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(54) **LIFTING SYSTEM**

HUBSYSTEM

SYSTÈME DE LEVAGE

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Description

[0001] The present invention relates to a lifting system provided with a loading platform and destined for use with work machines, such as telescopic lifting machines ("telescopic handlers" or "telehandlers"), aerial platforms or other like machines.

[0002] Loading platforms are known which comprise a bottom plane, able to support the operators and tools, about which side walls are arranged which have the function of preventing accidental falls of the operators or the tools arranged on the bottom plane.

[0003] The platforms are able to be connected to a telescopic lifting arm, with which the work machines are provided, by means of attachment devices.

[0004] The known platforms work very effectively when used for work activities at height which require manual intervention by the operators, possibly with the use of portable tools which, as mentioned, can be easily loaded on the platform.

[0005] However, there are some types of work activities which cannot be carried out using known loading platforms and are therefore performed inefficiently and sometimes in a dangerous way.

[0006] Take, for example, the case of removing asbestos claddings present on the roofs of buildings, by removing the slabs forming the cladding.

[0007] At present, with the purpose of removing the asbestos slabs or another material of a similar kind and/or danger, it is necessary for one or more operators to walk on the roofs in order to work, secured to a safety harness anchored to the roof.

[0008] In fact, if a known platform were to be used for the removal of the slabs, the slabs would have to be loaded onto the bottom plane of the platform, by passing them above the side walls, which would not be practicable and would implicate excessive risks for the operators.

[0009] Another reason for which it is not possible to use known platforms for this type of operation is constituted by the fact that the operators designated for the removal of the slabs normally use protective suits, in which a higher-than-atmospheric pressure is created, with the aim of preventing direct contact with asbestos fibres dispersed in the air.

[0010] As these pressurised suits are voluminous, the operators would suffer from a limited ability to comfortably and effectively manage the lifting and lowering of the platform using the commands provided on-board the platform itself, which commands control the movements of the telescopic arm; clearly, a limited manoeuvring ability would not comply with the safety criteria existing related to the use of this type of tools.

[0011] Therefore, at present, the operators moving on roofs of buildings remove the slabs of the cladding and position them resting on a pallet lifted by a crane or by the forks of a telehandler, which pallet is periodically lowered to the ground surface for the transfer of the removed slabs towards the bed of a truck or the like.

[0012] This solution can be extremely dangerous because if the load of asbestos slabs is not perfectly secured to the pallet, it might slip during the movement and crash down to the ground, with the consequence that the asbestos dust would be dispersed into the atmosphere.

[0013] US5992562 discloses a scissor lift control system including a around control station, located on the base portion of the work platform, and a platform control station. A keyed selector switch is provided at the around control station in order to provide power to either the platform control station or the around control station.

[0014] WO2012001353 discloses a safety device for an aerial lift having operating controls for manoeuvring its basket to a desired location. In detail, this invention includes a passive switch normally closed that allow a flow of electricity which can be cut in order to prevent further movement of the basket.

[0015] EP1026120 describes an aerial platform apparatus having a ground control station and a platform control station. In order to use the platform control station, the operator is required to turn on a key switch, to pull out an emergency stop switch and to depress a foot switch interlock.

[0016] US2011305552 discloses a work platform that can be engaged by a front-end loader bucket.

[0017] The technical task underpinning the present invention is therefore to provide a lifting system which obviates the drawbacks of the prior art.

[0018] This technical task is attained by the lifting system realised according to claim 1.

[0019] Further characteristics and advantages of the present invention will become more apparent from the following indicative, and hence nonlimiting, description of preferred, but not exclusive, embodiments of the system of the invention, as illustrated in the accompanying drawings, in which:

- figures 1 and 2 are axonometric views of the loading platform of the invention, in a first working configuration;
- figures 3 and 4 are two enlarged views of detail K of figure 2, in two different use steps of the platform;
- figure 5 is a side view of a telehandler which bears the platform of figures 1 and 2, in a second working configuration; and
- figures 6 and 7 are axonometric views of the platform, in the second working configuration, in which the operators are using two different functions of the system of the invention.

[0020] With reference to the above-mentioned figures, reference numeral 1 denotes a loading platform for a telehandler 2, an aerial platform or like work machines.

[0021] The platform 1 of the invention is especially destined to be connected to a lifting arm 21 with which the work machine 2 is provided.

[0022] In the following, for ease of illustration and without departing from the general description, reference will

be made to the particular case in which the work machine is a telehandler 2 (see figure 5).

[0023] The platform 1 primarily comprises a bottom plane 10 able to support operators 31, 32 and/or work tools.

[0024] The plane 10 is associated to side walls 11, 12, 13, 14 having the aim of preventing accidental falls of the operators or the load.

[0025] In particular, the plane 10 is preferably quadrangular (for example rectangular) and, therefore, the side walls 11, 12, 13, 14 are located at the perimeter of the plane 10, from which they project to define a sort of open-topped cage.

[0026] The lifting arm 21 is mobile and preferably telescopic; in detail, the arm 21 comprises a plurality of segments, inserted with the possibility of sliding into one another, of which a proximal segment of the arm hinged to the frame of the machine 2 or a rotary turret thereof, and a distal segment which mounts the attachment device 22 for removably attaching the platform 1.

[0027] The platform 1 is provided with a hooking device 15 designed for anchoring to the attachment device 22 of the arm 21, in known ways. Note that the platform 1 can be rotatable with respect to an axis that passes through the hooking device 15; in particular, such a device 15 can include a hinge on which a movement device acts, preferably of a hydraulic type.

[0028] In general, the movements of the arm 21 and the rotation of the platform are preferably performed using hydraulic devices, such as for example hydraulic cylinders, on activation of one or more hydraulic distributors (preferably electro-hydraulic) or other types of activating apparatus, not illustrated as they can be of known type.

[0029] It is possible for the movement devices to be of electromechanical and not hydraulic type.

[0030] The invention includes a first command apparatus 41 arranged on-board the platform 1 and directly activatable by an operator 31, 32 working on the platform 1.

[0031] The first apparatus 41 is able to command the hydraulic distributors (or other activating apparatus), so that they move the arm 21 (and possibly the turret and the rotation joint of the platform 1, if present) in accordance with the commands selected by the operator who is on-board the platform 1.

[0032] The first command apparatus 41 can be fixed or removably applicable to a special seating of the platform 1, provided with connectors and connectable to the control unit of the telehandler 2 by means of a transmission system for transmitting the signals that can be cabled or wireless, for example of the radio frequency type.

[0033] Said seating can be located on the internal side of the most internal side wall 12 of the platform 1, i.e. the side wall connected to the above-mentioned hooking device 15, on the external side.

[0034] The platform 1 can be provided with a control unit of its own to which the first command apparatus 41 is connected; as will be more fully clarified in the following,

the invention is configured as a lifting system that includes a processing unit which comprises the control unit of the telehandler 2 and possibly the control unit of the platform 1, if present.

5 **[0035]** The first command apparatus 41 is connected to the hydraulic distributors via the control unit of the telehandler 2 and in general via the above-mentioned processing unit, the distributors being hydroelectric devices that can be driven using control signals; basically,
10 it is also possible to have an embodiment of the invention in which the first apparatus 41 is directly connected via cable or via radio to the distributors.

[0036] The first command apparatus 41 comprises an interface, consisting for example of a joystick, buttons,
15 display (including a touchscreen), levers and the like, the activation of which enables the operator 31, 32 to select the commands for movement of the arm 21.

[0037] In more general terms, the interface of the first command apparatus 41 is configured to enable to set or
20 select at least one first position parameter, representative of the movement of the arm 21 both relative to the inclination with respect to the machine frame 2 and relative to the extension and shortening of the arm 21 and, possibly, relative to the rotation of the turret, if present.

25 **[0038]** The first apparatus 41 is adapted to generate first command signals, according to the selections made on the relative interface, and the processing unit is adapted to receive the first command signals and is configured to generate and transmit driving signals to the distributors, according to the command signals received.

30 **[0039]** The platform 1 of the invention has been designed to switch from a first to a second working configuration and vice versa.

35 **[0040]** In detail, the first working configuration (illustrated in figures 1 and 2) can be a normal use configuration while the second configuration (illustrated in figures 5, 6 and 7) can be employed for special uses, such as for example the removal of asbestos slabs from roof claddings or similar uses.

40 **[0041]** In the preferred embodiment, shown in the accompanying figures, at least one 11 of the side walls 11, 12, 13, 14 which border the bottom plane 10 can be mobile between an upright position, defining a first configuration of normal use of the platform 1, and a lowered position, defining a second special use configuration of the platform 1.

45 **[0042]** For the sake of precision, in the lowered position of the mobile side wall 11, the platform 1 is in an open configuration which enables the introduction or resting of the material, while in the upright position the platform 1 is closed on all sides.

50 **[0043]** The mobile side wall 11 is preferably tiltable, i.e. it can rotate between the upright position in which it is substantially perpendicular to the bottom plane 10, like the other side walls 12, 13, 14, to a lowered position in which it defines a prolongation of the bottom plane 10, and is therefore parallel and/or consecutive to the bottom plane (see figures 6 and 7). Preferably, the mobile side

wall 11 is the most external or "frontal" side wall, i.e. the one opposite the rear side wall 12 which bears the hooking device 15.

[0044] In detail, the tiltable side wall 11 is hinged to the bottom 10 at the lower side thereof; auxiliary means to aid the movement of the side wall 11 can be included between the two different positions, which connect the mobile side wall 11 and the bottom 10 of the platform 1, such as for example gas springs, hydraulic cylinders, etc.

[0045] In order to be used together with the bottom 10 as a support for the load, the mobile side wall 11 is provided with a continuous plane, substantially identical to the bottom plane of the platform 1, for example constituted by a slab 110 at least partly made of metal, for example aluminium.

[0046] In still greater detail, the side walls 11, 12, 13, 14 can be of a reticular type (or trellis), with the lattice of the mobile side wall 11 fixedly bearing the above-mentioned continuous plane.

[0047] Further, at the longitudinal ends thereof, the mobile side wall 11 can be provided with two low walls 111, 112 or parapets, to define, in the special use configuration, prolongations of the two fixed side walls 13, 14 arranged between the mobile side wall 11 and the rear side wall 12.

[0048] The two low walls 111, 112 can be hinged to the mobile side wall 11 and be manually fixable in a position in which they are perpendicular to the mobile side wall 11.

[0049] The invention preferably includes a detecting device 51, 52 adapted to check whether the platform 1 is in the first or second working configuration.

[0050] In detail, the detecting device 51, 52 is adapted to check whether said mobile side wall 11 is in the upright position or whether it is in the lowered position.

[0051] In the preferred embodiment, the platform 1 comprises, solidly constrained to the mobile side wall 11, an elongate profiled member 51, for example an elongate curved plate, while the bottom of the platform 1 includes a sensor 52 for detecting the displacement of the profiled member, for example a switch (see figures 3 and 4).

[0052] The curved plate 51 is fixed to the external side of the mobile side wall 11 while the sensor 52 is located below the bottom 10.

[0053] When the mobile side wall 11 moves into the lowered position, the switch 52 is activated and produces a signal representing the fact that the platform 1 is in the open configuration.

[0054] Other embodiments are possible in which the detecting device includes a proximity sensor or in which the microswitch 52 is activated by a mechanism, linkage or mechanical member that is different to the above-mentioned plate 51.

[0055] The system of the invention comprises a second command apparatus, separate from the platform 1 and adapted to enable an operator to select commands, and able to command the above-mentioned activating apparatus according to commands selected by the operator.

[0056] In particular, the second apparatus can be the one located internally of the guide cabin 23 of the work machine 2 and can be like those already used in this type of vehicles and, for this reason, it is not illustrated in the appended figures.

[0057] Alternatively or additionally, the second apparatus can be located externally of the vehicle; for example, the second apparatus can be provided with a radio remote control activatable by an operator from outside the cabin 23 of the machine 2.

[0058] In general, the second command apparatus, like the above-described first apparatus, also comprises an interface, which can include a joystick, buttons, display (including a touchscreen), levers and the like, the activation of which enables the operator to select the commands for movement of the arm 21.

[0059] In the case of using a radio remote control, the control is provided with the interface as described in the foregoing paragraph.

[0060] The interface of the second command apparatus is configured to enable to set or select at least one second position parameter, representative of the movement of the arm 21 both relative to the inclination with respect to the machine frame 2 and relative to the extension and shortening of the arm 21 and, possibly, relative to the rotation of the turret, if present.

[0061] The second apparatus is adapted to generate second command signals, according to the selections made on the relative interface, and the above-mentioned processing unit is adapted to receive the second command signals and is configured to generate and transmit driving signals to the distributors, according to the second command signals received.

[0062] In practice, both the operators 31, 32 on-board the platform 1 and the operator in the cabin 23, who is also the driver of the vehicle 2, have available command means of the telescopic arm 21 and possibly of the turret and the rotation joint of the platform 1.

[0063] Please note that the invention advantageously enables switching the command of the command apparatus 41 of the platform 1 to the operator in the cabin 23 and vice versa, according to the various working conditions and the different uses of the platform 1, with the aim of always maintaining the highest degree of safety and effectiveness of use.

[0064] The system of the invention includes at least an enabling device 42, 43 provided with an interface selectable by an operator 31, 32 located on-board the platform 1.

[0065] The invention, as shown in the appended figures, preferably includes two enabling devices 42, 43 and, in general, might include a number of enabling devices 42, 43 matching the number of operators 31, 32 that are to work on-board the platform 1.

[0066] The two enabling devices 42, 43 are separated from one another by a distance such as to prevent a same operator 31, 32 from selecting both interfaces of the devices 42, 43; in this way, it is guaranteed that the two operators 31, 32 required for working on-board the plat-

form 1 both act voluntarily on the interface, with the aim of determining which one has command of the arm 21.

[0067] In the example illustrated, the two devices 41, 42 are located at two internal corners of the platform 1, in particular the corners defined at the lateral ends of the side wall 12 opposite the mobile side wall; however, this is not a mandatory solution.

[0068] The interface of the two enabling devices 42, 43 can also comprise common command elements such as buttons, displays, touchscreens, levers, etc...; in the example illustrated in the appended tables of drawings, each enabling device 42, 43 is provided with two buttons 421, 422, 431, 432, the use of which in the invention will be explained in detail in the following.

[0069] As mentioned in the foregoing, the invention includes a processing unit, connected to the first 41 and second command apparatus and to the enabling device(s) 42, 43, as well as to the detecting device 51, 52.

[0070] In general, it is to be noted that, in the present description, the processing unit is presented divided into distinct functional modules for the sole purpose of describing the functions thereof in a clear and complete manner.

[0071] In practice, the processing unit can be constituted by a single electronic device, including of the type commonly present on this type of machine and platforms, such as the two above-mentioned control units, suitably programmed for carrying out the functions described.

[0072] The different modules can be hardware items and/or software routines that are part of the programmed device.

[0073] These functions may be performed by a plurality of electronic devices over which the aforesaid functional modules can be distributed.

[0074] In general, the processing unit can use one or more microprocessors or microcontrollers for running the instructions contained in memory modules and the aforesaid functional modules may, also, be distributed over a plurality of local or remote computers based on the architecture of the network in which they reside.

[0075] The processing unit is configured for enabling or disabling the command of the activating apparatus by the first 41 or the second command apparatus, according to the selections made on said interface of the enabling device(s) 42, 43.

[0076] Selections of the interface also refers to the choice not to act on the interface; in detail, if the enabling devices 42, 43 are provided with buttons 421, 422, 431, 432 and they are not pressed, then a normal operating condition is selected.

[0077] For the sake of precision, the processing unit comprises an enabling module configured for enabling control of the hydraulic distributors activating the arm 21 alternatively by the command apparatus 41 on-board the platform 1 or by the command apparatus in the cabin, according to what has been selected or not selected on the enabling devices 42, 43. Before specifying further characteristics of the invention and its functioning, it is

specified that an aim of the system of the invention is to allow that, during the use of the platform 1 for special activities such as removal of a cladding (for example an asbestos cladding), command of the movement of the arm 21, and therefore the displacing of the platform 1, is entrusted to the operator in the cabin and not the operators 31, 32 on the platform 1.

[0078] In fact, note that during normal use of the platforms, the arm is commanded by the apparatus located on-board the platform, as the operators on the platform have direct vision of the environment surrounding the platform itself, for example the roof of a building, which the operator in the cabin does not have.

[0079] However, as explained during the description of the prior art, for the purposes of removal of asbestos slabs, the operators on the platform often wear a voluminous and uncomfortable pressurised suit which limits their movements and therefore also their ability to safely command the arm. With this aim in mind, the invention can also include the possibility of an exceptional operating condition in which the command of the arm 21 can be taken over by the operators 31, 32 on-board the platform 1, as is more fully explained in the following.

[0080] Returning to the description of the system of the invention, the processing unit and in particular the enabling module thereof, the module is configured either to enable or disable the command of the activating apparatus by the first 41 or the second command apparatus, also according to the checks carried out by the detecting device 51, 52, i.e. depending on whether the platform 1 is in the normal configuration or in the special use configuration.

[0081] In practice, the processing unit receives the above-described first or second command signals, the configuration signals from the switch 52 (or other device suitable for the purpose) and enabling signals from the enabling devices 42, 43 and, according to these, processes driving signals which are transmitted to the distributor(s) which activate the cylinders of the arm 21.

[0082] As explained above, in the preferred embodiment of the invention, each enabling device 42, 43 includes buttons 421, 422, 431, 432, preferably two in number.

[0083] Pressing on a first button 421, 431 selects a first enabling condition while pressing on the second button 422, 432 selects a second enabling condition, alternative to the first; in practice, on the basis of the pressure exerted on the buttons of the enabling devices 42, 43 the command of the arm 21 can be established or switched by the command apparatus 41 of the platform 1 or by the command apparatus separate from the platform 1 and located in the cabin 23.

[0084] Preferably, the invention envisages that the processing unit enables control of the arm 21 by the apparatus in the cabin, disabling the apparatus on the platform 1, if both the platform 31, 32 operators have contemporaneously pressed or continue to press the first button 421, 431 of the relative enabling device 42, 43.

[0085] In general terms, the interface of the enabling device 42, 43, however realised, is adapted to enable an operator 31, 32 to select at least a first enabling condition; when said first enabling condition is selected, the enabling module of the processing unit enables the second command apparatus (separate from the platform 1) to command the activating apparatus (constituted by one or more distributors) and at the same time disables the first command apparatus 41.

[0086] If two enabling devices 42, 43 are present, the enabling module is configured to enable the second command apparatus to command the activating apparatus and to disable the first command apparatus 41, once said first enabling condition is selected in both the enabling devices 42, 43 located on-board the platform 1.

[0087] Note that the enabling module is preferably configured for enabling the first command apparatus 41 to command the activating apparatus, only if the detecting device 51, 52 has checked that the platform 1 is in the second working configuration, i.e. the one for special use of the platform. When the second enabling condition is selected, the enabling module enables the first command apparatus 41 to command the activating apparatus while disabling the second command apparatus.

[0088] The functioning of the invention is explained in the following.

[0089] When in the normal use configuration, illustrated in figures 1 and 2, with the mobile side wall 11 upright, the platform 1 of the invention can be used like any other platform.

[0090] For the sake of precision, the command of the arm 21 is exclusively entrusted to the operators 31, 32 on-board the platform 1 who use the joystick and the buttons or other interface means of the above-mentioned first command apparatus 41.

[0091] If the platform 1 is to be employed for special uses, such as the removal of asbestos roof claddings, before use the platform 1 must be opened, i.e. the mobile side wall 11 must be tilted, creating a lengthened bottom plane 10, 110 at the base of the platform 1.

[0092] As can be seen in figures 3 and 4, the opening of the mobile side wall 11 activates the switch 52 which transmits the above-mentioned configuration signal to the processing unit, which thus receives the information that the platform 1 is in the working configuration for special uses.

[0093] At this point, the operators 31, 32, represented in a stylised way in the figures, board the platform 1 and move to a respective enabling device 42, 43, in order for both of them to press the above-mentioned first button 421, 431, which selects the first enabling condition.

[0094] At this point, the processing unit disables the use of the first command apparatus 41, authorising only the second command apparatus located in the cabin only to move the lifting arm 21 on activation of the distributor or the hydraulic distributors.

[0095] When the platform 1 has reached the working location, for example on a roof, the two operators 31, 32

can remove the claddings and bring them on-board the platform 1.

[0096] Note that the platform 1 of the invention further comprises two hooking rods 61, 62, preferably curved in a hook shape, to which it is possible to anchor retaining cables (not illustrated for the sake of clarity in the figures) connected to the suits or to a harness worn by the operator 31, 32 working on the platform 1.

[0097] The rods 61, 62 are preferably located at the opposite corners flanking the fixed side wall 12 opposite the mobile side wall 11; the rods 61, 62 prolong the side walls 11, 12, 13, 14 from above and can be removably coupled to attachment members mounted on the side walls and maintained in position by special holes and split pins or like releasable joining means.

[0098] It can also be envisaged that the rods 61, 62 can be blocked in various angular positions to facilitate use thereof.

[0099] Once a load of asbestos slabs has been accumulated on the platform 1, the operators 31, 32 newly approach the enabling devices 42, 43 and both press the first button 421, 431 to enable the operator in the cabin to return the platform 1 to the ground surface, together with the material to be unloaded.

[0100] In a case in which the operators 31, 32 are at height and for some reason the cabin operator is not able to activate the arm 21, for example because he has left the cabin, it is possible for the platform 1 to be lowered and the two operators 31, 32 to the ground surface in the following way.

[0101] One of the platform 1 operators 32 goes to one of the enabling devices 42, 43 and presses the second button 432, 422.

[0102] The processing unit then authorises the first command apparatus 41 to control the movement of the arms 21, enabling the second operator 31 to manoeuvre the platform 1 to bring it and its occupant operators 31, 32 to the ground surface.

[0103] It can be envisaged that the processing unit interrupts the disabling of the use of the first command apparatus 41 as long as the second button 432, 422 continues to be pressed.

[0104] In this way, there is the certainty that the operator 31 positioned at the commands can move the platform 1 only if the other operator 32 is safe and is not on the edge of the loading plane 10, 110 defined by the free end of the mobile side wall 11.

Claims

1. A lifting system for work machines (2), comprising:

- a loading platform (1) able to support operators (31, 32) and/or tools;
- a mobile lifting arm (21) on which said platform (1) is mounted;
- at least an activating apparatus for moving said

- arm (21);
 at least a first command apparatus (41), arranged on-board the platform (1) and adapted to enable an operator (31, 32) to select commands, the first apparatus (41) being able to command said activating apparatus according to commands selected by said operator (31, 32);
 at least a second command apparatus, separate from the platform (1) and adapted to enable an operator to select commands, and able to command said activating apparatus according to commands selected by said operator;
 at least an enabling device (42, 43) provided with an interface (421, 422, 431, 432) selectable by an operator (31, 32); and
 a processing unit configured for enabling or disabling the command of the activating apparatus by the first (41) or the second command apparatus, according to the selections made on said interface of the enabling device (42, 43); **characterized in that**
 said enabling device (42, 43) is located on-board said platform (1);
 the interface of the enabling device (42, 43) being adapted to enable an operator (31, 32) to select at least a first enabling condition, the processing unit comprising an enabling module configured for enabling the second command apparatus to command the activating apparatus and for disabling the first command apparatus (41) when said first enabling condition is selected.
2. The system according to the preceding claim, comprising at least two enabling devices (42, 43).
 3. The system according to at least one of the preceding claims, wherein the platform (1) is adapted to pass from a first to a second working configuration and vice versa.
 4. The system according to the preceding claim, wherein the platform (1) comprises a bottom plane (10) and a plurality of side walls (11, 12, 13, 14), of which at least one side wall (11) is mobile between an upright position, defining a first configuration of normal use of the platform (1) and a lowered position, defining a second special use configuration of the platform (1).
 5. The system according to the preceding claim, wherein, in the lowered position thereof, the mobile side wall (11) defines a prolongation of said bottom plane (10).
 6. The system according to at least one of claims from 3 to 5, comprising at least a detecting device (51, 52) adapted to check whether the platform (1) is located in the first or the second working configuration, said processing unit being configured for enabling and disabling the command of the activating apparatus by the first (41) or the second command apparatus, also according to the checks carried out by said detecting device (51, 52).
 7. The system according to at least one of claims from 4 to 6, wherein the detecting device (51, 52) is adapted to check whether said mobile side wall (11) is in the upright position or to check whether the mobile side wall (11) is in the lowered position, or both.
 8. The system according to claim 2, wherein the enabling module is configured for enabling the second command apparatus to command the activating apparatus and for disabling the first command apparatus (41), once said first enabling condition is selected in both the enabling devices (42, 43).
 9. The system according to at least one of claims from 2 to 8, wherein the two enabling devices (42, 43) are separated from one another by a distance such as to prevent a same operator (31, 32) from selecting both interfaces of the devices (42, 43).
 10. The system according to at least one of the preceding claims, wherein the interface of the enabling device (42, 43) is adapted to enable an operator (31, 32) to select a second enabling condition, the processing unit comprising an enabling module configured for enabling the first command apparatus (41) to command the activating apparatus and for disabling the second command apparatus when said second enabling condition is selected.
 11. The system according to at least one of claims from 6 to 10, wherein the enabling module is configured for enabling the first command apparatus (41) to command the activating apparatus, following checking by the detecting device (51, 52) that the platform (1) is in the second working configuration.
 12. The system according to at least one of the preceding claims, wherein the second command apparatus is provided with a radio remote control.
 13. A work machine (2) comprising a system according to at least one of the preceding claims and comprising a cabin (23) in which the second command apparatus is located.

Patentansprüche

1. Hubsystem für Arbeitsmaschinen (2), umfassend:
 eine Ladeplattform (1), geeignet zum Tragen

- von Bedienpersonen (31, 32) und/oder Werkzeugen;
einen beweglichen Hubarm (21), auf dem die Plattform (1) montiert ist;
zumindest eine Betätigungsvorrichtung zum Bewegen des Arms (21);
zumindest eine erste Steuereinrichtung (41), die an Bord der Plattform (1) angeordnet und geeignet ist, einer Bedienperson (31, 32) die Auswahl von Steuerbefehlen zu ermöglichen, wobei die erste Vorrichtung (41) in der Lage ist, die Betätigungsvorrichtung gemäß den von der Bedienperson (31, 32) ausgewählten Steuerbefehlen anzusteuern;
zumindest eine zweite Steuereinrichtung, die von der Plattform (1) getrennt angeordnet und geeignet ist, einer Bedienperson die Auswahl von Steuerbefehlen zu ermöglichen, und die in der Lage ist, die Betätigungsvorrichtung gemäß den von der Bedienperson ausgewählten Steuerbefehlen anzusteuern;
zumindest eine Zustimmungseinrichtung (42, 43), die eine Schnittstelle (421, 422, 431, 432) aufweist, an der eine Bedienperson (31, 32) eine Auswahl tätigen kann; und
eine Verarbeitungseinheit, die dafür konfiguriert ist, die Ansteuerung der Betätigungsvorrichtung durch die erste (41) oder die zweite Steuereinrichtung freizugeben oder zu sperren, je nachdem, welche Auswahl an der Schnittstelle der Zustimmungseinrichtung (42, 43) getätigt wurde; **dadurch gekennzeichnet, dass** die Zustimmungseinrichtung (42, 43) an Bord der Plattform (1) angeordnet ist;
die Schnittstelle der Zustimmungseinrichtung (42, 43) geeignet ist, einer Bedienperson (31, 32) die Auswahl zumindest einer ersten Freigabebedingung zu ermöglichen, wobei die Verarbeitungseinheit ein Freigabemodul umfasst, das dafür konfiguriert ist, die zweite Steuereinrichtung für die Ansteuerung der Betätigungsvorrichtung freizugeben und die erste Steuereinrichtung (41) zu sperren, wenn diese erste Freigabebedingung ausgewählt wurde.
2. System nach dem vorhergehenden Anspruch, umfassend zumindest zwei Zustimmungseinrichtungen (42, 43).
 3. System nach zumindest einem der vorhergehenden Ansprüche, wobei die Plattform (1) geeignet ist, von einer ersten zu einer zweiten Betriebskonfiguration zu wechseln und umgekehrt.
 4. System nach dem vorhergehenden Anspruch, wobei die Plattform (1) eine Bodenfläche (10) und mehrere Seitenwände (11, 12, 13, 14) umfasst, von denen zumindest eine Seitenwand (11) beweglich ist zwischen einer aufgerichteten Position, die eine erste Konfiguration des Normalbetriebs der Plattform (1) definiert, und einer abgesenkten Position, die eine zweite Konfiguration des speziellen Betriebs der Plattform (1) definiert.
 5. System nach dem vorhergehenden Anspruch, wobei die bewegliche Seitenwand (11) in ihrer abgesenkten Position eine Verlängerung der Bodenfläche (10) bildet.
 6. System nach zumindest einem der Ansprüche von 3 bis 5, umfassend zumindest eine Erkennungseinrichtung (51, 52) zur Prüfung, ob die Plattform (1) in der ersten oder der zweiten Betriebskonfiguration angeordnet ist, wobei die Verarbeitungseinheit dafür konfiguriert ist, die Ansteuerung der Betätigungsvorrichtung durch die erste (41) oder die zweite Steuereinrichtung freizugeben oder zu sperren, auch unter Berücksichtigung der durch die Erkennungseinrichtung (51, 52) vorgenommenen Prüfungen.
 7. System nach zumindest einem der Ansprüche von 4 bis 6, wobei die Erkennungseinrichtung (51, 52) geeignet ist zu prüfen, ob sich die bewegliche Seitenwand (11) in der aufgerichteten Position befindet, oder zu prüfen, ob sich die bewegliche Seitenwand (11) in der abgesenkten Position befindet, oder beides.
 8. System nach Anspruch 2, wobei das Freigabemodul dafür konfiguriert ist, die zweite Steuereinrichtung für die Ansteuerung der Betätigungsvorrichtung freizugeben und die erste Steuereinrichtung (41) zu sperren, nachdem die erste Freigabebedingung an beiden Zustimmungseinrichtungen (42, 43) ausgewählt wurde.
 9. System nach zumindest einem der Ansprüche von 2 bis 8, wobei die zwei Zustimmungseinrichtungen (42, 43) durch einen Abstand voneinander getrennt sind, der verhindert, dass dieselbe Bedienperson (31, 32) gleichzeitig eine Auswahl an beiden Schnittstellen der Einrichtungen (42, 43) tätigen kann.
 10. System nach zumindest einem der vorhergehenden Ansprüche, wobei die Schnittstelle der Zustimmungseinrichtung (42, 43) geeignet ist, einer Bedienperson (31, 32) die Auswahl einer zweiten Freigabebedingung zu ermöglichen, wobei die Verarbeitungseinheit ein Freigabemodul umfasst, das dafür konfiguriert ist, die erste Steuereinrichtung (41) für die Ansteuerung der Betätigungsvorrichtung freizugeben und die zweite Steuereinrichtung zu sperren, wenn diese zweite Freigabebedingung ausgewählt wurde.
 11. System nach zumindest einem der Ansprüche von 6 bis 10, wobei das Freigabemodul dafür konfiguriert

ist, die erste Steuereinrichtung (41) für die Ansteuerung der Betätigungsvorrichtung freizugeben, nachdem durch die Erkennungseinrichtung (51, 52) geprüft wurde, dass sich die Plattform (1) in der zweiten Betriebskonfiguration befindet.

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12. System nach zumindest einem der vorhergehenden Ansprüche, wobei die zweite Steuereinrichtung mit einer Funkfernsteuerung ausgestattet ist.

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13. Arbeitsmaschine (2), umfassend ein System nach zumindest einem der vorhergehenden Ansprüche und umfassend eine Kabine (23) in der die zweite Steuereinrichtung angeordnet ist.

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Revendications

1. Un système de levage pour machines opératrices (2), comprenant :

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une plateforme de chargement (1) destinée à supporter des opérateurs (31, 32) et/ou des outils ;

un bras de levage (21), mobile, sur lequel est montée ladite plateforme (1) ;

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au moins un appareil d'actionnement pour mouvoir ledit bras (21) ;

au moins un premier appareil de commande (41), disposé à bord de la plateforme (1) et destiné à permettre à un opérateur (31, 32) de sélectionner des commandes, le premier appareil (41) étant destiné à commander ledit appareil d'actionnement en fonction des commandes sélectionnées par ledit opérateur (31, 32) ;

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au moins un deuxième appareil de commande, séparé de la plateforme (1) et destiné à permettre à un opérateur de sélectionner des commandes, et destiné à commander ledit appareil d'actionnement en fonction des commandes sélectionnées par ledit opérateur ;

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au moins un dispositif d'habilitation (42, 43) doté d'une interface (421, 422, 431, 432) sélectionnable par un opérateur (31, 32) ; et

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une unité de traitement configurée pour habiliter ou inhiber la commande de l'appareil d'actionnement par le premier (41) ou le deuxième appareil de commande, en fonction des sélections effectuées sur ladite interface du dispositif d'habilitation (42, 43) ;

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caractérisé en ce que

ledit dispositif d'habilitation (42, 43) est situé à bord de ladite plateforme (1) ;

l'interface du dispositif d'habilitation (42, 43) étant destinée à permettre à un opérateur (31, 32) de sélectionner au moins une première condition d'habilitation, l'unité de traitement comprenant un module d'habilitation configuré pour

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habiliter le deuxième appareil de commande à commander l'appareil d'actionnement et pour inhiber le premier appareil de commande (41) lorsque ladite première condition d'habilitation est sélectionnée.

2. Le système selon la revendication précédente, comprenant au moins deux dispositifs d'habilitation (42, 43).

3. Le système selon au moins l'une des revendications précédentes, dans lequel la plateforme (1) est destinée à passer d'une première à une deuxième configuration opérationnelle et inversement.

4. Le système selon la revendication précédente, dans lequel la plateforme (1) comprend un plan de fond (10) et une pluralité de parois latérales (11, 12, 13, 14), parmi lesquelles au moins une paroi latérale (11) est mobile entre une position érigée, définissant une première configuration d'utilisation normale de la plateforme (1) et une position abaissée, définissant une deuxième configuration d'utilisation spéciale de la plateforme (1).

5. Le système selon la revendication précédente, dans lequel, dans sa position abaissée, la paroi latérale mobile (11) définit un prolongement dudit plan de fond (10).

6. Le système selon au moins l'une des revendications de 3 à 5, comprenant au moins un dispositif de détection (51, 52) destiné à vérifier si la plateforme (1) se trouve dans la première ou la deuxième configuration opérationnelle, ladite unité de traitement étant configurée pour habiliter et inhiber la commande de l'appareil d'actionnement par le premier (41) ou le deuxième appareil de commande, en fonction également des vérifications effectuées par ledit dispositif de détection (51, 52) .

7. Le système selon au moins l'une des revendications de 4 à 6, dans lequel le dispositif de détection (51, 52) est destiné à vérifier si ladite paroi latérale mobile (11) est dans la position érigée ou à vérifier si ladite paroi latérale mobile (11) est dans la position abaissée, ou les deux.

8. Le système selon la revendication 2, dans lequel le module d'habilitation est configuré pour habiliter le deuxième appareil de commande à commander l'appareil d'actionnement et pour inhiber le premier appareil de commande (41), une fois que ladite première condition d'habilitation est sélectionnée dans les deux dispositifs d'habilitation (42, 43).

9. Le système selon au moins l'une des revendications de 2 à 8, dans lequel les deux dispositifs d'habilitation

(42, 43) sont séparés l'un de l'autre d'une distance telle qu'elle empêche un même opérateur (31, 32) de sélectionner les deux interfaces des dispositifs (42, 43).

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10. Le système selon au moins l'une des revendications précédentes, dans lequel l'interface du dispositif d'habilitation (42, 43) est destinée à permettre à un opérateur (31, 32) de sélectionner une deuxième condition d'habilitation, l'unité de traitement comprenant un module d'habilitation configuré pour habiliter le premier appareil de commande (41) à commander l'appareil d'actionnement et pour inhiber le deuxième appareil de commande lorsque ladite deuxième condition d'habilitation est sélectionnée. 10 15
11. Le système selon au moins l'une des revendications de 6 à 10, dans lequel le module d'habilitation est configuré pour habiliter le premier appareil de commande (41) à commander l'appareil d'actionnement, suite à la vérification par le dispositif de détection (51, 52) que la plateforme (1) est dans la deuxième configuration opérationnelle. 20
12. Le système selon au moins l'une des revendications précédentes, dans lequel le deuxième appareil de commande est pourvu d'une radiocommande. 25
13. Une machine opératrice (2) comprenant un système selon au moins l'une des revendications précédentes et comprenant une cabine (23) dans laquelle se trouve le deuxième appareil de commande. 30

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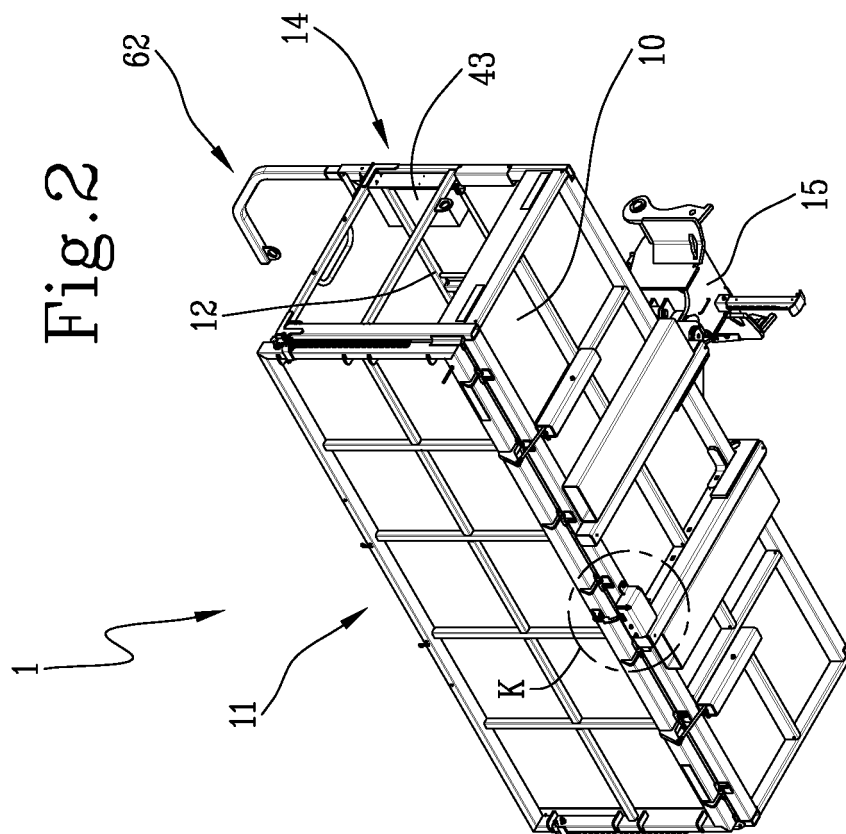
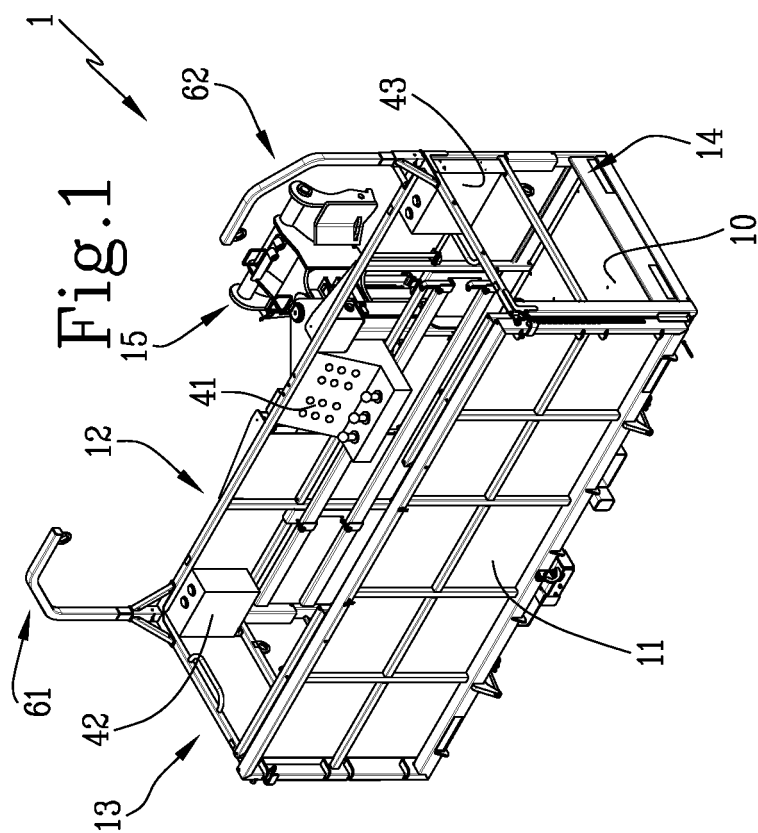


Fig.3

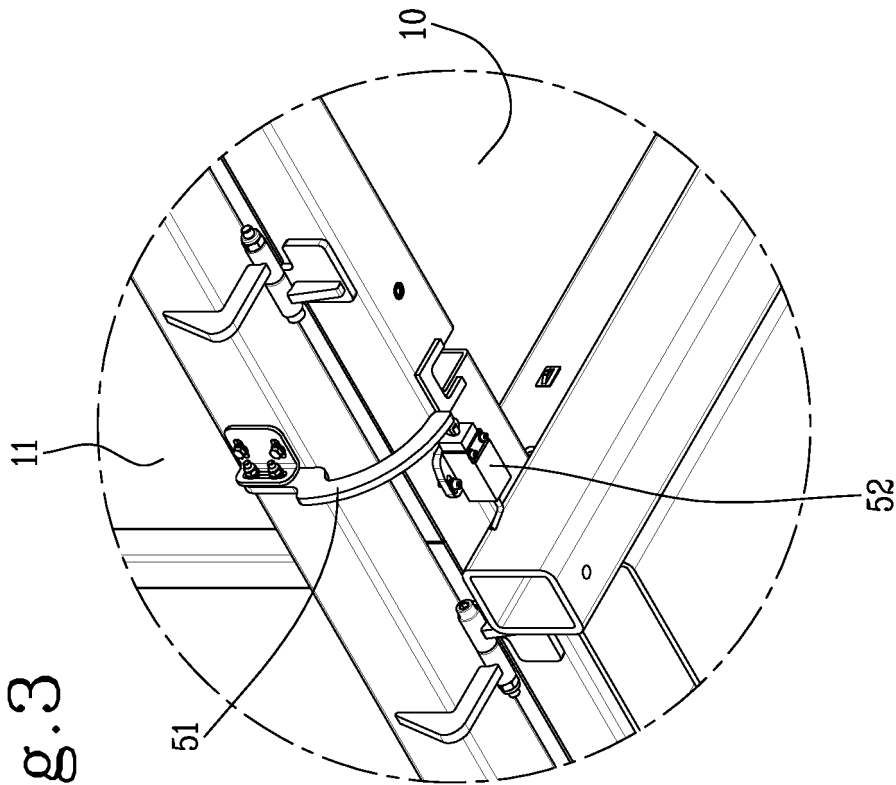
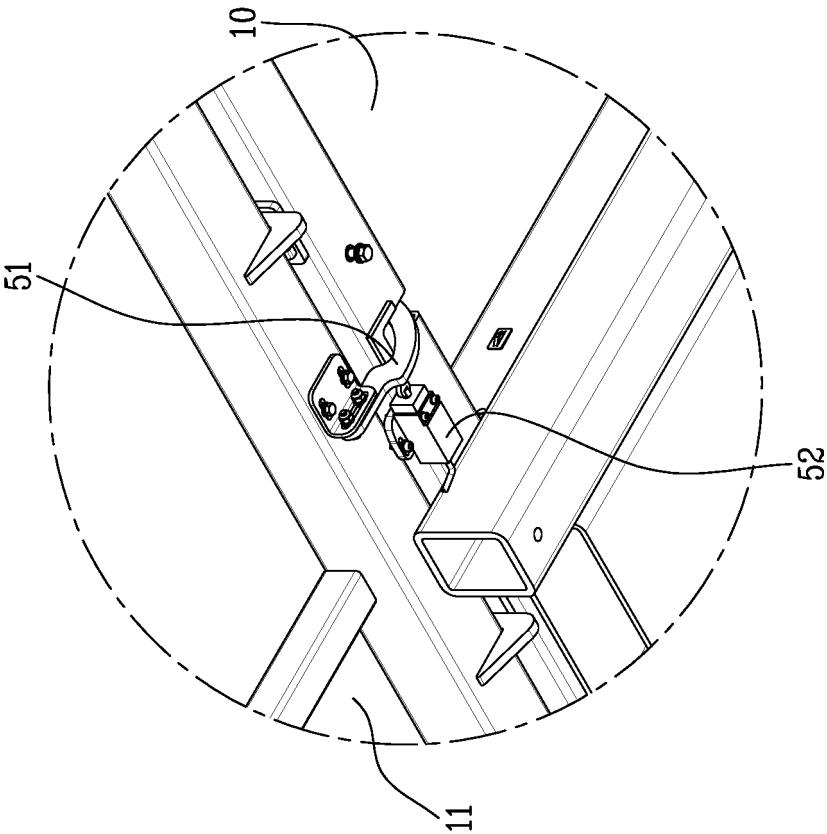


Fig.4



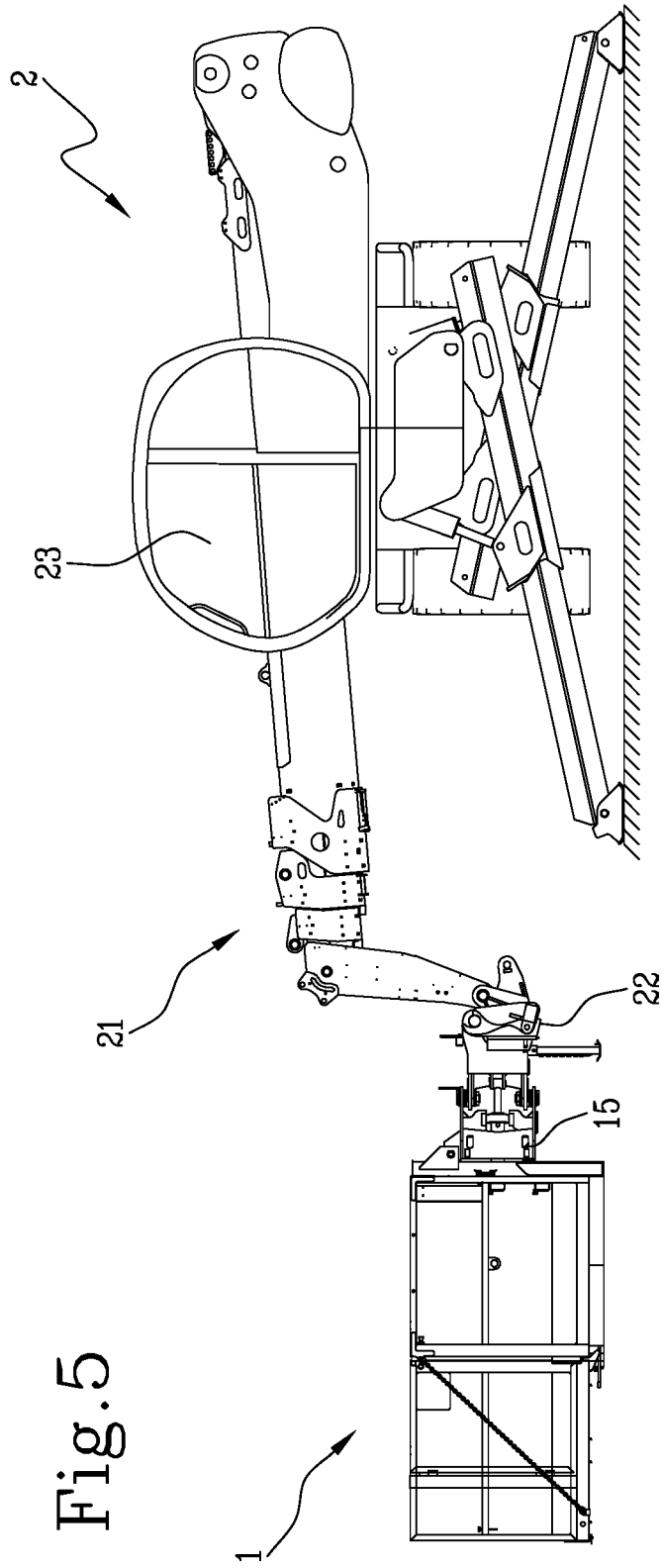
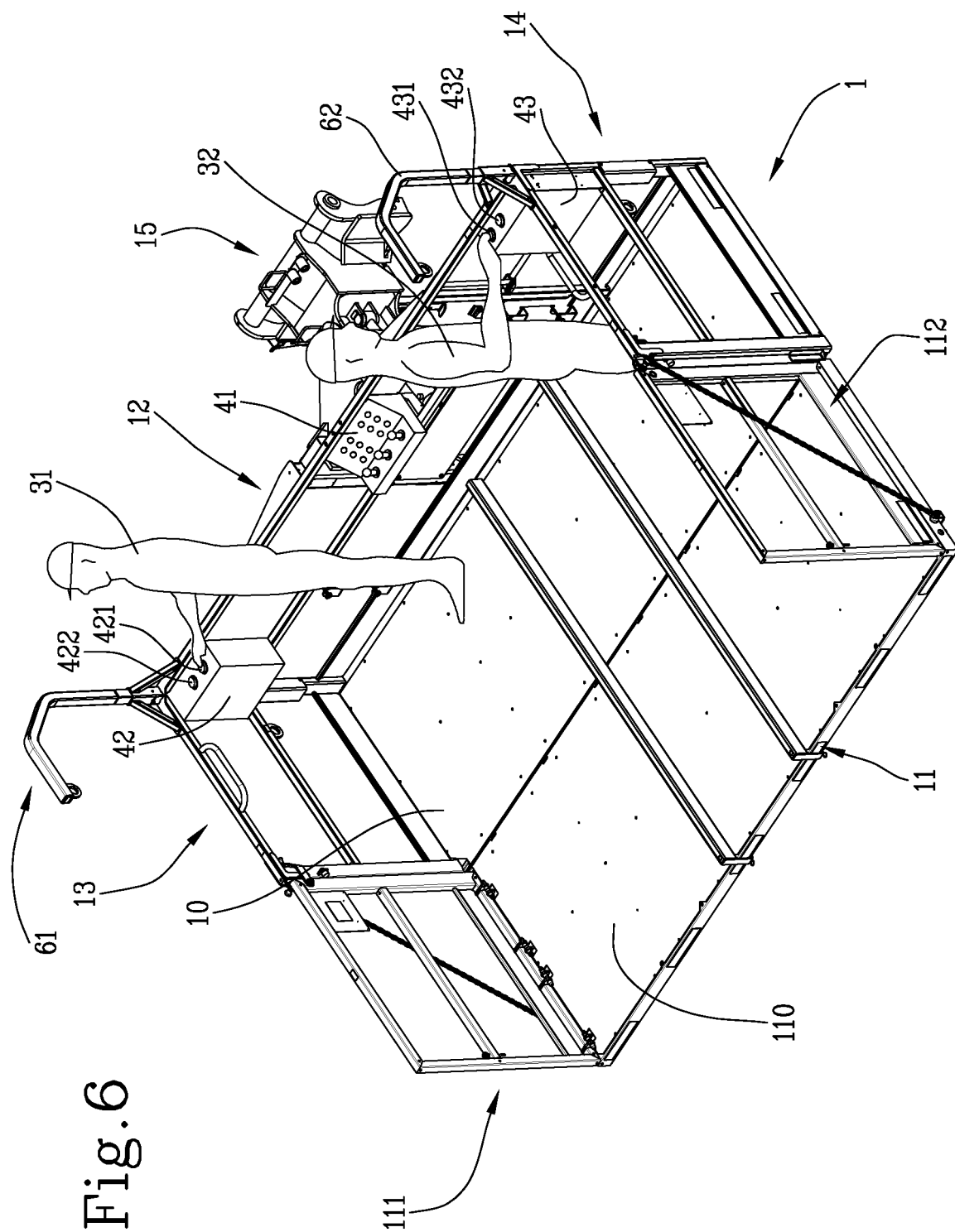


Fig.5

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b.
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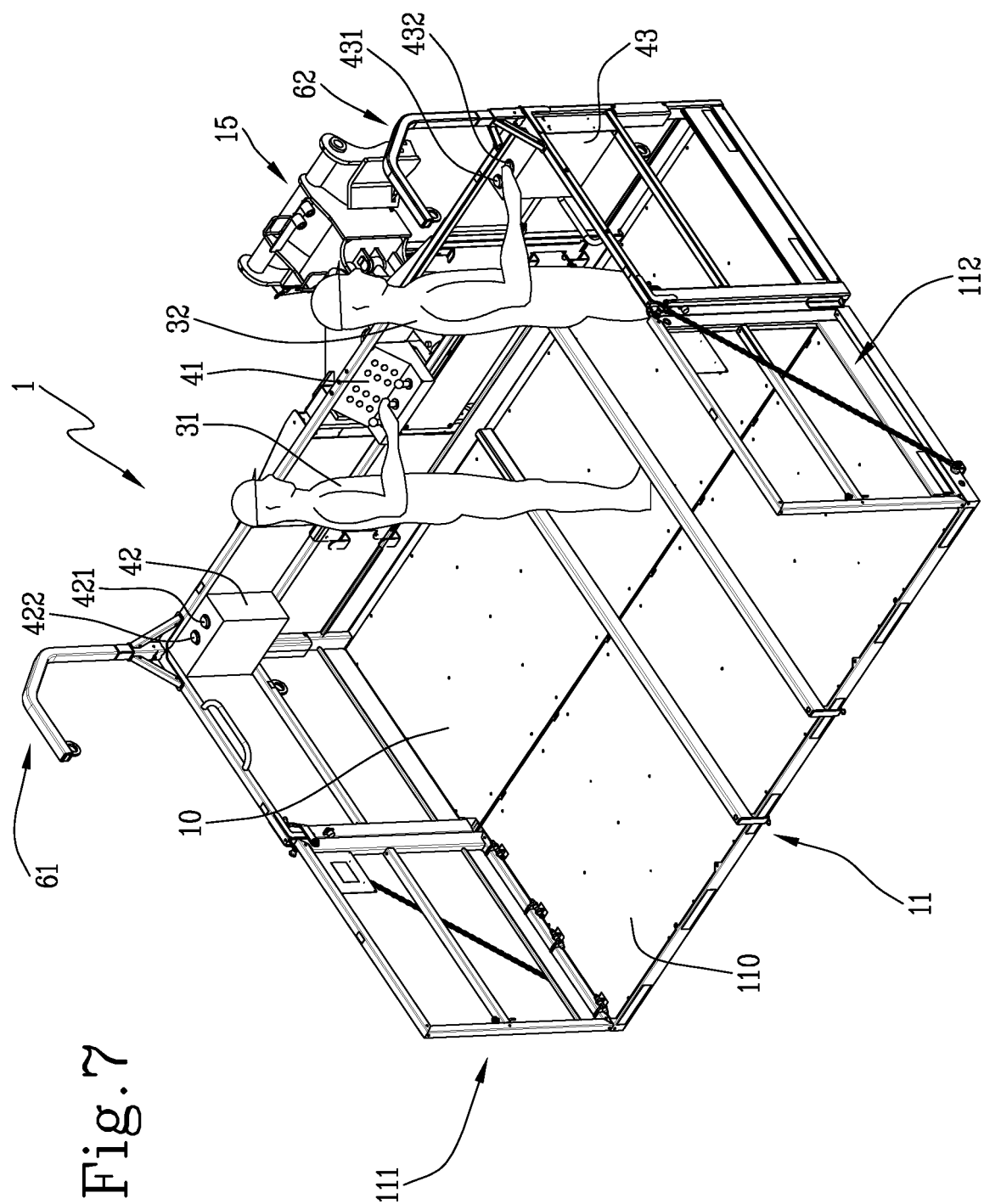


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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