VEHICLE FOR HIGH LIFT WORK

Technical Field

[0001] The present invention relates to a vehicle for high lift work which is provided with a protective wall for protecting workers on a platform when cargos etc. are loaded or unloaded by setting the platform from the opening of a container formed by opening right and left doors of the container toward a target position.

Background

[0002] In the case where food and cargos are loaded from a container into an airplane, a platform is set from the opening of the container to a loading port (target position) to load or unload cargos etc. In this case, since the loading port of the airplane is located at a relatively high place, it is necessary to protect workers on the platform from a side wind etc.

[0003] Therefore, the applicant has already proposed a vehicle for high lift work in which at least one panel is provided on each door body of right and left doors of the container, the panel being stored in a lapped manner on the outside of the door body when the container is closed, and forming a protective wall on the platform by being pulled out from the outside of the door body toward the loading port when the container is opened.

[Patent Document 1] Japanese Patent No. 3550020

Disclosure of the Invention

[0004] Depending on the shape of an airframe, cargos etc. sometimes must be loaded or unloaded from a further distant place. In this case, the protective wall must be extended further together with the platform.

[0005] On the other hand, the loading port of the airplane has a special shape such that the surface thereof is curved. Therefore, in the case where the protective wall is formed by pulling out panels having the same shape as that of the door boy from the door body as in the conventional case, depending on the shape of the airframe, some clearance is formed between the protective wall and the airframe.

Although such a clearance has no hindrance for the purpose of protecting workers, it may give a feeling of uneasiness to the workers, so that it is preferable to keep this clearance as small as possible.

[0006] The present invention has been made based on the above-described fact-finding, and a problem to be solved by the present invention is to provide a vehicle for high lift work which is provided with a protective wall capable of being extended together with a platform while a clearance formed near a target position is kept small.

[0007] The invention described in claim 1 provides a vehicle for high lift work including a container having two door bodies arranged at the right and left; a platform set from the opening of the container formed by opening the door bodies toward a target position; and a truck elevatably holding the container, characterized in that at least two mini-panels, which are arranged in parallel in the height direction of the door body, are provided on the side surface of the door body, the mini-panel being stored in a lapped manner when the opening of the container is closed, and being pulled out from the door body toward the target position to form a protective wall on the platform when the opening of the container is opened.

[0008] The invention described in claim 2 is characterized in that in claim 1, an auxiliary panel held oscillatably to the mini-panel is provided on the side surface of the mini-panel.

[0009] The invention described in claim 3 is characterized in that in claim 2, the auxiliary panel has an oscillating portion of the auxiliary panel in the lower part of the auxiliary panel to enable oscillation due to the gravity; and a contact member is provided which brings the auxiliary panel into contact with the door body and oscillates against the gravity to store the auxiliary panel on the mini-panel when the mini-panel is stored on the door body, and separates the auxiliary panel from the door body and oscillates by means of the gravity when the mini-panel is pulled out from the door body.

[0010] The invention described in claim 4 is characterized in that in claim 2 or 3, the mini-panel is provided with a cut portion formed by

cutting a corner portion located in the oscillating direction of the auxiliary panel.

[0011] The invention described in claim 5 is characterized in that in any one of claims 1 to 4, a lock mechanism for regulating the running-out of the mini-panel from the door body is provided between the door body and the mini-panel.

[0012] The invention described in claim 6 provides a vehicle for high lift work including a container having two door bodies arranged at the right and left; a platform set from the opening of the container formed by opening the door bodies toward a target position; and a truck elevatably holding the container, characterized in that the door body has at least one panel which is stored in a lapped manner when the opening of the container is closed, and is pulled out from the door body toward the target position to form a protective wall on the platform when the opening of the container is opened; and at least two mini-panels are provided on a panel pulled out farthest from the door body, of the panels, the mini-panel being arranged in parallel in the height direction of the panel, being stored in a lapped manner when the opening of the container is closed, and being pulled out from the panel toward the target position to form a protective wall on the platform when the opening of the container is opened.

[0013] The invention described in claim 7 is characterized in that in claim 6, an auxiliary panel held oscillatably to the mini-panel is provided on the side surface of the mini-panel.

[0014] The invention described in claim 8 is characterized in that in claim 7, the auxiliary panel has an oscillating portion of the auxiliary panel in the lower part of the auxiliary panel to enable oscillation due to the gravity; a contact member is provided which brings the auxiliary panel into contact with the panel and oscillates against the gravity to store the auxiliary panel on the panel when the mini-panel is stored on the panel, and separates the auxiliary panel from the panel and oscillates by means of the gravity when the mini-panel is pulled out from the panel.

[0015] The invention described in claim 9 is characterized in that in claim 7 or 8, the mini-panel is provided with a cut portion formed by cutting a corner portion located in the oscillating direction of the auxiliary panel.

[0016] The invention described in claim 10 is characterized in that in any one of claims 6 to 9, a lock mechanism for regulating the running-out of the mini-panel from the panel is provided between the door body and the mini-panel.

[0017] The invention described in claim 11 is characterized in that in any one of claims 1 to 10, the truck is provided with a driving source for an engine etc. and a driver's cabin.

[0018] In the present invention, on the side surface of each of the door bodies arranged at the right and left, at least two mini-panels are arranged in parallel in the height direction of the door boy, by which the mini-panels are pulled out individually toward the target position after the door bodies are opened or after the panel is pulled out from the door body simultaneously with the opening of the door bodies. Thereby, the protective wall for preventing a side wind and dropping can be formed on the platform set between the opening of container and the target position. According to this configuration, even when the platform is longer than the door body, a side wind on the platform, dropping, etc. can be prevented.

[0019] Moreover, in this case, by pulling out the mini-panels from the door body or the panel independently, a clearance formed between the target position and the protective wall near the target position can be kept small. Therefore, comfortable work can be realized without giving a feeling of uneasiness to the worker.

[0020] Further, in this case, when the opening of the container is closed, the mini-panels are stored on the side surface of each of the door bodies arranged at the right and left. Therefore, even when the two door bodies arranged at the right and left are closed, the opening of the container can be closed without interference of the mini-panels with each other. In addition, the compactness can be achieved.

[0021] Also, in the present invention, at least one of the panels is provided on the side surface of each of the door bodies arranged at the right and left, and at least two mini-panels are arranged in parallel in the height direction of the panel. In this case, especially even when the platform is longer than the panels pulled out from the door body, a side wind on the platform, dropping, etc. can be prevented.

[0022] In the present invention, it is preferable that the auxiliary panel held oscillatably to the mini-panel be provided on the side surface of the mini-panel. According to this configuration, the clearance formed between the protective wall and the target point near the target point is kept further small, so that more comfortable work can be realized. In particular, in this case, the oscillating portion of the auxiliary panel is disposed in the lower part of the auxiliary panel to enable oscillation due to the gravity, and a contact member is provided which brings the auxiliary panel into contact with the door body or the panel and oscillates the auxiliary panel against the gravity to store the auxiliary panel on the mini-panel when the mini-panel is stored on the door body or the panel, and separates the auxiliary panel from the door body or the panel and oscillates the auxiliary panel by means of the gravity when the mini-panel is pulled out from the door body or the panel. Thereby, the auxiliary panel is pulled out and stored automatically in synchronization with the pulling-out and storing of the mini-panel from and to the door body or the panel, so that the work required for the pulling-out and storing of the auxiliary panel can be omitted, which improves the work efficiency. Further, in this case, the mini-panel is preferably provided with the cut portion formed by cutting the corner portion located in the oscillating direction of the auxiliary panel. According to this configuration, a wide oscillation range of the auxiliary panel with respect to the mini-panel can be secured, and the clearance formed between the protective wall and the target position near the target position is kept at the minimum, so that more comfortable work can be realized.

[0023] Also, in the present invention, if the lock mechanism for

regulating the running-out of the mini-panel from the door body or the panel is provided between the door body and the mini-panel or between the panel and the mini-panel, at the time of the movement as a vehicle, a phenomenon that the mini-panel runs out from the door body or the panel and interferes with surrounding portions can be prevented.

[0024] Further, in the present invention, if the driving source for an engine etc. and the driver's cabin are provided integrally with or separately from the truck to which the container is installed, the mobility as a vehicle for high lift work is improved, so that the workability is improved.

Brief Description of the Drawings

[0025]

[Figure 1] A side view of a lift truck which is used at an airport and has a box-shaped cargo bed for loading in-flight meal etc. into an airframe through a loading port, showing one embodiment of the present invention.

[Figure 2] An enlarged view of an essential portion, showing Figure 1 from the direction D1.

[Figure 3] A side view of one (left-hand side) of platform preventive walls on a platform in accordance with the embodiment shown in Figure 1, shown from the inside of the platform.

[Figure 4] Figures 4(a) and 4(b) are front views of first to third protective walls shown in the arrow-marked directions D2 and D3 in Figure 3, respectively.

[Figure 5] Figures 5(a) and 5(b) are plan views showing a state in which a platform protective wall in accordance with the embodiment shown in Figure 1 is stored and a state in which it is pulled out, respectively, showing from the direction D1 in Figure 1.

[Figure 6] Figures 6(a) and 6(b) are a side view of a third protective wall in accordance with the embodiment shown in Figure 1, viewed from the platform, and a front view thereof, viewed from the vehicle front toward the rear, respectively.

[Figure 7] Figures 7(a) and 7(b) are enlarged views of essential

portions showing the regions C and D in Figure 6(a), respectively.

[Figure 8] A plan view of an essential portion showing Figure 3 from the direction D4.

[Figure 9] Figures 9(a) and 9(b) are operation views typically showing a lock mechanism in accordance with the embodiment shown in Figure 1.

Best Mode for Carrying Out the Invention

[0026] One embodiment of the present invention will now be described with reference to the accompanying drawings. In the explanation below, the direction in which a driver's cabin lies is made the front, and the upper/lower and right/left directions are defined viewed from the driver.

[0027] Figure 1 is a side view of a lift truck 100 which is used at an airport and has a box-shaped cargo bed for loading in-flight meal etc. into an airframe 10 through a loading port (target position) 10a of airplane, showing one embodiment of the present invention.

[0028] As shown in Figure 1, the lift truck 100 includes a mobile vehicle body (truck) 120 having a driver's cabin 110 in the front, a pantographic link mechanism 130 provided on a vehicle body frame 121 mounted on the vehicle body 120, and a container 140 elevated on the vehicle body 120 by the link mechanism 130. At four places, front and rear and right and left, of the vehicle body frame 121, stabilizing hydraulic jacks 122 are provided to secure stability against wind pressure at the time when the box-shaped cargo bed 140 is raised.

[0029] The link mechanism 130 is made up of two outer side links 131 arranged in parallel at the right and left and two inner side links arranged in parallel at the right and left, a link shaft 133 for rotatably supporting the side links 131, 132, and a hydraulic lift cylinder 134 installed between the side links 131 and 132.

[0030] Portions near the upper ends of the outer side links 131 are connected integrally to each other by a front shaft X1, and the lower ends thereof are supported so as to be movable along the vehicle body frame 121. Likewise, portions near the upper ends of the inner side links 132 are connected integrally to each other by a rear shaft X2, and

the lower ends thereof are fixedly held turnably to the vehicle body frame 121 by a fixed shaft X3. The front shaft X1 and the rear shaft X2 are set under a rectangular cargo bed frame 141 that holds the box-shaped cargo bed 140. Between the cargo bed frame 141 and the container 140, a direct-acting mechanism consisting of a roller and rail or the like is provided so that the container 140 is supported so as to be movable along the cargo bed frame 141.

[0031] The hydraulic lift cylinder 134 is expanded or contracted by the operation of a rise button or a lower button (not shown) on a control panel Cp arranged on the vehicle body 120 performed by the worker. Thereby, when the driver continues to press the rise button on the control panel Cp to raise the container 140, the hydraulic lift cylinder 134 is expanded, so that the crosslink mechanism 130 can elevate the container 140 with respect to the vehicle body 120. Similarly, when the driver continues to press the lower button on the control panel Cp to lower the container 140, the hydraulic lift cylinder 134 is contracted during the time when the pressing operation is continued, so that the container 140 can be lowered with respect to the vehicle body 120. Thereby, the crosslink mechanism 130 can raise and lower the container 140 with respect to the vehicle body 120 with expansion and contraction of the hydraulic lift cylinder 134 while a state in which the container is parallel with the road surface is maintained.

[0032] The container 140 has a platform 160, which can be expanded and contracted in the front direction of vehicle, in the front thereof to load food and cargos into the airplane. This platform 160 is constructed so that a sub-platform 162 is pulled out of or stored in a main platform 161 by the operation of a pull-out button or a store button (not shown) on a control panel, not shown, arranged in the container 140 performed by the worker. In a normal state such as vehicle running, the platform 160 is supported in a state of being in contact with a frame 123 fixed to vehicle body frame 121 and mounted at a predetermined upper position of the driver's cabin 110 as shown in the region A in Figure 1.

[0033] On both sides of the platform 160, brackets 163 are provided integrally. A roller (not shown) is attached to each of the brackets 163, and the roller is attached to two guide rails (supports) 164 extending upward from both sides in the front of the container 160. Therefore, when the container 140 begins to rise, the guide rails 164 move relative to the platform 160, so that the container 140 is raised while the platform 160 is kept at the position shown in the region A in Figure 1. At the time when the height of the floor surface of the container 140 coincides with the floor surface height of the platform 160, the platform 160 comes into contact with the lower end portions of the guide rails 164, and is fixedly held to the container 140, so that the platform 160 rises integrally with the container 140.

[0034] Figure 2 is an enlarged view of an essential portion, showing Figure 1 from the direction D1. Figure 3 is a side view of one (left-hand side) of platform preventive walls 200, described later, formed on both sides, right and left, of the platform 160, shown from the inside of the platform 160.

[0035] In Figure 2, reference numeral 210 denotes a door body of a hinged double construction, which is provided on the front surface of the container 140. The door body 210 is turnably attached to a square frame 142, which forms a work port (opening) 140a for loading and unloading cargos etc. into and from the container 140, via hinges H1.

[0036] The door body 210 may be opened and closed by manual operation. In this embodiment, an actuator 201 capable of expansion and contraction is oscillatably provided on the upper beam portion of the square frame 142 of the container 140 and the door body 210 via pin members P1 and P2, respectively. This actuator 201 is expanded and contracted by the pressing operation of a button arranged on the control panel, not shown, in the container 140. Therefore, the door body 210 can open the work port 140a of the container 140, and also can close the work port 140a of the container 140 merely by the operation of the button in the container 140.

[0037] Specifically, after the floor surface height of the container 140

has coincided with the floor height of the platform 160, when the worker presses the button in the container 140, the door body 210 is opened toward the platform 160 pulled out toward the loading port 10a of the airframe 10, by which a first platform protective wall (hereinafter referred to as a “first protective wall”) is formed. The door body 210 is provided with a packing, not shown, so that the airtightness in the container 140 is kept in the closed state shown by the solid line in Figure 2. Also, after the hinges H1 have been opened to the base point, the door body 210 can be fixed to the platform 160 by the insertion of a pin member etc.

[0038] Reference numeral 220 denotes a panel arranged on the outside of the door body 210. When the door body 210 is closed, the panel 220 is stored on the outside surface of the door body 210 in a lapped manner as shown in Figure 2, and when the door body 210 is opened, the panel 220 is pulled out from the outside surface of the door body 210 toward the loading port 10a (target position) of the airframe 10 to form a second platform protective wall (hereinafter referred to as a “second protective wall”) on the platform 160.

[0039] The second protective wall 220 may also be stored or pulled out by manual operation. In this embodiment, an actuator 202 capable of expansion and contraction is provided between the first protective wall 210 and the second protective wall 220 as shown in Figure 3. This actuator 202 is also expanded and contracted by the pressing operation of a button arranged on the control panel, not shown, in the container 140. Therefore, the second protective wall 220 can be pulled out from the first protective wall 210, and also can be stored on the outside of the first protective wall 210 in a lapped manner merely by the operation of the button in the container 140.

[0040] Reference numeral 230 denotes a panel arranged on the outside of the second protective wall 220. When the door body 210 is closed, the panel 230 is stored on the outside of the door body 210 together with the second protective wall 220 in a lapped manner as shown in Figure 2, and when the door body 210 is opened, the panel 230

is pulled out from the second protective wall 220 toward the loading port 10a of the airframe 10 to form a third platform protective wall (hereinafter referred to as a "third protective wall") on the platform 160 as shown in Figure 3.

[0041] Figures 4(a) and 4(b) are front views of the first to third protective walls 210 to 230 shown in the arrow-marked directions D2 and D3 in Figure 3, respectively. The operations of the first to third protective walls 210 to 230 are explained below by taking the left door body 210 shown in Figures 3 and 4 as an example.

[0042] As shown in Figure 3, the second protective wall 220 slides in the front and rear direction of vehicle with respect to the first protective wall 210 along two first guide mechanisms 300 arranged in parallel in the height direction between the first protective wall 210 and the second protective wall 220. As shown in Figure 4, the guide mechanism 300 is made up of a first protective wall side guide rail 310 which is provided on the outside of the first protective wall 210 and extends along the platform 160, a second protective wall side guide rail 320 which is provided on the inside of the second protective wall 220 and extends along the platform 160, and a first slide member 330 which moves along these guide rails 310 and 320.

[0043] As shown in Figures 3 and 4, the first protective wall side guide rail 310 and the second protective wall side guide rail 320 are arranged in an offset manner in the height direction of the panel (door body). Also, as shown in Figure 3, the first slide member 330 has a substantially diamond-shaped side shape. Also, as shown in Figure 4, two rollers 331 provided on the inside of the first slide member 330 are held movably on the guide rail 310 of the first protective wall 210, and two rollers 332 provided on the outside of the first slide member 330 are held movably on the guide rail 320 of the second protective wall 220. Also, although not described in detail, at both ends of the guide rail 310 and the guide rail 320, stoppers S (refer to Figure 6) are provided to prevent the rollers 331 or 332 from leaving the rail.

[0044] Thereby, the second protective wall 220 is held slidably on

the outside of the first protective wall 210 via the two guide mechanisms 300 arranged in parallel in the height direction of the second protective wall 220. The slide member 330 in accordance with this embodiment is held by the rollers 331 and 332 with respect to the guide rails 310 and 320, respectively. These rollers 331, 332 may be replaced with friction elements simply moving slidingly on the guide rails 310, 320. Also, the guide mechanism 300 may be such that guide rails are provided on both sides of the slide member 330, and the guide rails 310, 320 are replaced with rollers or friction elements.

[0045] Similarly, as shown in Figure 3, the third protective wall 230 slides in the front and rear direction of vehicle along two first guide mechanisms 400 arranged in parallel in the height direction between the second protective wall 220 and the third protective wall 230. As shown in Figure 4, the guide mechanism 400 is made up of a second protective wall side guide rail 410 which is provided on the outside of the second protective wall 220 and extends along the platform 160, a third protective wall side guide rail 420 which is provided on the inside of the third protective wall 230 and extends along the platform 160, and a second slide member 430 which moves along these guide rails 410 and 420.

[0046] As shown in Figures 3 and 4, the second protective wall side guide rail 410 and the third protective wall side guide rail 420 are arranged in an offset manner in the height direction of the panel (door body). Also, as shown in Figure 3, the second slide member 430 also has a substantially diamond-shaped side shape. Also, as shown in Figure 4, two rollers 431 provided on the inside of the second slide member 430 are held movably on the guide rail 410 of the second protective wall 220, and two rollers 432 provided on the outside of the second slide member 430 are held movably on the guide rail 420 of the third protective wall 230. Also, although not described in detail, at both ends of the guide rail 410 and the guide rail 420, stoppers S (refer to Figure 6) are provided to prevent the rollers 431 or 432 from leaving the rail.

[0047] Thereby, the third protective wall 230 is held slidably on the

outside of the second protective wall 220 via the two guide mechanisms 400 arranged in parallel in the height direction of the third protective wall 230. In this case as well, the slide member 430 is held by the rollers 431 and 432 with respect to the guide rails 410 and 420, respectively. These rollers 431, 432 may be replaced with friction elements simply moving slidingly on the guide rails 410, 420. Also, the guide mechanism 400 may be such that guide rails are provided on both sides of the slide member 430, and the guide rails 410, 420 are replaced with rollers or friction elements.

[0048] The second protective wall 220 and the third protective wall 230 may be slid independently by manual operation. In this embodiment, however, a rope moving mechanism 500 is provided to synchronize the pulling-out and storing of the second protective wall 220 and the third protective wall 230.

[0049] Figures 5(a) and 5(b) are plan views showing a state in which the platform protective wall 200 arranged on the left-hand side is stored and a state in which it is pulled out, respectively, showing from the direction D1 in Figure 1.

[0050] The rope moving mechanism 500 of this embodiment uses a chain. As shown in Figure 5(a), a first chain wheel 510 and a second chain wheel 520 are provided rotatably in the front and rear end portions of the second protective wall 220. A chain 530 consists of two chains 531 and 532. One end of the chain 531 is fixed via a fixing member 540 in the front of the first protective wall 210, the chain 531 is set around the first chain wheel 510, and the other end of the chain 531 is fixed via a fixing member 550 at the rear of the third protective wall 230. On the other hand, one end of the chain 532 is fixed via the fixing member 540 in the front of the first protective wall 210, the chain 532 is set around the second chain wheel 520, and the other end of the chain 532 is fixed via the fixing member 550 at the rear of the third protective wall 230.

[0051] According to the above-described configuration, when the third protective wall 230 is moved in the front direction of vehicle, the

second protective wall 220 moves by a half of the movement distance of the third protective wall 230 in synchronization with the third protective wall 230, and is pulled out from the first protective wall 210. On the other hand, when the third protective wall 230 is moved in the rear direction of vehicle, the second protective wall 220 moves by a half of the movement distance of the third protective wall 230 in synchronization with the third protective wall 230, and is stored on the outside of the first protective wall 210. That is to say, according to the rope moving mechanism 500, the second protective wall 220 and the third protective wall 230 can be stored on and pulled out from the first protective wall 210 synchronously. In addition, since the first protective wall 210 and the second protective wall 220 are synchronous, both of the protective walls 220 and 230 can be fixed with respect to the platform 160 merely by fixing only either of the first protective wall 210 and the second protective wall 220 to the platform 160 by means of the insertion of a pin member etc. The first chain 531 and the second chain 532 may be a loop-shaped endless chain, and the rope moving mechanism may use a wire in place of the chain.

[0052] Since the shape of the airframe 10 of airplane is curved as shown in Figure 1, when the third protective wall 230 is positioned at the foremost position, some clearance is formed between the third protective wall 230 and the loading port 10a. Although such a clearance has no hindrance for the purpose of protecting workers, it may give a feeling of uneasiness to the workers, so that it is preferable to keep this clearance as small as possible.

[0053] In this embodiment, therefore, as shown in Figure 3, three mini-protective walls 1 arranging in parallel in the height direction of the third protective wall 230 are provided on the third protective wall 230 that is pulled out farthest from the first protective wall 210, of the two protective walls 220 and 230.

[0054] Figures 6(a) and 6(b) are a side view of the third protective wall 230 arranged on the left-hand side, viewed from the platform 160, and a front view thereof, viewed from the vehicle front toward the rear,

respectively. Also, Figures 7(a) and 7(b) are enlarged views of essential portions showing the regions C and D in Figure 6(a), respectively.

[0055] Referring to Figures 6 and 7, on the outside of the third protective wall 230, the three mini-protective walls 1 are arranged in the height direction of the third protective wall 230. These mini-protective walls 1 slide in the front and rear direction of vehicle with respect to the third protective wall 230 along two guide mechanisms 600 arranged in parallel on the outside of the third protective wall 230. As shown in Figure 7, the guide mechanism 600 is provided with intermediate guide rails 630 between a third protective wall side guide rail 610, which is provided on the outside of the third protective wall 230 and extends along the platform 160, and a mini-protective wall side guide rail 620, which is provided on the inside of the mini-protective wall 1 and extends along the platform 160 so that the intermediate guide rails 630 face to the guide rails 610 and 620, and slide members 640 are disposed along the rails 610 to 630 between the third protective wall side guide rail 610 and the intermediate guide rail 630 and between the mini-protective wall side guide rail 620 and the intermediate guide rail 630. The slide member 640 has ball members 641 rotatably held by the rails 610 to 630. According to this configuration, there is formed a double expansion/contraction guide rail in which two slide members 640 are interposed between the third protective wall 230 and the mini-protective wall 1.

[0056] Thereby, the mini-protective wall 1 is slidably held on the outside of the third protective wall 230 via the two guide mechanisms 600 arranged in parallel in the height direction of the mini-protective wall 1. In this embodiment, by interposing the slide members 640 between the guide rails 610 to 630, a long stroke for pulling the mini-preventive wall 1 out of the third protective wall 230 is secured. If the long stroke is unnecessary, one slide member 640 may be interposed between the third protective wall side guide rail 610 and the mini-protective wall side guide rail 620. Further, the slide member 640 has

the ball members 641. However, a roller or a friction member sliding on the rail 610, 620 may be used in place of the ball member 641. Also, the guide mechanism 600 may be such that guide rails are provided on both sides of the slide member 640, and the guide rails 610, 620, 630 may be replaced with ball members, rollers, or friction elements. In this embodiment, as shown in Figure 6, on the outside surface of the third protective wall 230, a stopper 230s for limiting the movement of the intermediate guide rails 630 and the slide members 649 is provided.

[0057] Also, in this embodiment, as shown in Figure 3, on the outside surface of the mini-protective wall 1, an auxiliary panel 2 held oscillatably with respect to the mini-protective wall 1 via a pin member Po is provided. Figure 8 is a plan view of an essential portion showing Figure 3 from the direction D4. As shown in Figure 8, a cushioning member 2a made of a synthetic resin is provided at the tip end of the auxiliary panel 2 to lighten the contact with the airframe 10.

[0058] If the pin member Po is disposed near the center in the height direction of the mini-protective wall 1, the auxiliary wall 2 can be oscillated uniformly in the up-and-down direction. In the case of this embodiment, however, the oscillating portion (pin member) of the auxiliary panel 2 is disposed on the lower side of the auxiliary panel 2 (mini-protective wall 1). According to this configuration, the auxiliary panel 2 is oscillated downward with respect to the mini-protective wall 1 by its gravity without the operation performed by the worker.

[0059] As shown in Figure 3, the auxiliary panel 2 is provided with a rod-shaped member (contact member) 3 extending toward the third protective wall 230. Also, as shown in Figure 6(a) or 7(b), on the outside surface of the third protective wall 230 is provided a contact portion 4 protruding outward, with which a rear end 3e of the rod-shaped member 3 comes into contact. According to this configuration, when the mini-protective wall 1 is stored on the outside of the third protective wall 230, the rear end 3e of the rod-shaped member 3 comes

into contact with the contact portion 4 protruding from the outside surface of the third protective wall 230. When the mini-protective wall 1 is further pushed in toward the third protective wall 230, a force for oscillating the auxiliary panel 2 upward against the gravity of the auxiliary panel 2 is created with the oscillating portion P1 being a base point, so that the auxiliary panel 2 can be stored on the outside of the mini-protective wall 1. When the mini-protective wall 1 is pulled out of the third protective wall 230, the rear end 3e of the rod-shaped member 3 separates from the contact portion 4, so that a force for oscillating the auxiliary panel 2 downward by means of the gravity of the auxiliary panel 2 is created with the oscillating portion P1 being a base point. Therefore, the auxiliary panel 2 can be pulled out to the outside of the mini-protective wall 1.

[0060] Further, in this embodiment, as shown in Figure 3, the mini-protective wall 1 is provided with a cut portion 1c formed by cutting a corner portion located in the oscillating direction of the auxiliary panel 2. In this embodiment, since the auxiliary panel 2 is oscillated downward by its gravity, the cut portion 1c is provided at the lower end of the auxiliary panel 2. However, the cut portion 1c can be provided at the upper end or both of the upper and lower ends of the auxiliary panel 2 in accordance with the oscillating direction of the auxiliary panel 2.

[0061] Also, in this embodiment, as shown in Figures 3 and 6, a lock mechanism 700 for regulating the running-out of the mini-protective wall 1 from the third protective wall 230 is provided between the third protective wall 230 and the mini-protective wall 1. Although the lock mechanism 700 is provided between each of the mini-protective walls 1 and the third protective wall 230, in Figures 3 and 6, only the lock mechanism 700 provided between the mini-protective wall 1 disposed in the uppermost portion and the third protective wall 230 is shown typically.

[0062] Figures 9(a) and 9(b) are operation views typically showing the lock mechanism 700. As shown in Figure 6, this lock mechanism

700 includes a snatch lock (lock body) 710 provided on the outside surface of the third protective wall 230, and a striker (engagement protrusion) 720 which protrudes from the inside surface of the mini-protective wall 1 as shown in Figure 3 and engages detachably with the snatch lock 710. The snatch lock 710 has claw portions 710n keeping a closed state or an open state until a fixed force is applied by the urging force of a spring etc. When the mini-protective wall 1 is stored on the outside surface of the third protective wall 230, as shown in Figure 9(a), the claw portions 710n hold the striker 720 of the mini-protective wall 1 therebetween, so that the mini-protective wall 1 is fixed with respect to the third protective wall 230. When the mini-protective wall 1 is pulled toward the front of vehicle by a force greater than the engagement force of the snatch lock 710, the claw portions 710n release the striker 720 of the mini-protective wall 1, so that the mini-protective wall 1 can be pulled out of the third protective wall 230 as shown in Figure 9(b).

[0063] Reference characters 210w, 220w, 230w, and 1w denote inspection windows provided in the first protective wall 210, the second protective wall 220, the third protective wall 230, and mini-protective wall 1, respectively. These windows are made of a transparent material such as a glass material or an acrylic material. According to this configuration, when the second protective wall 220, the third protective wall 230, and mini-protective wall 1 are stored on the outside of the first protective wall 210, since the inspection windows thereof are lapped on each other, even in the state in which the work port 140a of the container 140 is closed by the door bodies 210, the platform 160 and the airframe 10 of airplane on the outside can be inspected from the interior of the container 140.

[0064] On the front roof of the container 140, a canopy 144 serving as a covering against rain, which is stored on the roof at the time of running, and taken out at the necessary time, is provided. Therefore, for the third protective wall 230 in accordance with this embodiment, as shown in Figure 6(a), a cut portion 230c is formed in the corner portion

in the upper rear portion thereof to prevent interference with a hydraulic cylinder, not shown, for raising/lowering and expanding/contracting the canopy 144.

[0065] As described above, in this embodiment, the second and third protective walls 220 and 230 are provided on the outside surface of each of the door bodies 210 arranged at the right and left, and on the protective wall 230 pulled out farthest from the door body 210, of the protective walls 220 and 230, three mini-protective walls 1 are arranged in parallel in the height direction of the protective wall 230. Therefore, when the work port 140a of the container 140 is opened, as shown by the imaginary line in Figure 2, the door bodies 210 arranged at the right and left are opened, and at the same time, the protective walls 220 and 230 are pulled out from the outside surface of each of the door bodies 210, and then the mini-protective walls 1 arranged in parallel on the protective wall 230 are pulled out individually toward the loading port 10a as shown in Figure 1 by manual operation. Thereby, the protective wall 200 can be formed on the platform 160 set between the work port 140a of the container 140 and the loading port 10a to prevent a side wind and dropping. According to this configuration, even if the platform 160 is longer than the protective walls 220 and 230 pulled out from the door body 210, a side wind on the platform 160 and dripping can be prevented.

[0066] Moreover, in this case, since the mini-protective walls 1 are pulled out independently from the protective wall 230, a clearance formed between the protective wall 200 and the loading port 10a near the loading port 10a is kept small. Therefore, comfortable work can be realized without giving a feeling of uneasiness to the workers.

[0067] Further, in this case, when the work port 140a of the container 140 is closed, the mini-protective walls 1 are stored on the outside surface of each of the door bodies 210 arranged at the right and left. Therefore, even when the two door bodies 210 arranged at the right and left are closed, the work port 140a of the container 140 can be closed without interference of the mini-protective walls 1 with each other.

In addition, the compactness can be achieved.

[0068] Also, in this embodiment, the auxiliary panel 2 oscillatably held to the mini-protective wall 1 via the pin member P1 is provided on the side surface of the mini-protective wall 1. Therefore, the clearance formed between the protective wall 200 and the loading port 10a near the loading port 10a is kept further small, so that more comfortable work can be realized. Especially in this embodiment, as shown in Figure 3, the oscillating portion Po of the auxiliary panel 2 is arranged on the lower side of the auxiliary panel 2 to enable oscillation due to the gravity, and also the rod-shaped member 3 is provided on the auxiliary panel 2 so that the rod-shaped member 3 can come into contact with the contact portion 4 provided on the third protective wall 230. Thereby, the auxiliary panel 2 is pulled out and stored automatically in synchronization with the pulling-out and storing of the auxiliary panel 2 from and to the mini-protective wall 1, so that the work required for the pulling-out and storing of the auxiliary panel 2 can be omitted, which improves the work efficiency. Further, in the case of this embodiment, the mini-protective wall 1 is provided with the cut portion 2c formed by cutting the corner portion located in the oscillating direction of the auxiliary panel 2. Therefore, a wide oscillation range of the auxiliary panel 2 with respect to the mini-protective wall 1 can be secured, and the clearance formed between the protective wall 200 and the loading port 10a near the loading port 10a is kept at the minimum, so that more comfortable work can be realized.

[0069] Also, in this embodiment, the lock mechanism 700 for regulating the running-out of the mini-protective wall 1 from the third protective wall 230 is provided between the third protective wall 230 and the mini-protective wall 1. Therefore, at the time of the movement as a vehicle, a phenomenon that the mini-protective wall 1 runs out from the third protective wall 230 and interferes with other protective walls etc. around the mini-protective wall 1 can be prevented.

[0070] In the present invention, the mini-protective wall 1 may be provided directly on the door body 210 without arranging the protective

walls 220 and 230 between the mini-protective wall 1 and the door body 210. As in this embodiment, however, at least one of the protective walls 220 and 230 is provided on the side surface of each of the door bodies 210 arranged at the right and left, and at least two mini-protective walls 1 are arranged in parallel in the height direction of the protective wall 230. In this case, especially even when the platform 160 is longer than the protective walls 220 and 230 pulled out from the door body 210, a side wind on the platform 160, dropping, etc. can be prevented.

[0071] Further, in this embodiment, if a driving source for an engine etc. and the driver's cabin are provided integrally with or separately from the vehicle body 2 to which the container 140 is installed, the mobility as a vehicle for high lift work is improved, so that the workability is improved.

[0072] The above description merely shows one embodiment of the present invention, and various changes and modifications can be made in the scope of the claims. For example, at least two mini-protective walls 1 have only to be arranged in parallel in the height direction of the protective wall, and the number of mini-protective walls is not limited to three. Also, the number of protective walls 220, 230 interposed between the mini-protective wall 1 and the door body 210 may be three or more. Also, the platform 160 is not limited to one that expands and contracts in the front and rear direction of vehicle, and the platform 160 that slides in the right and left direction of vehicle can be used. In addition, the elements, members, mechanisms, or the like employed in the embodiments can be replaced or combined in various ways between the embodiments according to the application.

Claims

1. A vehicle for high lift work comprising a container having two door bodies arranged at the right and left; a platform set from the opening of the container formed by opening the door bodies toward a target position; and a truck elevatably holding the container, characterized in that

at least two mini-panels, which are arranged in parallel in the height direction of the door body, are provided on the side surface of the door body, the mini-panel being stored in a lapped manner when the opening of the container is closed, and being pulled out from the door body toward the target position to form a protective wall on the platform when the opening of the container is opened.

2. The vehicle for high lift work according to claim 1, characterized in that an auxiliary panel held oscillatably to the mini-panel is provided on the side surface of the mini-panel.

3. The vehicle for high lift work according to claim 2, characterized in that the auxiliary panel has an oscillating portion of the auxiliary panel in the lower part of the auxiliary panel to enable oscillation due to the gravity; and a contact member is provided which brings the auxiliary panel into contact with the door body and oscillates against the gravity to store the auxiliary panel on the mini-panel when the mini-panel is stored on the door body, and separates the auxiliary panel from the door body and oscillates by means of the gravity when the mini-panel is pulled out from the door body.

4. The vehicle for high lift work according to claim 2 or 3, characterized in that the mini-panel is provided with a cut portion formed by cutting a corner portion located in the oscillating direction of the auxiliary panel.

5. The vehicle for high lift work according to any one of claims 1 to 4, characterized in that a lock mechanism for regulating the running-out of the mini-panel from the door body is provided between the door body and the mini-panel.

6. A vehicle for high lift work comprising a container having

two door bodies arranged at the right and left; a platform set from the opening of the container formed by opening the door bodies toward a target position; and a truck elevatably holding the container, characterized in that

the door body has at least one panel which is stored in a lapped manner when the opening of the container is closed, and is pulled out from the door body toward the target position to form a protective wall on the platform when the opening of the container is opened, and

at least two mini-panels are provided on a panel pulled out farthest from the door body, of the panels, the mini-panel being arranged in parallel in the height direction of the panel; being stored in a lapped manner when the opening of the container is closed; and being pulled out from the panel toward the target position to form a protective wall on the platform when the opening of the container is opened.

7. The vehicle for high lift work according to claim 6, characterized in that an auxiliary panel held oscillatably to the mini-panel is provided on the side surface of the mini-panel.

8. The vehicle for high lift work according to claim 7, characterized in that the auxiliary panel has an oscillating portion of the auxiliary panel in the lower part of the auxiliary panel to enable oscillation due to the gravity; a contact member is provided which brings the auxiliary panel into contact with the panel and oscillates against the gravity to store the auxiliary panel on the panel when the mini-panel is stored on the panel, and separates the auxiliary panel from the panel and oscillates by means of the gravity when the mini-panel is pulled out from the panel.

9. The vehicle for high lift work according to claim 7 or 8, characterized in that the mini-panel is provided with a cut portion formed by cutting a corner portion located in the oscillating direction of the auxiliary panel.

10. The vehicle for high lift work according to any one of claims 6 to 9, characterized in that a lock mechanism for regulating the running-out of the mini-panel from the panel is provided between the

door body and the mini-panel.

11. The vehicle for high lift work according to any one of claims 1 to 10, characterized in that the truck is provided with a driving source for an engine etc. and a driver's cabin.