudinal direction of the snow blower.

[0052] The locking mechanism having the lifting guide plate 92 and the bracket 94 uses the guide pin 89

through the vertically long slot 92d of the lifting guide plate 92 for guiding vertical movement of the lifting guide plate 92 relative to the bracket 94 and for restricting movement of the lifting guide plate 92 in the longitudinal direction of the snow blower relative to the bracket 94 without such front and rear guide members 77 and 78 used by the locking mechanism having the lifting guide plate 72 and the bracket 74, thereby reducing the number of parts.

[0053] Furthermore, the top end of the slot 92d defines the upper limit position of the guide pin 89, thereby defining the upper limit position of the bracket 94 of the main frame 9 relative to the lifting guide plate 92 of the travelling device 50, i.e., defining the lower limit position of the snow-removing unit 1. Similarly, the bottom end of the slot 92d defines the upper limit position of the snow-removing unit 1. Therefore, the lifting guide plate 92 need not have such complicated shape as the lifting guide plate 72 having the upper and lower retaining portions 72b and 72c, thereby being simplified.

[0054] Other construction is similar with that of the locking mechanism having the lifting guide plate 72 and the bracket 74.

[0055] The locking mechanism having the lifting guide plate 72 and the bracket 74 shown in Figs. 3 to 6 will be described again with reference numerals or statements in parentheses designating corresponding parts or structure of the locking mechanism shown in Fig. 7. As shown in Figs. 4 and 5 (or Fig. 7), just under the front guide roller 77, the side guide plate 75 (or 95) has a slot 75a (or 95a), and the other side guide plate 76 (or 96) has a suitable slot (hidden in the drawings). The latch 73 is passed through the slot 75a (or 95a) and the slot of the side guide plate 76 (or 96). The slot 75a (or 95a) and the unshown slot of the side guide plate 76 (or 96) are sufficiently long in the longitudinal direction of the main body so as to allow movement of the latch 73 therein between its lock position and its unlock position.

[0056] In this way, the slots of the side guide plates 75 and 76 (or 95 and 96) prevent the latch 73 from vertically moving and appropriately guide it in the longitudinal direction of the main body into the notch 72a (or 92a) of the lifting guide plate 72 (or 92).

[0057] The parallel left and right side guide plates 75 and 76 (or 95 and 96) are disposed in the longitudinal direction of the main frame 9. The side guide plate 75 (or 95) is longitudinally longer than the side guide plate 76 (or 96) so as to project rearward from the side guide plate 76 (or 96), and a wire guide notch 75b (or 95b) opened rearward is formed in the rear end of the side guide plate 75 (95). The wire 83 for operatively connecting the latch 73 to the lifting lever 86 is laterally passed through the wire guide notch 75b (or 95b).

[0058] In the bracket 74, the latch support plate 79 projects horizontally outward (rightward) from the upper right side surface of the right side guide plate 76 just above the hidden slot of the side guide plate 76. (The bracket 94 is provided with an unshown member for sup-

porting the latch 73 similar to the bracket 74 having the latch support plate 79.) The latch support plate 79 is formed in a substantially L-like shape in a plan view, having a laterally expanded rear end portion, and is integrally fixed at the front end thereof to the fixture plate 71 by welding or the like.

[0059] The latch 73 is bent in a substantially V-like shape in a plan view and the bent intermediate portion of the latch 73 is pivotally supported by the laterally expanded rear portion of the support plate 79 through a pivot pin 80. One side of the latch 73 is extended rearward from the pivoted intermediate portion thereof, and pivotally connected at the rear end thereof to an end of the wire 83 through a joint pin 82.

[0060] As mentioned above, the other side of the latch 73 is passed through the unshown slot of the right side guide plate 76 (or 96) and the slot 75a (or 95a) of the left side guide plate 75 (or 95). Between the side guide plates 75 and 76, the latch 73 is disposed just below the front guide roller 77.

[0061] Although the latch 73 is disposed on the right side of the bracket 74 (or 94) in this embodiment, the latch 73 may be alternatively disposed on the left side thereof. In this case, a horizontal plate for pivotally supporting the latch 73 may project leftward from the left side guide plate 75 (or 95).

[0062] By rotating the latch 73 counterclockwise in plan view, the portion of the latch 73 between the side guide plates 75 and 76 (or 95 and 96) is moved rearward and inserted into one of the notches 72a (or 92a) of the lifting guide plate 72 (or 92) so as to lock the main frame 9 integrally having the snow-removing unit 1 to the travelling device 50, thereby fixing the vertical position of the snow-removing unit 1. Moreover, a washer 84 is attached to the pin 82, and one end of the wire 83 is fixed between the latch 73 and the washer 84. A compression spring 85 is coiled around the wire 83 between the rear end of the latch 73, to which the washer 84 is attached, and the side guide plate 75 having the wire guide notch 75b (or 95b). The latch 73 is biased by the compression spring 85 so as to be rotated counterclockwise in plan view as shown in Fig. 6, whereby the portion of the latch 73 passed through the slots of the side guide plates 75 and 76 (95 and 96) is biased rearward toward the notches 72a (or 92a) of the lifting guide plate 72 (or 92). Therefore, the latch 73 inserted in one of the notches 72a (or 92a) is held so as to maintain the locked condition of the main frame 9 unless the wire 83 is pulled for removing the latch 73 from the notch 72a (or 92a).

[0063] The wire 83 connected at one end thereof to the latch 73 is extended from the wire guide notch 75b (or 95b) and connected at the other end thereof to the lifting lever 86 disposed near the handle 10 as shown in Fig. 1.

[0064] The lifting lever 86 serves as operation means for switching the locking mechanism between a locking state and an unlocking state. The locking state of the locking mechanism means that the latch 73 is fitted into

one of the notches 72a (or 92a) of the lifting guide plate 72 (or 92), and the unlocking state thereof means that the latch 73 is separated from the notch 72a (or 92a).

[0065] Alternatively, the wire 83 extended from the lifting lever 86 may be directly connected to an upper portion of the lifting guide plate 72 (or 92), and the lifting guide plate 72 (or 92) may be biased so as to be locked with the main body (the main frame 9). In this case, by operating the lifting lever 83 (gripping the lifting lever 83 together with the handle 10), the wire 83 is moved together with the lifting guide plate 72 (or 92) against the biasing force so as to unlock the lifting guide plate 72 (or 92) from the main frame 9.

[0066] The lifting lever 86 is disposed adjacent to one of the handles 10. In the snow blower shown in Fig. 1, the lifting lever 86 is disposed just below the grip of the right handle 10 opposite to the snow-removing clutch lever 51 above the same grip. Alternatively, the lifting lever 86 may be disposed adjacent to (or below) the left handle 10. The position of the lifting lever 86 is not limited if the lifting lever 86 can be operated by a hand holding the handle 10.

[0067] By gripping the lifting lever 86 together with the handle 10, the lifting lever 86 is rotated upward so as to pull the wire 83 against the biasing force of the spring 85, so that the latch 73 is rotated and the portion thereof between the side guide plates 75 and 76 (or 95 and 96) is moved forward and separated from the notch 72a (or 92a) of the lifting guide plate 72 (or 92), thereby unlocking the main frame 9 from the travelling device 50 and allowing vertical rotation of the main frame 9 relative to the travelling device 50 for changing the vertical position of the snow-removing unit 1. At this time, the front guide roller 77 contacting the lifting guide plate 72 prevents the lifting guide plate 72 from rotating forward relative to the bracket 74 so as to be engaged with the latch 73, (or the guide pin 89 in the slot 92d restricts forward movement of the lifting guide plate 92 relative to the bracket 94), thereby maintaining the unlocking state of the locking mechanism. In this way, the lifting guide plate 72 (or 92) becomes vertically slidable relative to the bracket 74 (or 94), thereby enabling the vertical position of the snow-removing unit 1 to be changed by operating the handles 10.

[0068] An operator gripping the handles 10 together with the lifting lever 86 moves the handles 10 vertically so as to set the snow-removing unit 1 to desired height. Then, the operator looses his/her hold of the lifting lever 86. Accordingly, the lifting lever 86 returns to its initial position by the biasing force of the compression spring 85 so as to rotate the latch 73 and insert it into one of the notches 72a (or 92a), thereby putting the locking mechanism into the locking state.

[0069] Due to the above-mentioned construction, the snow blower can be easily operated for locking/unlocking the main body with/from the travelling device 50 in adjusting the height of the snow-removing unit 1. The lifting lever 86 can be operated by a hand holding the

handle 10 immediately in case of need, so that the snow removing work does not need to be stopped for height control of the snow-removing unit 1. The locking mechanism of the height control device for the snow removing unit 1 using the latch 73 and the lifting guide plate 72 (or 92) having the notches 72a (or 92a) is simple and inexpensive.

[0070] A cover may be removably provided for covering the whole of the locking mechanism, wherein the cover may have a slot through which the lifting guide plate 72 (or 92) is allowed to move vertically relative to the bracket 74 (or 94). Such a cover protects the locking mechanism, particularly, prevents the notches 72a (92a) from generation of frozen cake therein or insertion of a pebble therein. Furthermore, the cover keeps an operator in safety from the locking mechanism.

Industrial Applicability of the Invention

[0071] The foregoing height control device for the snow blower is available for any other machine having such a main body and a traveling device that the main body is vertically rotatable relative to the traveling device.

Claims

1. A snow blower, comprising:

- a travelling device (50) having a fulcrum axis (4);
- a main body (9) vertically rotatable around the fulcrum axis (4) relative to the travelling device (50);
- a snow-removing unit (1) disposed at the front portion of the main body (9), wherein the height of the snow-removing unit (1) can be adjusted by rotating the main body (9) relative to the travelling device (50); and
- an operation unit (40) provided at the rear portion of the main body (9),

characterized by

- a height control operation member (86) provided near the operation unit (40);
- a first engaging member (73) provided at the rear portion of the main body (9) in connection with the height control operation member (86); and
- a second engaging member (72) provided at the rear portion of the travelling device (50), wherein, by operating the height control operation member (86) to engage the first engaging member (73) with the second engaging member (72), the main body (9) is fixed to the travelling device (50), and by operating the height

control operation member (86) to disengage the first engaging member (73) from the second engaging member (72), the main body (9) becomes rotatable relative to the travelling device (50).

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2. A snow blower as set forth in claim 1, further comprising:

a plurality of notches (72a) formed in the second engaging member (72) at predetermined intervals so that the first engaging member (73) is selectively inserted into one of the notches (72a) of the second engaging member (72), thereby being engaged with the second engaging member (72).

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3. A snow blower as set forth in claim 1, the operation unit (40) further comprising a handle (10), wherein a lever (86) serving as the height control operation member is disposed near a grip of the handle (10).

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Fig. 1

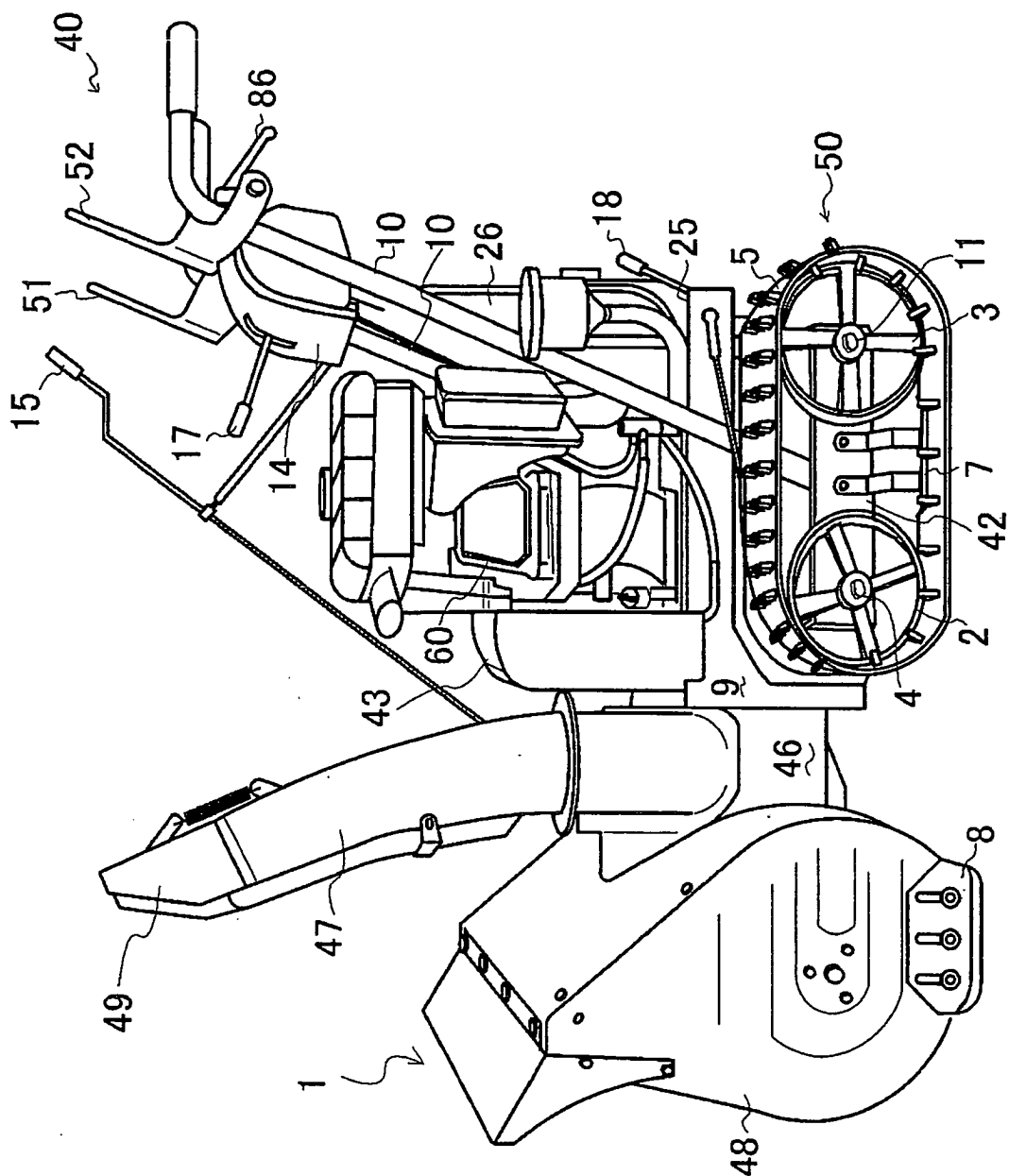


Fig. 2

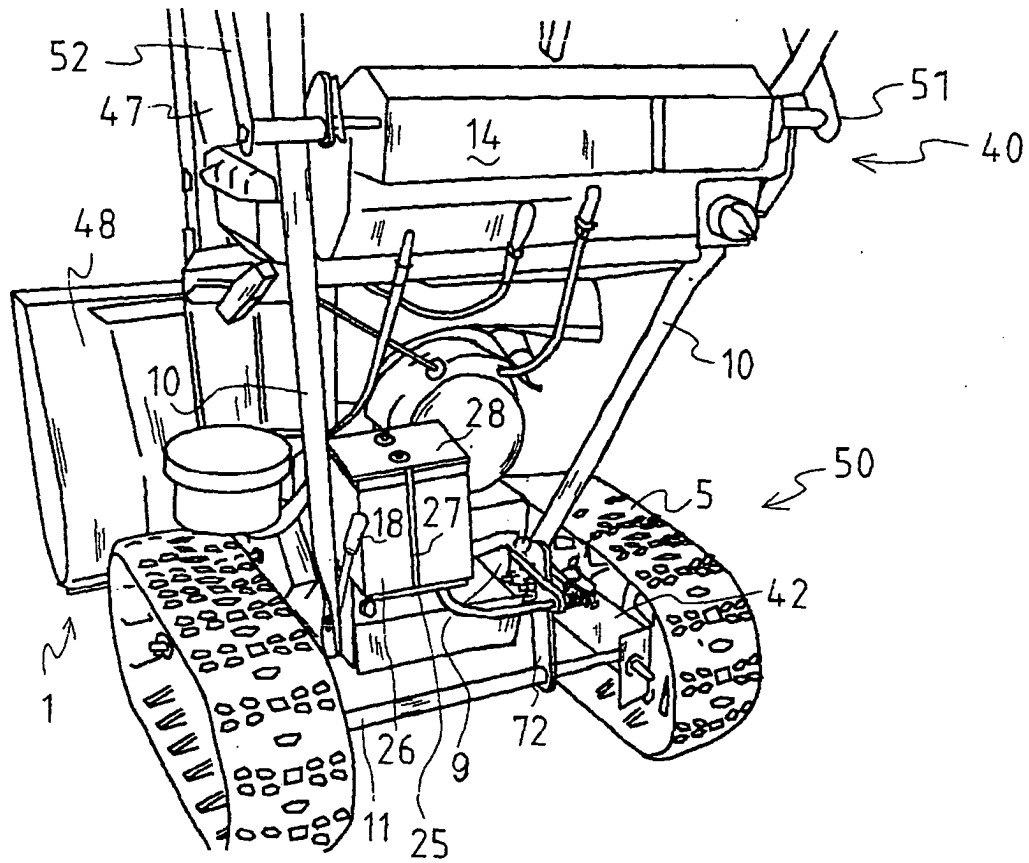


Fig. 3

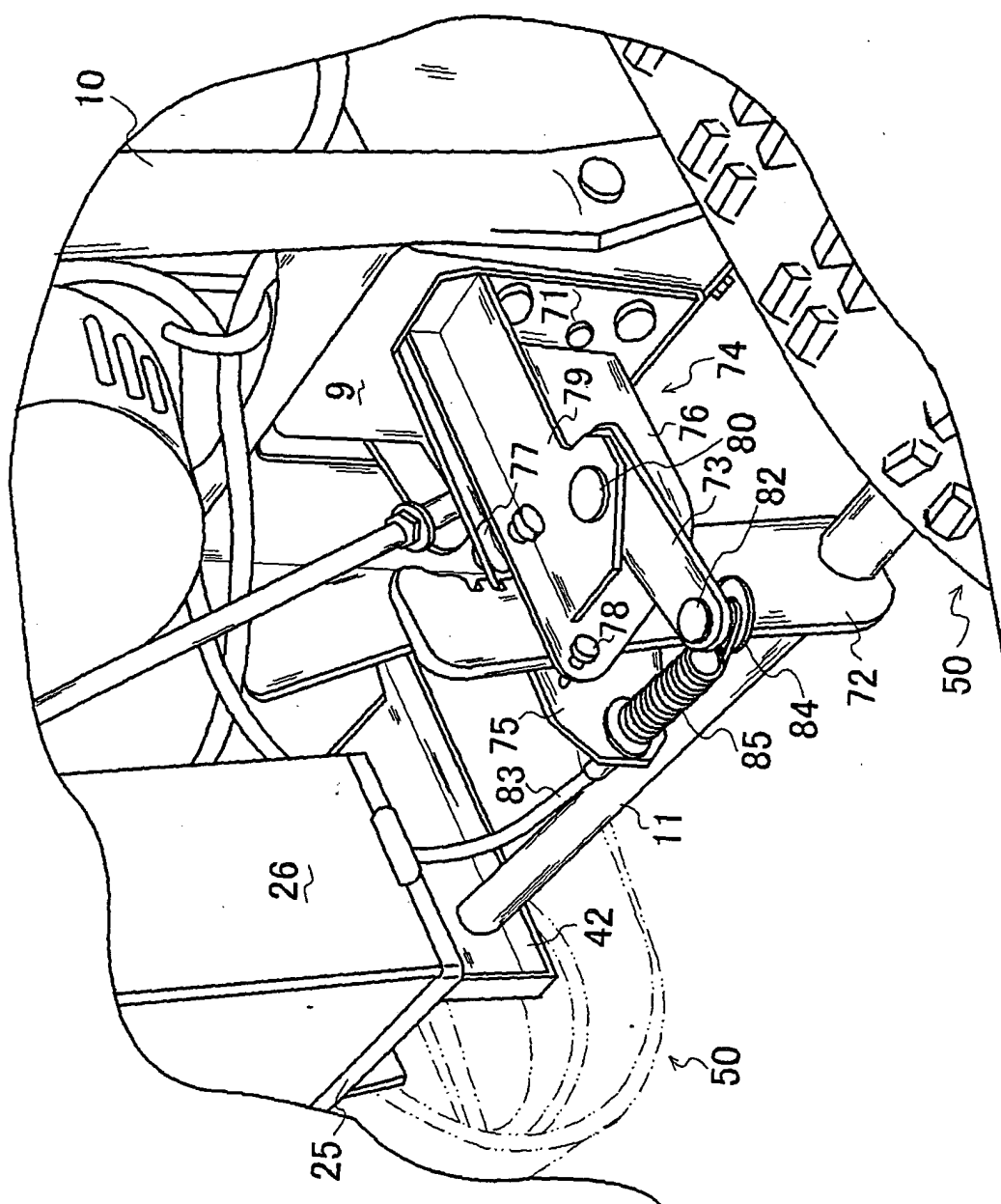


Fig. 4

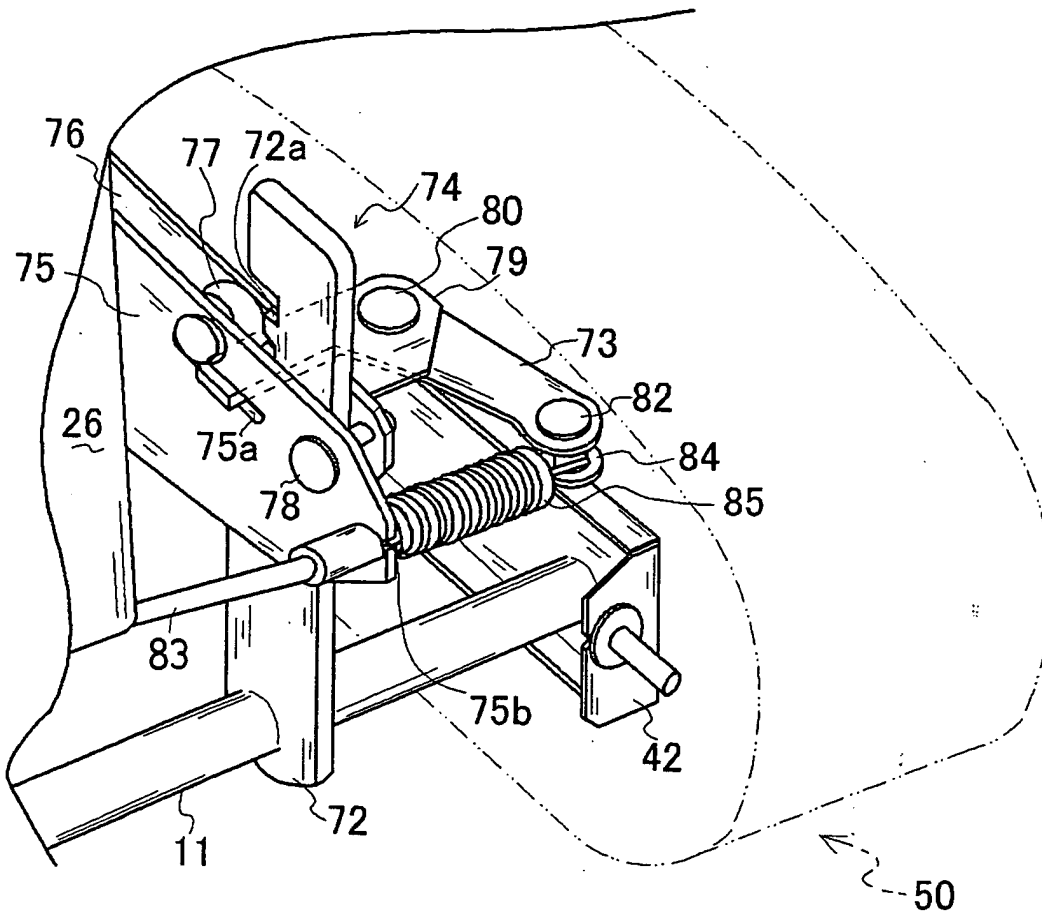


Fig. 5

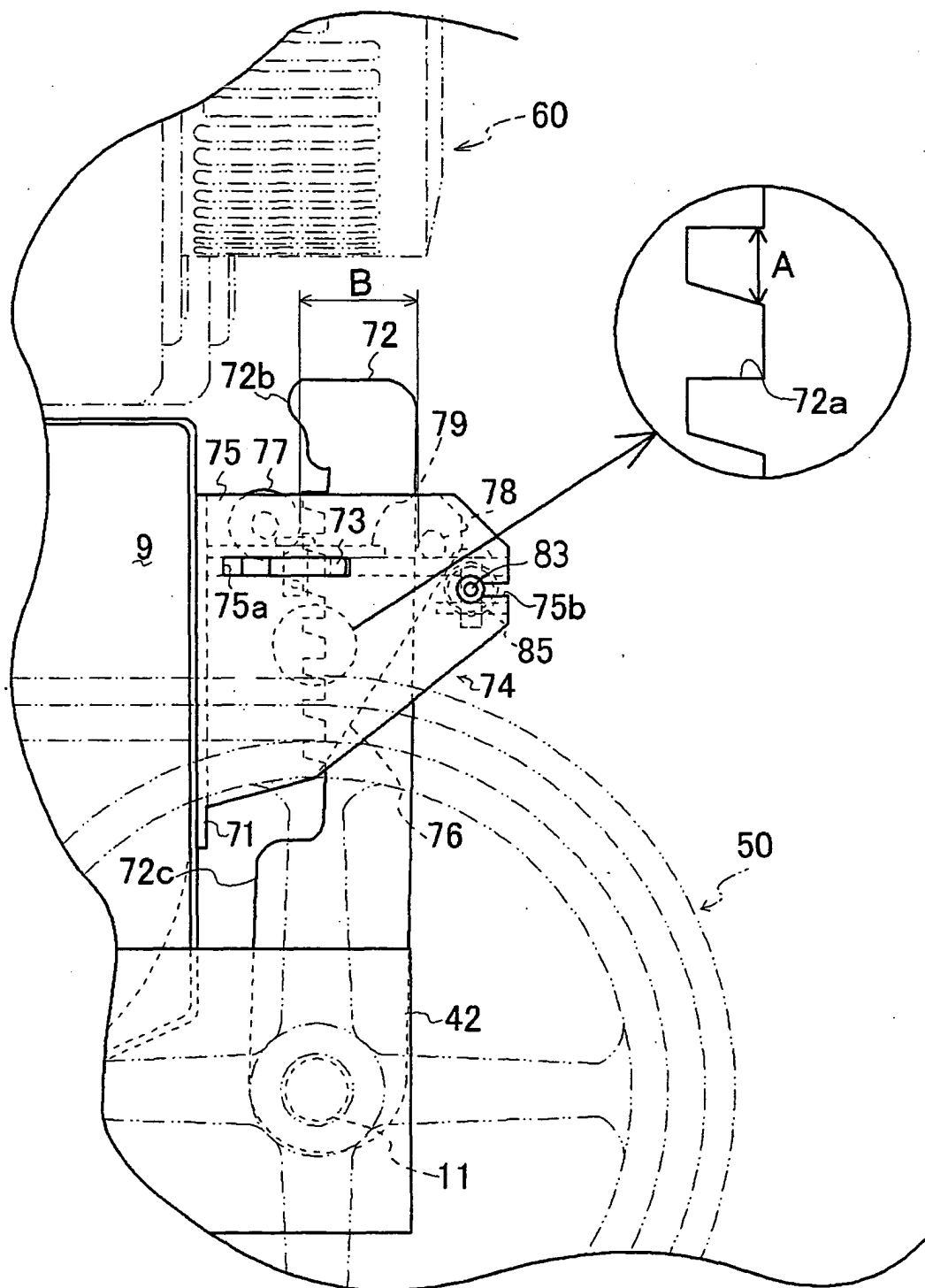


Fig. 6

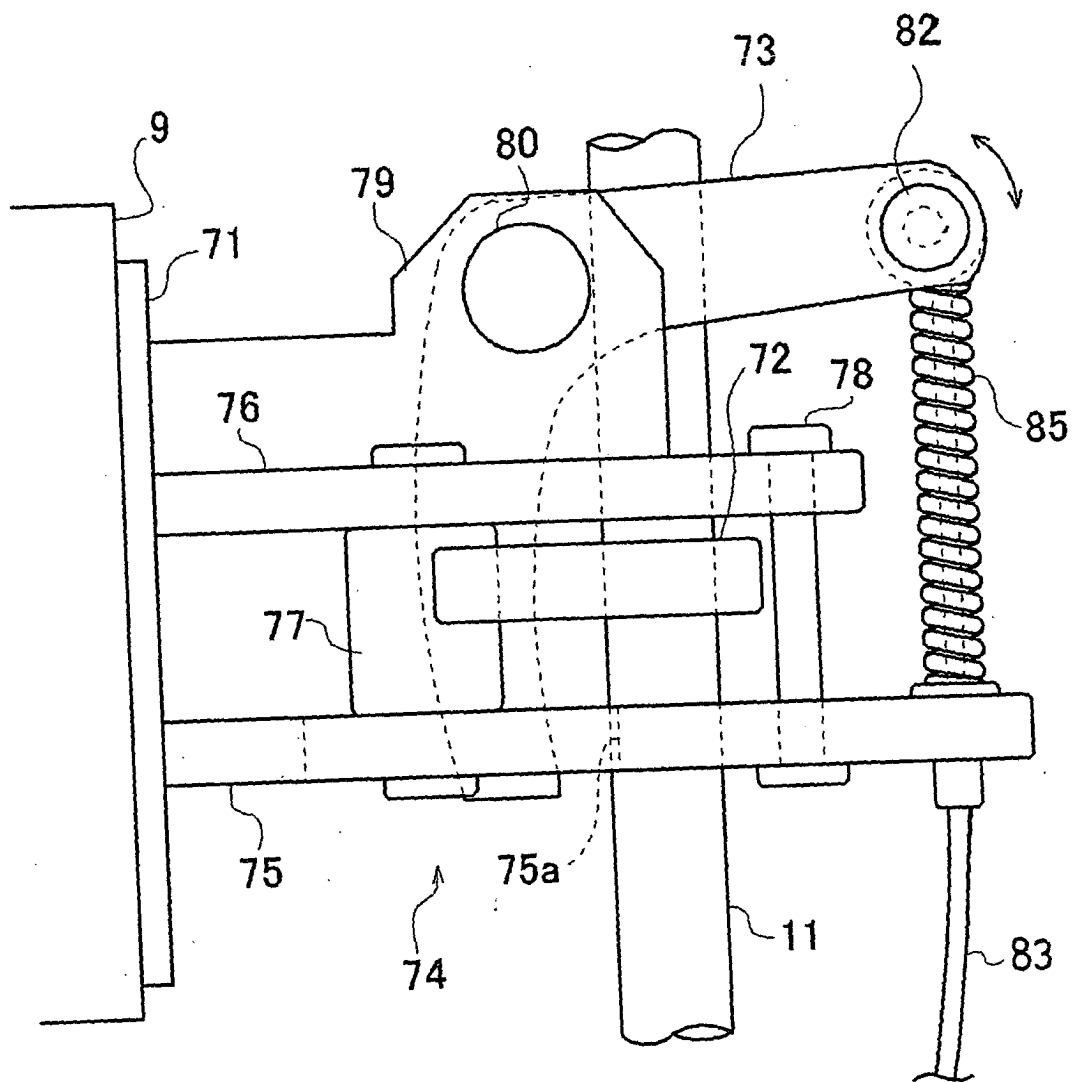


Fig. 7

