VEHICLE FOR HIGH LIFT WORK

Technical Field

[0001] The present invention relates to a vehicle for high lift work provided with an elevating device for elevatably holding a cargo bed or a work bed with respect to a platform truck. More particularly, it relates to safety measures assuming the case where the cargo bed etc. lower due to an unexpected condition.

Background

[0002] An elevating device for a vehicle for high lift work includes a lower guide rail fixedly held on a platform truck, an upper guide rail fixedly held in a lower part of a cargo bed or a work bed, a first rod-shaped member one end of which is oscillatably held with respect to the platform truck and the other end of which is movably held by the upper guide rail, and a second rod-shaped member one end of which is oscillatably held with respect to the cargo bed or the work bed and the other end of which is movably held by the lower guide rail, and also has a crosslink mechanism in which the first rod-shaped member and the second rod-shaped member are crossed.

[0003] For such an elevating device, since a hydraulic actuator is used to elevate and position the cargo bed, the lowering of the cargo bed etc. in the case where any trouble occurs in the actuator is considered. Therefore, there has conventionally been provided safety measures consisting of a rack having a plurality of contact surfaces and a ratchet mechanism having a claw that intermittently engages with the contact surface of the rack (for example, refer to Patent Document 1).

[Patent Document 1] Unexamined Japanese Utility Model Publication No. 2-49280

[0004] However, the above-described elevating device requires a fixed arrangement space above the platform truck. Therefore, in the case where this device is used for a relatively small vehicle, it is sometimes necessary to change the layout of the entirety of vehicle.

Disclosure of the Invention

[0005] A problem to be solved by the present invention is to prevent the unexpected lowering of a cargo bed or a work bed without greatly changing the vehicle layout of a vehicle for high lift work.

[0006] The present invention provides a vehicle for high lift work provided with an elevating device for elevatably holding a cargo bed or a work bed with respect to a truck, characterized in that the elevating device includes a guide rail having a channel-shaped track on the side surface thereof, and a link mechanism which has a portion held movably in the track of the guide rail, and elevates the cargo bed or the work bed with respect to the truck according to the rail position of the portion; and an opening communicating with the interior of the track is formed in the side wall of the guide rail, and a stopper, which enters into the track from the outside through the opening to stop the movement of the portion for lowering the cargo bed or the work bed, is provided.

[0007] In the present invention, it is preferable that the stopper include a base which is held and fixed oscillatably to the side surface of the guide rail, and is allowed to enter into the track through the opening by oscillation directed to the side surface and is separated from the track via the opening by oscillation away from the side wall, driving means for generating oscillation of the base, and a contact portion with which the portion comes into contact. In this case, the contact portion may be integral with or separate from the base.

[0008] Further, in the present invention, it is preferable that an inclined surface which allows the portion to ride on in the movement of the portion for raising the cargo bed or the work bed be provided at the rear end of the base. Also, in the present invention, it is preferable that the contact portion be provided with a contact surface coinciding with the shape of the portion. In addition, in the present invention, it is preferable that the truck be provided with a driving source for an engine etc. and a driver's cabin.

[0009] According to the present invention, when the cargo bed or the work bed begins to lower despite the fact that the lowering of the cargo

bed etc. is not commanded, the movement of the portion of a link mechanism for lowering the cargo bed etc. can be stopped by the stopper that enters into the track from the outside through the opening communicating with the interior of the track, which is formed in the web of the guide rail. Moreover, since the stopper in accordance with the present invention is arranged on the web of the guide rail, there is no need for greatly changing the layout of vehicle to secure an arrangement space for the stopper by providing a stopper separately on the truck. In addition, the lowering height of the cargo bed etc. is decreased as compared with the case where the stopper is provided in the upper part or the lower part of the guide rail, so that a long rising stroke of the elevating device can be secured. According to the present invention, therefore, the lift truck in which measures for preventing the unexpected lowering of the cargo bed etc. are taken can be made compact.

[0010] Also, in the present invention, if the stopper includes the base which is held and fixed oscillatably on the outside surface of the web of the guide rail, the driving means for generating oscillation of the base, and the contact portion which is provided at the tip end of the base and with which the portion comes into contact, the entering and separating of the stopper can be realized by a simple construction, so that the manufacturing cost can be reduced. According to the present invention, therefore, the vehicle for high lift work in which measures for preventing the unexpected lowering of the cargo bed etc. are taken can be provided at a low cost.

[0011] Also, in the present invention, if the inclined surface that allows the portion to ride on in the movement of the portion for raising the cargo bed or the work bed is provided at the rear end of the base, even in the case where the stopper cannot be separated from the track of the guide rail due to any trouble, the portion of the link mechanism can get over the stopper. According to the present invention, therefore, even in the state in which stopper cannot be separated from the track of the guide rail due to any trouble, the cargo bed etc. can be raised surely.

[0012] Also, in the present invention, if the contact portion is provided with the contact surface coinciding with the shape of the portion, when the stopper comes into contact with the portion of the link mechanism, the contact thereof is a surface contact, not a line contact. Therefore, stress concentration occurring on the stopper and the portion of the link mechanism is relieved, so that the durability is improved.

[0013] 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, the mobility as a vehicle for high lift work is improved, so that the workability can be improved.

Brief Description of the Drawings

[0014]

[Figure 1] A side view of a lift truck in accordance with one embodiment of the present invention, which is used to load cargos, in-flight meal, etc. into an airplane.

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

[Figure 3] A plan view of an essential portion, showing Figure 2 from the direction D2.

[Figure 4] A plan view of an essential portion, showing Figure 2 from the direction D3.

[Figure 5] A partial sectional view of a hydraulic cylinder which is one example of an actuator, showing the embodiment shown in Figure 1.

[Figure 6] A plan view of an essential portion of a lift truck in accordance with another embodiment of the present invention, shown from the direction D1 referring to Figure 1.

[Figure 7] A plan view of an essential portion of still another embodiment in which two stoppers are provided on a guide rail, showing from above the guide rail.

[Figure 8] Figure 8(a) is a plan view of an essential portion of another mode of a stopper shown from above a guide rail, and Figures 8(b) and 8(c) are sectional views typically showing the cross-sectional shape of a stopper, the figures being shown by the Z-Z cross section in Figure 1.

Best Mode for Carrying Out the Invention

[0015] Figure 1 is a side view of a lift truck 1 in accordance with one embodiment of the present invention, which is used to load cargos, in-flight meal, etc. into an airplane. This figure shows a work state in which cargos etc. are loaded using this lift truck 1. Also, Figure 2 is a plan view of an essential portion, showing Figure 1 from the direction D1. Figures 3 and 4 are a plan view of an essential portion, showing Figure 2 from the direction D2, and a plan view of an essential portion, showing from the direction D3, respectively.

[0016] As shown in Figure 1, the lift truck 1 is a mobile vehicle for high lift work provided integrally with a driver's cabin 2a and a driving source for an engine etc., not shown, on a vehicle body (truck) 2, and is provided with an elevating mechanism 10 for elevatably holding a container (cargo bed) 3 with respect to the vehicle body 2.

[0017] The elevating device 10 is constructed so that a first guide rail 11 is fixed on the vehicle body 2 and a second guide rail 12 is fixed in a lower part of the container 3, and also a first guide rail 15 is fixed on the vehicle body 2 so as to be in parallel with the first guide rail 11 and a second guide rail 16 is fixed in a lower part of the container 3 so as to be in parallel with the second guide rail 12, and a crosslink mechanism in which a crosslink crossing two rod-shaped members 13 and 14 and a crosslink crossing two rod-shaped members 17 and 18 are arranged in parallel in the vehicle width direction is provided between the vehicle body 2 and the container 3.

[0018] Specifically, as shown in Figure 1, one end 14a, 18a of the second rod-shaped member 14, 18 is attached oscillatably to a lower part of the container 3 via a pin member P2. On the other hand, a shaft member 10a is set between the other ends 14b and 18b as shown in Figure 2. At both ends of the shaft member 10a, a flanged roller (portion) 10r is installed rotatably. Further, as shown in the cross sections X-X and Y-Y in Figure 2, the first guide rail 11, 15 has a channel-shaped cross section in which an upper wall 11U (15U) and a lower wall 11L (15L) are connected by a side wall (web) 11w (15w).

The groove S thereof forms a track S of a channel shape open to the inside surface of the guide rail 11, 15, and as shown in Figure 3, each roller R is movably held by the lower wall 11L 15L in the track S. On the other hand, like the second rod-shaped member 14, 18, one end 13a, 17a of the first rod-shaped member 13, 17 is also attached oscillatably to the vehicle body 2 via a pin member P1, and on the other hand, a beam member 10a is set between the other ends 13b and 17b as shown in Figure 2. At both ends of the shaft member 10a, a flanged roller 10r as shown in Figure 2 is installed rotatably. Further, like the cross sections X-X and Y-Y in Figure 2, the second guide rail 12, 16 also has a channel-shaped cross section in which an upper wall 12U (16U) and a lower wall 12L (16L) are connected by a side wall 12w (16w). The groove S thereof forms a track S of a channel shape open to the inside surface of the guide rail 12, 16, and as shown in Figure 3, each roller 10r is movably held by the upper wall 12U and the lower wall 12L and the upper wall 16U and the lower wall 16L in the track S. Thereby, the two crosslinks expand and contract synchronously according to the rail position of the roller 10r in the guide rail 11, 15 (12, 16).

[0019] Further, for the elevating device 10, a beam member (not shown) is set between the first rod members 13, 17, and this beam member is connected to the vehicle body 2 by an hydraulic actuator 19 as shown in Figure 1. The hydraulic actuator 19 is expanded or contracted by the worker's operation of a rise button or a lower button on a control panel 100, the control panel 100 being attached oscillatably to the beam member and the vehicle body by pin members P3 and P4, respectively, and being arranged on the vehicle body 2. Thereby, when the operator presses the rise button on the control panel 100 to raise the container 3, the hydraulic actuator 19 is expanded during the time when the pressing operation is continued. As a result, the first rod-shaped members 13, 17 and the second rod-shaped members 14, 18 are moved toward the driver's cabin 2a along the first guide rails 11, 15 and the second guide rails 12, 16 via the rollers 10r, by which the container 3

can be raised with respect to the vehicle body 2. Similarly, when the operator presses the lower button on the control panel 100 to lower the container 3, the hydraulic actuator 19 is contracted during the time when the pressing operation is continued. As a result, the first rod-shaped members 13, 17 and the second rod-shaped members 14, 18 are moved away from the driver's cabin 2a along the first guide rails 11, 15 and the second guide rails 12, 16 via the rollers 10r, by which the container 3 can be lowered with respect to the vehicle body 2.

[0020] In this embodiment, the measures described below are taken considering that the expanded actuator 19 is contracted by a trouble etc., by which the container 3 is lowered. The measures described below are taken on both of the first guide rails 11, 15. For convenience, however, explanation is given on the first guide rail 15 side only.

[0021] As shown in Figures 2 to 4, the web 15w of the first guide rail 15 is formed with an opening A communicating with the interior of the track S, and a stopper 20 is provided to stop the movement of the roller 10r for lowering the container 3 by entering into the track S from the outside through the opening A. As shown in Figure 4, the stopper 20 includes a cover member 21 held and fixed oscillatably to the side surface 15w of the guide rail 15 via a pin member P5, a base 22 which is formed integrally with the inside surface of the cover member 21, and is allowed to enter into the track S through the opening A by oscillation directed to the side surface 15w of the first guide rail 15 (refer to the solid line in Figure 2) and is separated from the track S via the opening A by oscillation away from the side wall 15w of the guide rail 15 (refer to the two-dot chain line in Figure 2), driving means 23 for generating oscillation of the base 21, and a contact portion 24 which is provided at the tip end of the base 22 and with which the roller 10r comes into contact. The contact portion 24 may be integral with or separate from the base 22.

[0022] The driving means 23 has a hydraulic actuator 23a that is expanded by the continuous pressing operation of the rise button and the lower button on the control panel 100, and both ends thereof are

connected oscillatably to the web 15w of the first guide rail 15 and the cover member 21 via pin members P6 and P7, respectively.

[0023] The actuator 23a is a hydraulic cylinder which has a spring Sp for generating an urging force to draw the cover member 21 toward the guide rail 15 and expands an arm 23a1 by means of internal filling of oil supplied from an oil supplying/discharging path 23a4. Figure 5 is a partial sectional view typically showing the hydraulic cylinder 23a. As shown in Figure 5, the hydraulic cylinder 23a movably holds the arm 23a1 by means of a housing 23a2. The arm 23a1 is provided with a piston 23a3 sliding in the housing 23a2. The piston 23a3 is pressed to the pin member p6 side by the urging force of two springs Sp arranged concentrically and doubly, so that the arm 23a1 is normally housed in the housing 23a2. On the other hand, the piston 23a3 forms a cylinder chamber R between the piston 23a3 and the housing 23a2 at a position opposite to the springs Sp. The cylinder chamber R is connected with the oil supplying/discharging path 23a4, so that oil can be supplied to and discharged from the cylinder chamber R. Thereby, during the time when the worker continues the pressing operation of the rise button or the lower button on the control panel 100, oil is supplied into the cylinder chamber R through the oil supplying/discharging path 23a4 to expand the arm 23a1 of the hydraulic cylinder 23a, and when the pressing force to the rise button or the lower button is released, the oil in the cylinder chamber R is drained through the oil supplying/discharging path 23a4 to contract the arm 23a1.

[0024] Therefore, in a state in which the worker does not press the rise button or the lower button on the control panel, the track S is blocked while the stopper 20 enters into the guide rail 11 (15). During the time when the worker continues to press the rise button, oil is supplied into the hydraulic cylinder 23a, so that the stopper 20 separates from the track S in the guide rail 11 (15) to raise the container 3 with respect to the vehicle body 2 without regulating the movement of the roller 10r. When the container 3 reaches the target height and the pressing force to the rise button is released, the container 3 is stopped,

and at the same time, the oil in the hydraulic cylinder 23a is drained, so that the stopper 20 enters again into the guide rail 11 (15) to block the track S. Thereby, the movement of the roller 10r can be regulated by the stopper 20 even when the second rod-shaped member 14 (18) is moved in the direction away from the driver's cabin 2a along the first guide rail 11 (15) via the roller 10r despite the fact that the elevating device 10 does not command the lowering of the container 3 (contraction of the actuator 19) by using a controller 100c.

[0025] Also, during the time when the worker continues to press the lower button to lower the container 3, the stopper 20 separates from the track S in the guide rail 11 (15) to lower the container 3 toward the vehicle body 2 without regulating the movement of the roller 10r. When the container 3 is seated on the vehicle body 2 and the pressing force to the lower button is released, the container 3 is stopped, and at the same time, the oil in the hydraulic cylinder 23b is drained, so that the stopper 20 again enters into the guide rail 11 (15) to block the track S.

[0026] According to this embodiment, when the container 3 begins to lower despite the fact that the lowering of the container 3 (contraction of the actuator 19) is not commanded by the operation of the control panel 100 performed by the worker, the movement of the roller 10r for lowering the container 3 can be stopped by the stopper 20 that enters into the track S from the outside through the opening A communicating with the interior of the track S, which is formed in the web 11w, 15w of the guide rail 11, 15. Moreover, since the stopper 20 is arranged on the web 11w, 15w of the guide rail 11, 15, there is no need for greatly changing the layout of vehicle to secure an arrangement space for the stopper by providing a stopper separately on the vehicle body 2. In addition, since the stopper 20 is arranged on the web 11w, 15w of the guide rail 11, 15, the lowering height of the container 3 is decreased as compared with the case where the stopper is provided on the upper wall 11U, 15U or the lower wall 11L, 15L, so that a long rising stroke of the elevating device 10 can be secured. According to this embodiment,

therefore, the lift truck in which measures for preventing the unexpected lowering of the container 3 are taken can be made compact.

[0027] In this embodiment, when the container 3 is raised or lowered by the operation of the control panel 100, first, oil is supplied into the hydraulic cylinder 23a to release the stopper 20, and in order to operate the elevator device 10 after the release of the stopper 20 has been checked by the existing position sensor provided separately, the actuator 19 is expanded or contracted. If the container 3 is raised or lowered by this procedure, biting between the stopper 20 and the roller 10r can be prevented. Also, the hydraulic cylinder 23a may have a construction in which the hydraulic cylinder 23a can be expanded and contracted only by the supply and discharge of oil from the oil supply/discharge path 23a4 without the provision of the spring Sp in the hydraulic cylinder 23a.

[0028] Also, in this embodiment, since the stopper 20 includes the base 22 which is held and fixed oscillatably on the outside surface of the web 11w (15w) of the first guide rail 11 (15), the driving means 23 for generating oscillation of the base 22, and the contact portion 24 which is provided at the tip end of the base 22 and with which the roller 10r comes into contact, the entering and separating of the stopper 20 can be realized by a simple construction, so that the manufacturing cost can be reduced. According to this embodiment, therefore, the lift truck in which measures for preventing the unexpected lowering of the container 3 are taken can be provided at a low cost.

[0029] Also, in this embodiment, the driving means 23 may be an electronically-operated actuator 23a that expands and contracts based on the command from the controller, and a position sensor 23c for detecting that the roller 10r is located at a predetermined rail position may be provided. The position sensor 23c is arranged at a position just before the position at which the roller 10r crosses the opening A when the roller 10r is moved on the guide rail in the direction away from the driver's cabin 2a, and is located at a position at which the roller 10r moved in the direction away from the driver's cabin 2a can be

stopped by the stopper 20 by means of the command given to the actuator 23a by the controller 100 to which the detection signal from the position sensor 23c is inputted. According to this configuration, despite the fact that the lowering of the container 3 (contraction of the actuator 19) is not commanded by the controller 100c, if a position signal is outputted from the position sensor 23a when the second rod-shaped member 14 (18) moves (crosses) along the first guide rail 11 (15) in the direction away from the driver's cabin 2a via the roller 10r, a command is given to expand the actuator 23b regardless of the pressing operation of the rise button or the lower button arranged on the control panel, so that the base 22 of the stopper 20 can be allowed to enter into the track S of the guide rail 11 (15) through the opening A.

[0030] Also, in this embodiment, as shown in Figure 3, an inclined surface 22f that allows the roller 10r to ride on in the movement of the roller 10r for raising the container 3 is provided at the rear end of the base 22. According to this configuration, even in the case where the stopper 20 cannot be separated from the track S of the first guide rail 11 (15) due to any trouble, the roller 10r of the crosslink mechanism can get over the stopper 20. According to this embodiment, therefore, even in the state in which stopper 20 cannot be separated from the track S of the first guide rail 11, 15 due to any trouble, the container 3 can be raised surely.

[0031] In the case where the inclined surface 22f is provided on the base 22, even if the container 3 is raised, the roller 10r gets over the base 22 or is pushed out of the track s of the guide rail 11, 15, so that the actuator 23a has only to be operated only when the container 3 is lowered. Further, in this case, as shown in Figure 3, the driving means 23 may have a spring member 23b generating an urging force for allowing the base 22 to enter into the track S. According to this configuration, the stopper 20 can be held surely in the track S of the guide rail 11, 15. Therefore, even if the roller 10r gets over the base 22 of the stopper 20 or is pushed out of the track s of the guide rail 11, 15, the stopper 20 can be returned to the track s of the guide rail 11, 15 quickly.

[0032] Further, in this embodiment, the contact portion 24 is provided with an arc-shaped contact surface 24f coinciding with the shape of the roller 10r. According to this configuration, when the stopper 20 comes into contact with the roller 10r, the contact thereof is a surface contact, not a line contact. Therefore, stress concentration occurring on the stopper 20 and the roller 10r is relieved, so that the durability is improved. The shape of the contact surface 24f can be changed according to the shape of the roller 10r (portion).

[0033] Also, as a modification of this embodiment, a plurality of stoppers 20 may be arranged along the guide rail to prevent the unexpected lowering of container 3 even in the case where the container 3 is positioned at various heights.

[0034] Further, in this embodiment, the driving source (not shown) for an engine etc. and the driver's cabin 2a are provided integrally with or separately from the vehicle body 2. According to this configuration, the mobility as a lift truck is improved, so that the workability can be improved.

[0035] Also, Figure 6 is a plan view of an essential portion showing Figure 1 from the direction D1, showing another embodiment of the present invention. In this embodiment as well, the beam member 10a is set between the first rod-shaped members 14 and 18. However, the roller 10r is directly provided at the other end 14b (18b) of the first rod-shaped member 14 (18). In this embodiment, the same reference characters are applied to elements that are the same as those shown in Figures 1 to 5.

[0036] Figure 7 is a plan view of an essential portion of still another embodiment in which two stoppers 20 are provided on the guide rail 11, 15, showing from above the guide rail. In this embodiment, the same reference characters are applied to elements that are the same as those shown in Figures 1 to 6.

[0037] In this embodiment, an interlock member 23d is installed oscillatably at the tip end of the arm 23a1 of the actuator 23a via a pin member P8, and the other end of a connecting member 23e attached

oscillatably to the cover member 21 of the stopper 20 via a pin member P9 is connected oscillatably to the interlock member 23d via a pin member P10. According to this configuration, the stoppers 20 are separated synchronously from the interior of the track s of the guide rail 11, 15 by the expansion of the actuator 23a, and on the other hand, the stoppers 20 can be returned synchronously into the track s of the guide rail 11, 15 by the contraction of the actuator 23a. In this embodiment, explanation has been given on the configuration in which two stoppers 20 are interlocked with each other. However, the same configuration can be employed even in the case where three or more stoppers 20 are interlocked with each other.

[0038] Figure 8(a) is a plan view of an essential portion of another mode of the stopper shown from above the guide rail. In this figure, the same reference characters are applied to elements that are the same as those shown in Figures 1 to 7.

[0039] In this mode, there is used a stopper 30 which can be allowed to enter into the track s of the guide rail 11, 15 or can be separated from the interior of the track s by the expansion and contraction of the actuator 23a through the opening A formed in the web 11w, 15w of the guide rail 11, 15.

[0040] In this configuration as well, when the container 3 begins to lower despite the fact that the lowering of the container 3 is not commanded, the movement of the roller 10r for lowering the container 3 can be stopped by the stopper 30 entering into the track s from the outside through the opening A formed in the web 11w, 15w of the guide rail 11, 15. Moreover, since the stopper 30 is also arranged on the web 11w, 15w of the guide rail 11, 15, there is no need for greatly changing the layout of vehicle to secure an arrangement space for the stopper by providing a stopper separately on the vehicle body 2. In addition, the lowering height of the container 3 is decreased as compared with the case where the stopper 30 is provided on the upper wall 11U, 15U or the lower wall 11L, 15L of the guide rail 11,15, so that a long rising stroke of the elevating device 10 can be secured. According to this

embodiment as well, therefore, the lift truck in which measures for preventing the unexpected lowering of the container 3 are taken can be made compact.

[0041] Figures 8(b) and 8(c) are sectional views typically showing the cross-sectional shape of the stopper 30, the figures being shown by the Z-Z cross section in Figure 1.

[0042] The cross-sectional shape of the stopper 30 can be made, for example, circular as shown in Figure 8(b), and an arc-shaped contact surface 30f1 coinciding with the shape of the roller 10r is provided in the contact portion contacting with the roller 10r. According to this configuration, when the stopper 30 comes into contact with the roller 10r, the contact thereof is a surface contact, not a line contact. Therefore, stress concentration occurring on the stopper 30 and the roller 10r is relieved, so that the durability is improved. In this case, as in the case of the above-described embodiments, it is preferable that the stopper 30 be normally positioned in the track S. For example, in the case where the hydraulic cylinder is used as shown in Figure 5, the spring Sp generates an urging force in the direction such that the arm 23a1 is pushed out of the housing 23a2, and the supply/discharge timing of oil is made opposite to the supply/discharge timing explained with reference to Figure 4. Also, in the case where the cross-sectional shape of the stopper 30 is circular as shown in Figure 8(a), it is preferable that a key member 31 be arranged in the stopper 30, and the key member 31 be fitted in a key groove in a fixing portion 32 fixed to the vehicle body 2 etc. to prevent the stopper 30 from rotating around the axis. The rotation preventive means for the stopper 30 is not limited to the key member only, and may be a fit consisting of a protrusion and a groove formed on the surface of the stopper 30 and the fixing portion 32, or the like fit.

[0043] Similarly, the cross-sectional shape of the stopper 30 may be made rectangular as shown in Figure 8(c). In this case as well, it is preferable that an arc-shaped contact surface 30f2 coinciding with the shape of the roller 10r be provided in the contact portion contacting

with the roller 10r to relieve stress concentration. In this case as well, the shape of the contact surface 30f1, 30f2 can be changed according to the shape of the roller 10r (portion).

[0044] The above description typically shows only one mode of the present invention, and various changes and modifications can be made. For example, the stopper 20, 30 has only to be provided in at least either one of the first guide rails 11 and 15. However, as in the case of the above-described embodiments, the stopper 20, 30 is preferably provided both of the rails 11 and 15 to distribute a force that the stopper 20, 30 receives. Further, the stopper 20, 30 is not necessarily operated by the expansion and contraction of the actuator 23a, but can be operated manually. Further, the stopper 20, 30 can be provided in at least one of the second guide rails 12 and 16 in addition to the first guide rail 11, 15 or in place of the first guide rail 11, 15.

[0045] Also, the portion for performing the elevating operation of the elevating device 10 is not limited to the roller 10r, and may be a friction member held and fixed to a rod-shaped member. Further, the application of the elevating device 10 is not limited to a cargo bed such as the container 3, and the elevating device 10 can be used for a work bed on which a person rides and performs repair work etc. Further, a mast mechanism for a forklift can be used. Further, the elevating device 10 is not limited to a crosslink type. Various types of elevating devices can be adopted if the elevating device has a link mechanism which has a portion movably held in a track of a guide rail and elevates the container 3 etc. with respect to the vehicle body 2 according to the rail position of the portion. 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 provided with an elevating device for elevatably holding a cargo bed or a work bed with respect to a truck, characterized in that

the elevating device includes a guide rail having a channel-shaped track on the side surface thereof, and a link mechanism which has a portion held movably in the track of the guide rail, and elevates the cargo bed or the work bed with respect to the truck according to the rail position of the portion; and

an opening communicating with the interior of the track is formed in the side wall of the guide rail, and a stopper, which enters into the track from the outside through the opening to stop the movement of the portion for lowering the cargo bed or the work bed, is provided.

2. The vehicle for high lift work according to claim 1, characterized in that the stopper includes a base which is held and fixed oscillatably to the side surface of the guide rail, and is allowed to enter into the track through the opening by oscillation directed to the side surface and is separated from the track via the opening by oscillation away from the side wall, driving means for generating oscillation of the base, and a contact portion with which the portion comes into contact.

3. The vehicle for high lift work according to claim 2, characterized in that an inclined surface which allows the portion to ride on in the movement of the portion for raising the cargo bed or the work bed is provided at the rear end of the base.

4. The vehicle for high lift work according to any one of claims 1 to 3, characterized in that the contact portion is provided with a contact surface coinciding with the shape of the portion.

5. The vehicle for high lift work according to any one of claims 1 to 6, characterized in that the truck is provided with a driving source for an engine etc. and a driver’s cabin.