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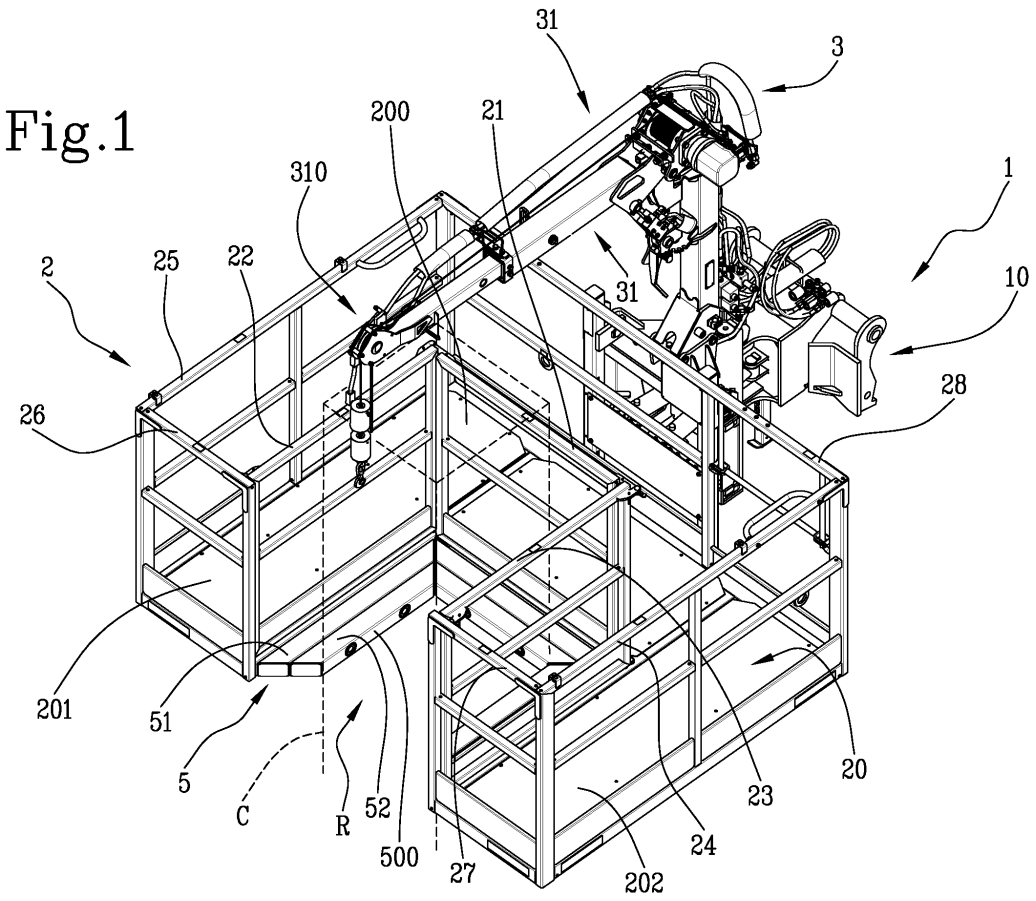
(54) A LOADING EQUIPMENT FOR WORKING MACHINES

(57) The loading equipment (1) intended for use with working machines such as telehandlers, aerial work platforms or the like, comprises a loading basket (2) equipped with a bottom plane (20), able to support operators and a plurality of lateral walls (21, 22, 23, 24, 25, 26, 27, 28) arranged at the sides of a perimeter of the bottom plane (20), wherein the perimeter has a profile that has a recess (R), defining in the basket (2) a housing space (S) intended to receive a chimneypot (C) or other similar objects.

Fig.1



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Description

[0001] The present invention relates to a loading equipment intended for use with working machines such as telehandlers (or telescopic handlers), aerial work platforms or other similar machines.

[0002] In detail, the invention relates to an equipment provided with a particular loading basket that allows the operators to perform special activities at height.

[0003] Loading baskets are known that comprise a bottom plane, able to support the operators and the equipment, around which bottom plane lateral walls are arranged which have the function of preventing accidental falls of the operators or of the equipment resting on the bottom plane.

[0004] The baskets are able to be connected to a telescopic lifting arm, with which the working machines are provided, by means of relevant attachment devices.

[0005] Known baskets work very effectively when they are used for work activities at height which require the manual intervention of the operators, possibly with the use of portable equipment that can be easily loaded onto the basket itself.

[0006] However, there are some types of work activities that cannot be performed through the use of known loading baskets and they are therefore performed inefficiently and, at times, dangerously.

[0007] Think for example about the replacement of unsafe chimneypots or chimneypots arranged on the roofs of houses built on land that is subject or has been subject in the past to seismic activity.

[0008] In practice, in the cases listed above, masonry chimneypots are replaced with metal chimneypots, e.g. made of copper, which are more resistant to seismic stresses.

[0009] During these operations, the chimneypots to be removed must be sectioned at the base, therefore close to the surface of the roof and then removed and carried to the ground using a winch; after this, the new chimneypot is lifted off the ground using the winch, brought to the sectioned base and fixed there.

[0010] Using known baskets, the operation of replacing a masonry chimneypot is therefore inconvenient, time consuming and above all dangerous for the safety of the operators on board the basket and for any operators or machinery on the ground, near the building, or inside the building itself.

[0011] In fact, for the purpose of correct and effective sectioning, the operators must use a circular saw, or similar equipment, around the chimneypot, cutting a substantial portion of its circumference.

[0012] This implies that the operators must lean out of the basket, while holding the cutting tool, with the clear risk of dropping the latter or even, in an extreme case, of the operator himself falling out of the basket.

[0013] Furthermore, the fact of having to coordinate the movements of the winch, used to bring the removed chimneypot to the ground and for bringing the new one onto the roof, with the basket manoeuvring arm movements is inconvenient, time consuming and requires the use of two operators to move the two machines from the corresponding cabs.

[0014] The technical task underpinning the present invention is therefore to provide a lifting system which obviates the limits of the prior art.

[0015] This technical task is attained by the loading equipment realised according to claim 1.

[0016] Further characteristics and advantages of the present invention will become more apparent from the following indicative, and hence nonlimiting, description of a preferred, but not exclusive, embodiment of the equipment according to the invention, as illustrated in the accompanying drawings, in which:

- figures 1, 3 and 4 are axonometric views of the equipment of the invention, in different operating configurations, associated with chimneypots shown in transparency and depicted in a stylised way;
- figure 2 is an axonometric view of the equipment of the previous figures, in the configuration of figure 1, in a different perspective, associated with a chimneypot represented schematically;
- figure 5 is an axonometric, partially exploded, view of the equipment; and
- figure 6 shows a detail of the equipment that represents a preferential expedient of the invention.

[0017] With reference to the mentioned figures, 1 indicates a loading equipment intended for use with a telehandler, an aerial work platform or other similar self-propelled working machines.

[0018] The equipment 1 of the invention has been especially designed for replacing chimneypots C, as mentioned in the description of the prior art, although its use for other operations, usual or special, to be performed at height, is not excluded.

[0019] The equipment 1 is adapted to be connected to a telescopic lifting arm, possibly articulated, with which the working machine is provided; the machine may have a fixed arm or be equipped with a rotatable turret for rotating the arm and, consequently, the proposed equipment 1.

[0020] The lifting arm comprises a plurality of segments, inserted with the possibility of sliding into one another, of which one proximal segment is hinged to the machine frame or to the rotary turret, and a distal segment that mounts an attachment device for the removable fitting of the equipment 1.

[0021] The equipment 1 is provided with a fitting device 10 designed for anchoring the arm attachment device, according to known ways.

[0022] It is to be noted that the equipment 1 may be rotatable with respect to an axis that passes through the fitting device 10; in particular, such device may include a joint on which a movement device can act, preferably of the hydraulic type.

[0023] In general, the movements of the arm and the rotation of the equipment 1 are preferably realised through hydraulic devices such as, for example, hydraulic cylinders, upon the activation of one or more hydraulic (preferably electro-hydraulic) distributors or other types of activation apparatuses, not depicted because they may also be of the known type.

[0024] The case is not excluded in which the movement devices are electromechanical and not hydraulic.

[0025] The equipment 1 includes a loading basket 2 which comprises a bottom plane 20, able to support the operators and the working equipment 1.

[0026] The bottom plane 20 (or "bottom", as it will also be called below) is associated with lateral walls 21, 22, 23, 24, 25, 26, 27, 28, preferably reticular, for the purpose of preventing any accidental fall of the operators, the equipment 1 or other objects.

[0027] The lateral walls 21, 22, 23, 24, 25, 26, 27, 28 (or parapets) rise from the bottom 20, preferably perpendicularly, defining a sort of cage that is open at the top.

[0028] In the preferential embodiment of the invention, the equipment 1 also includes a winch 3 physically and functionally associated with the basket 2, which will be described in more detail below.

[0029] The lateral walls 21, 22, 23, 24, 25, 26, 27, 28 are arranged at the sides of the perimeter of the bottom 20 and more precisely are mounted on the upper surface of the bottom 20, at the perimeter edge thereof.

[0030] In the preferential embodiment of the invention, shown in the appended figures, the basket 2 is generally C-shaped and has a housing S at the front intended to receive the chimneypot C, so as to cover it on three consecutive sides.

[0031] In more detail, the bottom 20 of the basket 2 is preferably C-shaped itself and is provided with a rear portion 200, joined to the fitting device 10 and that may be rectangular or however quadrangular, from which two projecting portions 201, 202 extend in the front direction, which may also be quadrangular, separate from one another to define a recess R between them, which in turn is square or more generally quadrangular.

[0032] A "recess" means an empty space that extends towards the inside of the bottom 20; in practice, the basket 2 has a rectangular shape apart from a quadrangular recess R afforded at the longest front side.

[0033] Since the lateral walls 21, 22, 23, 24, 25, 26, 27, 28 rise from the bottom 20 and are located at the perimeter sides, the mentioned recess R identifies a housing space S in the basket 2 for the chimneypot C.

[0034] During the operating steps, the chimneypot C is therefore between the two branches of the basket 2 which are defined by the projecting portions 201, 202 of the bottom 20, while it faces the central section of the basket 2.

[0035] In the version depicted in the appended figures, the recess R of the bottom plane 20 is U-shaped, defined by three consecutive sides R1, R2, R3 at an angle to one other (shown in figure 5), preferably orthogonal two by two; in practice, the internal sides R1, R2 of the projecting portions 201, 202 of the bottom 20 are parallel to each other and perpendicular to the connecting side.

[0036] In more general terms, the perimeter of the bottom 20 of the basket 2 has a profile that has a recess R that could also have a shape different from that shown in the figures.

[0037] In even more detail, the expression "perimeter" is used in this description in a general sense for indicating the peripheral boundary of the bottom plane 20, which could also comprise curved sections.

[0038] The basket 2 is closed by lateral walls 21, 22, 23, 24, 25, 26, 27, 28 on all sides of the perimeter, defining a closed enclosure; in the embodiment shown in the appended tables of drawings, the bottom 20 is limited by eight rectilinear sides and, therefore, the basket 2 includes eight lateral walls 21, 22, 23, 24, 25, 26, 27, 28.

[0039] One or more of the lateral walls 21, 22, 23 located at the sides R1, R2, R3 of the recess R is movable and, preferably, is removably fixed to the bottom surface 20, allowing the operators to directly access the chimneypot C with their tools.

[0040] In the example shown, the three lateral walls 21, 22, 23 alongside the housing space S, called "internal lateral walls" below, are removable from the sides of the recess R1, R2, R3, i.e. from the respective safe positions, and transferable to corresponding working positions, where they are fixed temporarily during the sectioning operations of the chimneypot C (compare figures 1 - 4).

[0041] In practice, during use, once the equipment 1 has been brought onto the roof and the chimneypot C housed in the free U-shaped space of the basket 2, the operators move the internal lateral walls 21, 22, 23 so as to have direct access to the chimneypot C on the three sides, allowing safe and effective sectioning.

[0042] To be precise, two of the internal lateral walls 22, 23 preferably the ones facing each other, are brought into a respective working position in which they are adjacent to other lateral walls, e.g. the most external lateral walls 24, 25 with which they are parallel (see figures 4 and 5).

[0043] The other internal lateral wall 21, preferably the central one, is brought to the mouth of the housing volume S, to define a connection between the two end front lateral walls 26, 27, so as to completely surround the chimneypot C (see figure 4); in practice, this internal lateral wall 21 closes the space between the two front lateral walls 26, 27, arranged at the end of the aforementioned projecting portions 201, 202, defining a single front continuous lateral wall 21, 26, 27.

[0044] For removably joining the internal lateral walls 21, 22, 23 from the bottom, a relevant attachment means is provided which may comprise a plurality of pins 31 located below the lateral walls 21, 22, 23 and holes 32 afforded on the upper surface of the bottom plane 20 of the basket 2, adapted to house the corresponding pins 31.

[0045] The invention may also provide a means 4 for

detecting whether the lateral walls 21, 22, 23 are in the safe position or in the working position, which will be described in detail below.

[0046] In any event, as the invention allows operators to be able to conveniently work around the chimneypot C, received in the housing space S of the basket 2, by positioning themselves as they like at least 270° around the chimneypot C itself, it is clear how the proposed equipment 1 is able to overcome many of the limits of the prior art listed above.

[0047] Some particular expedients of the equipment 1 are described below, which allow the user to obtain further advantages with respect to known solutions.

[0048] In detail, an aspect of the proposed equipment 1 is illustrated above all, which prevents the risks connected with the fact that, when using known baskets, operators have to lean out towards the chimneypots, while cutting away the base of the masonry chimneypot or installing the metal one.

[0049] In fact, the equipment 1 of the invention may comprise one or more modular platforms 5, of variable lengths, removably coupled to respective sides R1, R2, R3 of the recess R.

[0050] In practice, the invention provides a walkable support that extends from the bottom 20 of the basket 2 in the housing space S, to allow the operator to work in close proximity to the chimneypot C, to the full advantage of the effectiveness and safety of the operations performed.

[0051] The length of the platforms 5 is adjustable, according to methods described below, so as to be able to adapt to the different sizes of the specific chimneypot C to be cut; in detail, if the chimneypot C is wider, the platforms 5 will be narrower and vice versa.

[0052] As can be seen in the appended figures, the platforms 5 define an open (U-shaped) frame applied at the recess R of the bottom 20 of the basket 2, preferably with a substantially longitudinal continuous extension.

[0053] In the example shown, there are three platforms 5 arranged consecutively at the recess R.

[0054] Preferably, each platform 5 comprises a plurality of reduction elements 51, 52, arranged consecutively to each other, and substantially located in the plane in which the bottom 20 of the basket 2 lies.

[0055] The more elements 51, 52 connected to each other in succession, the wider the platform 5 will be, which allows it to be modular as described above.

[0056] In practice, the aim of the platform 5 is to reduce or eliminate the empty space between the bottom 20 of the basket 2 and the outer perimeter (or circumferential) surface of the chimneypot C.

[0057] Each reduction element 51, 52 is rigid, e.g. made of aluminium, preferably elongated, and has been devised to be mounted parallel to a corresponding side R1, R2, R3 of the recess R.

[0058] Furthermore, each reduction element 51, 52 may have a trapezoidal shape, defining platforms 5 that are tapered towards the outside; this characteristic allows the continuity of the support to be defined along the three sides R1, R2, R3 of the recess R.

[0059] In detail, in the preferential embodiment of the invention, for each side R1, R2, R3 of the recess R the use of a plurality of reducing elements 51, 52, of variable length, is envisaged, each comprising a first and a second side 50, 500 opposite one another (see figure 5), wherein the first side 50 is adapted to be placed in contact with a side R1, R2, R3 of the recess R or with the second side 500 of a different reducing element 51, 52.

[0060] In practice, each platform 5 comprises at least two, but preferably three or more reducing elements 51, 52, including a first element 51 provided with its own first side 50 which directly abuts on a respective side R1, R2, R3 of the recess R and a second opposite side 500, the latter being provided for coming into contact with the first side 50 of a second reducing element 52 and so on.

[0061] In the preferred case in which the reducing element 51, 52 has a substantially trapezoidal shape, its largest base is defined by the first side 50 and the smallest base is defined by the second side 500.

[0062] In general, the first side 50 is at most al long as the respective side R1, R2, R3 of the recess R of the support plane 20 or as long as the second side 500 of a different reducing element 52; in other words, the first side 50 of the first element 51 (the most internal one) of each platform 5 is at most as long as the side R1, R2, R3 of the recess R with which it is to come into contact, whereas the second side 500, shorter than the first, comes into contact directly with the first side 50 of the second element 52 which is at most as long as the second side 500 of the first element 51 and so on.

[0063] For the purpose of fixing the reducing elements 51, 52 to the bottom plane 20, threaded holes can be afforded on the edges of the sides R1, R2, R3 of the recess R and through holes can be afforded in the thickness of the elements, that can be aligned with one another to allow the insertion of fixing screws 6.

[0064] As mentioned above, the invention may comprise one or more detection devices 4, mounted on the basket 2, and adapted to detect whether the internal lateral walls 21, 22, 23 are in the safe position and adapted to produce warning signals according to the detections performed.

[0065] In practice, the invention makes it possible to detect whether the internal lateral walls 21, 22, 23 are all in their safe position, in which they are placed at the respective sides R1, R2, R3 of the recess R, in which case it is possible to safely move the equipment 1 or whether at least one of the lateral walls 21, 22, 23 is not in the safe position, therefore the device 4 emits a warning signal adapted to lock the support arm and possibly any other movements that can be performed by the equipment 1 itself.

[0066] In detail, the detection devices may comprise switches 4 operating at the aforementioned holes 32 afforded in the bottom surface 20 of the basket 2, such switches 4 being activated by the corresponding pin 31

when it is inserted in or removed from the hole itself (see figure 6).

[0067] To be precise, the invention may envisage the use of a processing unit adapted to receive the warning signals from the detection devices 4 and configured to inhibit or allow the movement of the arm that carries the equipment 1 and possibly also of the joint of the fitting device 10 mentioned above.

[0068] In even more detail, the electro-hydraulic distributor used for adjusting the aforementioned movements is adapted to receive control signals from the processing unit that are adapted to allow the activation of the hydraulic movement actuators or the inhibition thereof.

[0069] In the event in which the processing unit receives a corresponding warning signal from a detection device 4 representing the fact that (at least) one of the internal lateral walls 21, 22, 23 is not in its safe position, it sends control signals to the distributor that inhibit the activation of the actuators subject thereto.

[0070] The processing unit may consist of the control unit of the working machine or of a control unit arranged on board the equipment 1 or of other electronic devices.

[0071] 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.

[0072] In practice, such processing unit can consist of an electronic device, including of the type commonly present on this type of machine and/or equipment, like the two control units mentioned above, suitably programmed for carrying out the functions described.

[0073] The different modules may correspond to hardware entities and/or software routines being part of the programmed device.

[0074] Such functions may be performed by a plurality of electronic devices over which the aforesaid functional modules can be distributed.

[0075] In general, the processing unit can make use of one or more microprocessors or microcontrollers for performing the instructions contained in memory modules and the aforesaid functional modules may, also, be distributed over a plurality of local or remote calculators based on the architecture of the network in which they reside.

[0076] As mentioned, the equipment 1 preferably comprises a lifting winch 3 which in turn comprises a movable arm 31 that includes a distal active portion 310 provided with a gripping and lifting hook and a pulley around which the cable or another flexible and inextensible element for pulling the hook slides.

[0077] Advantageously, the winch 3 is located in the equipment 1 in a position such that its active portion 310 can be arranged and operate in the aforementioned housing space S, i.e. where, during use, the chimneypot C is located.

[0078] The winch 3 is solidly constrained to the basket 2 and preferably mounted on board the aforesaid fitting device 10, fixed to the back of the basket 2 and provided to be anchored to the lifting arm attachment device.

[0079] A preferred operating method of the invention is described below.

[0080] Initially, the basket 2 rests on the ground and the operators mount the reducing elements 51, 52 at the housing space S defined above, at the height of the bottom plane 20, according to the methods discussed above.

[0081] Aware of the dimensions of the masonry chimneypot C to be replaced, the operators know how many reducing elements 51, 52 to mount in series on the three sides R1, R2, R3 of the recess R of the bottom 20, so as to bridge the gap between the bottom 20 of the basket 2 and the external lateral surface of the chimneypot C.

[0082] After this, the operators enter the basket 2, through an openable section of a lateral wall or thanks to the fact that one of the bars of a lateral wall is movable, thus defining an access/exit.

[0083] In this step, the three internal lateral walls 21, 22, 23 are located in the respective safe positions mentioned previously.

[0084] At this point, the basket 2 is lifted above the roof and gradually brought into an operating position in which it receives the stone chimneypot to be replaced in the relevant housing space S as defined above.

[0085] The operators start to reposition the internal lateral walls 21, 22, 23 in the respective working positions and, as soon as one of the lateral walls 21, 22, 23 is removed from its safe position, one of the switches 4 mentioned above transmits an appropriate warning signal to the processing unit.

[0086] At this point, the hydraulic actuators that govern the movement of the arm and of the equipment 1 are inhibited and the equipment 1 stays still in position and cannot be moved unless particular bypass procedures are followed that are often envisaged in working machines for safety reasons.

[0087] Before starting the cutting operations, the chimneypot C is engaged to the hook of the winch 3 on board the equipment 1.

[0088] After this, the operators on board the basket 2 section the chimneypot C at the base, the stub remaining hanging on the hook of the winch 3.

[0089] Once the chimneypot C has been separated from the rest of the chimney, the internal lateral sides 21, 22, 23 are brought back into the safe position, which enables the movement of the arm, so that the cut chimneypot C can be brought to the ground together with the basket 2 and the operators.

[0090] This advantageously allows to prevent the use of an external winch, i.e. another working machine and the need to coordinate with the relative operator, to the full advantage of the speed, simplicity and cost effectiveness of the operations.

[0091] The masonry chimneypot C is unfitted from the winch 3 and the new metal chimneypot C is fitted thereto.

[0092] At this point, the equipment 1 is brought back up to height at the cut base of the chimneypot C, on the roof, one or more of the internal lateral walls 21, 22, 23 are moved into the working position, the new chimneypot C is mounted and secured to the top of the chimney, the lateral walls 21, 22, 23 are repositioned in the safe position and the equipment 1 with the operators brought back to the ground again.

Claims

1. A loading equipment (1) intended for use with working machines (2) such as telehandlers, aerial work platforms or the like, comprising a loading basket (2) equipped with a bottom plane (20) able to support operators and a plurality of lateral walls (21, 22, 23, 24, 25, 26, 27, 28) arranged at the sides of a perimeter of said bottom plane (20), wherein said perimeter is provided with a profile that has a recess (R), defining in the basket (2) a housing space (S) intended to receive a chimneypot (C) or other similar objects.

2. The equipment (1) according to the preceding claim, wherein said bottom plane (20) is C-shaped.

3. The equipment (1) according to at least one of the preceding claims, wherein said recess (R) is defined by at least three consecutive sides (R1, R2, R3), at an angle to one another.

4. The equipment (1) according to at least one of the preceding claims, wherein the basket (2) comprises a first portion, from which two projecting portions extend, defining between them a housing space (S).

5. The equipment (1) according to at least one of the preceding claims, comprising one or more reducing elements (51, 52), adapted to be removably fixed to the basket (2), at the housing space (S), thereby allowing the gap between the basket (2) and the surface of said chimneypot (C) to be reduced or cancelled.

6. The equipment (1) according to the preceding claim, wherein said reducing elements (51, 52) are adapted to be arranged substantially coplanar to the bottom plane (20) of the basket (2).

7. The equipment (1) according to claim 5 or claim 6, wherein said reducing elements (51, 52) are rigid and elongated and are adapted to be mounted parallel to respective sides (R1, R2, R3) of the recess (R).

8. The equipment (1) according to at least one of claims 5 to 7, comprising a plurality of reducing elements (51, 52) each comprising a first and a second side (50, 500) opposite one another, wherein the first side (50) is adapted to be placed in contact with a side (R1, R2, R3) of the recess (R) or with the second side (500) of a different reducing element (51, 52).

9. The equipment (1) according to the preceding claim, wherein each reducing element (51, 52) has a substantially trapezoidal shape, wherein the largest base is defined by said first side (50) and the smallest base is defined by said second side (500).

10. The equipment (1) according to claim 8 or the preceding claim, wherein the first side (50) is at most as long as the respective side (R1, R2, R3) of the recess (R) of the bottom plane (20) or the second side (500) of said different reducing element (51, 52)

11. The equipment (1) according to at least one of claims 5 to 10, comprising one or more modular platforms (5), of variable lengths, each comprising a plurality of reducing elements (51, 52) arranged consecutively to one another, each platform (5) being removably couplable to a respective side (R1, R2, R3) of the recess (R).

12. The equipment (1) according to at least one of the preceding claims, wherein said recess (R) is U-shaped and includes three consecutive sides (R1, R2, R3), perpendicular two by two, two of the sides (R1, R2) facing one another.

13. The equipment (1) according to at least one of the preceding claims, wherein a lateral wall (21, 22, 23) is removably fixed to the surface (20) at a side of the recess (R).

14. The equipment (1) according to claim 12 and the preceding claim, wherein the three lateral walls (21, 22, 23) placed at the three sides (R1, R2, R3) of the recess (R) are removably fixed to the bottom planes (20).

15. The equipment (1) according to claim 13 or claim 14, comprising at least one detecting device (4), mounted on the basket (2), and adapted to detect whether said removable side wall (21, 22, 23) is in a safe position thereof in which it is located at a respective side (R1, R2, R3) of the recess (R) of the bottom plane (20), said detecting device (4) being adapted to produce warning signals according to the detections performed.

16. The equipment (1) according to at least one of the preceding claims, comprising a lifting winch (3) provided with a movable arm (31) comprising a distal active portion (310) that includes a gripping and lifting hook and a pulley around which a flexible element

slides for pulling said hook, said winch (3) being positioned so that said active portion (310) can be arranged in the aforementioned housing space (S).

17. A loading system for a working machine, such as a telehandler or the like, comprising:

a movable lifting arm;
an equipment (1) according to claim 15, mounted on said lifting arm;
an apparatus for adjusting the movement of the arm; and
a processing unit adapted to receive said warning signals and configured to inhibit or allow said apparatus to move the arm.

18. A self-propelled working machine, comprising equipment (1) according to at least one of claims 1 to 16 or a system according to the preceding claim.

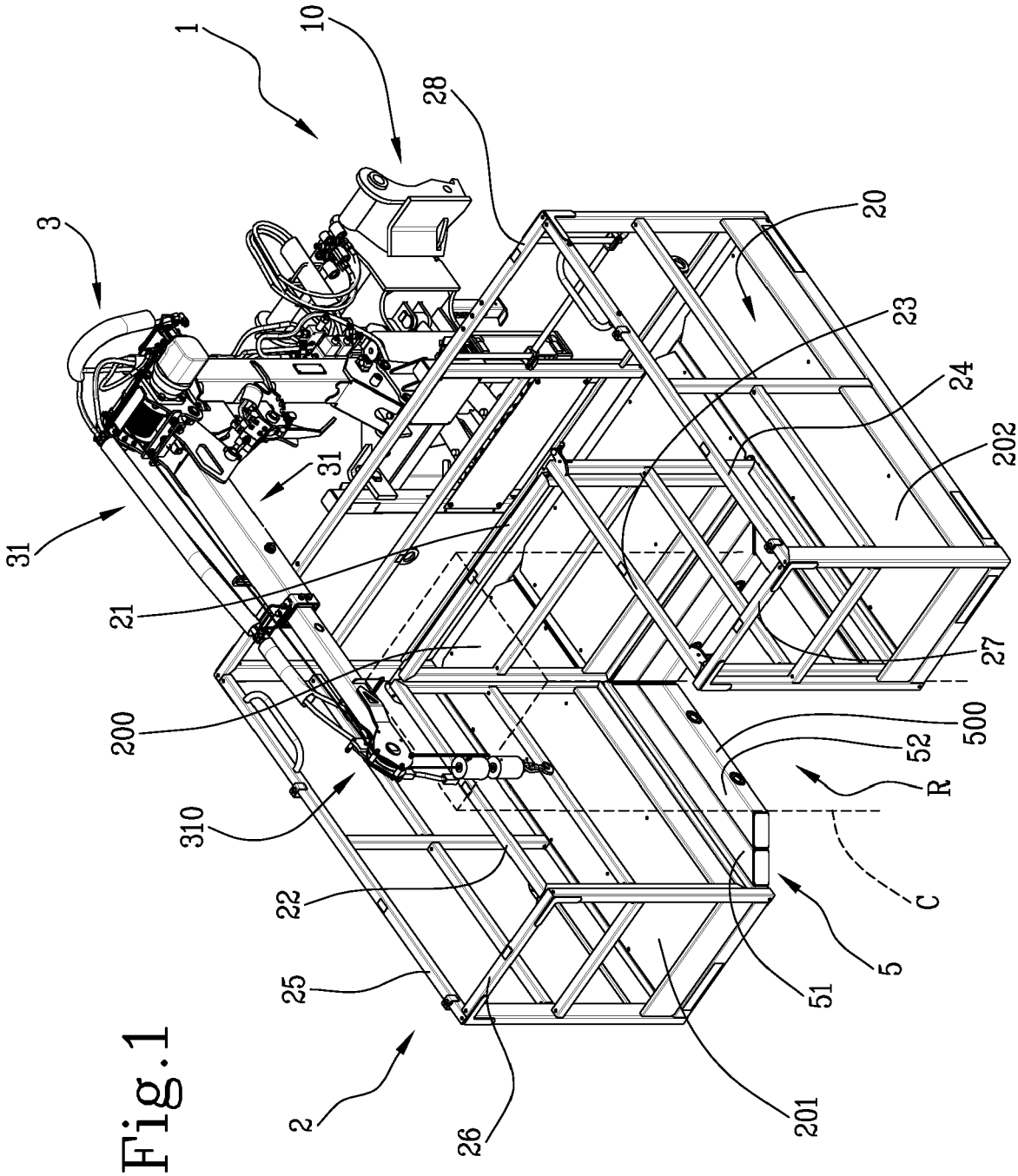

Fig.1

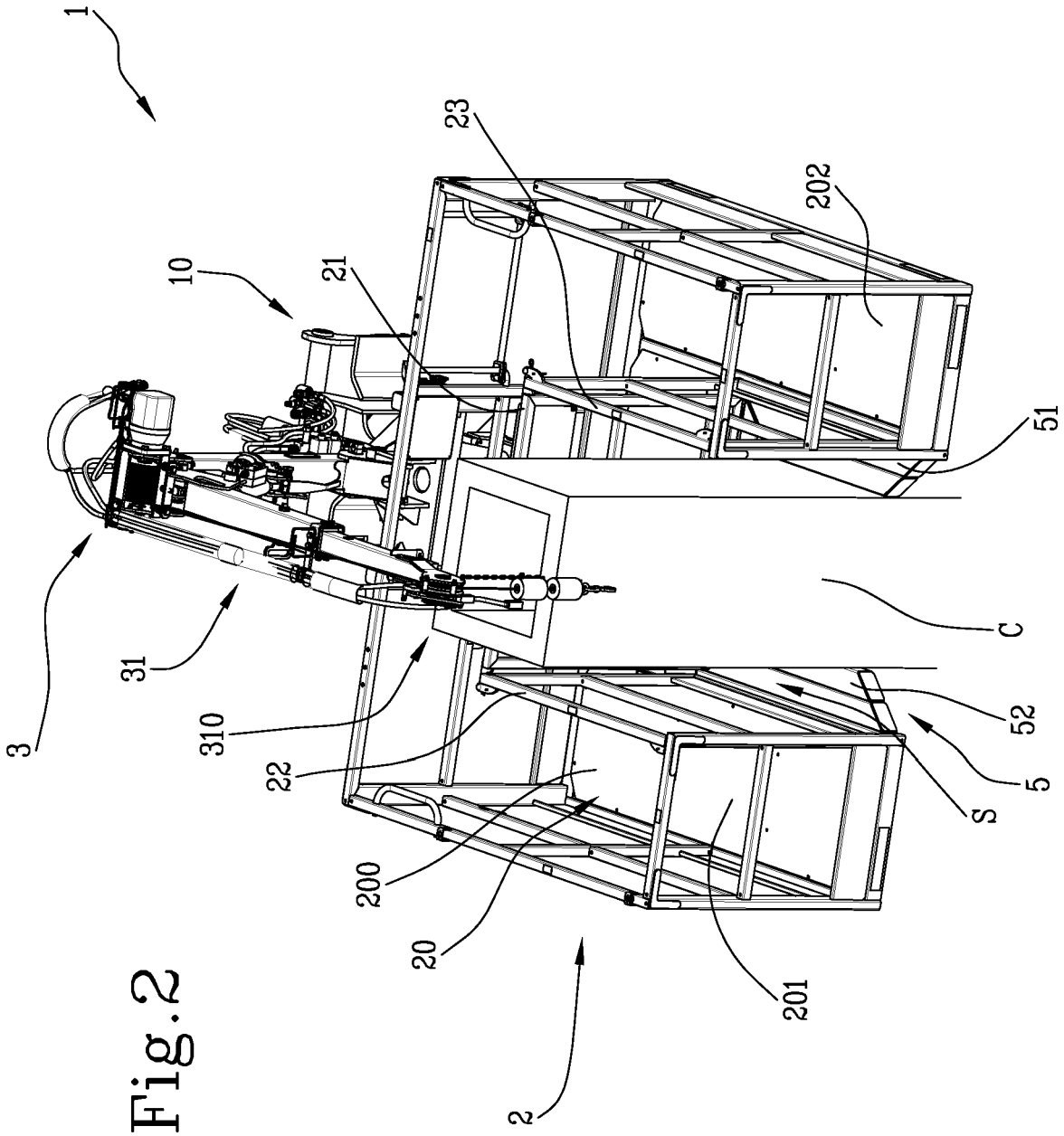

Fig.2

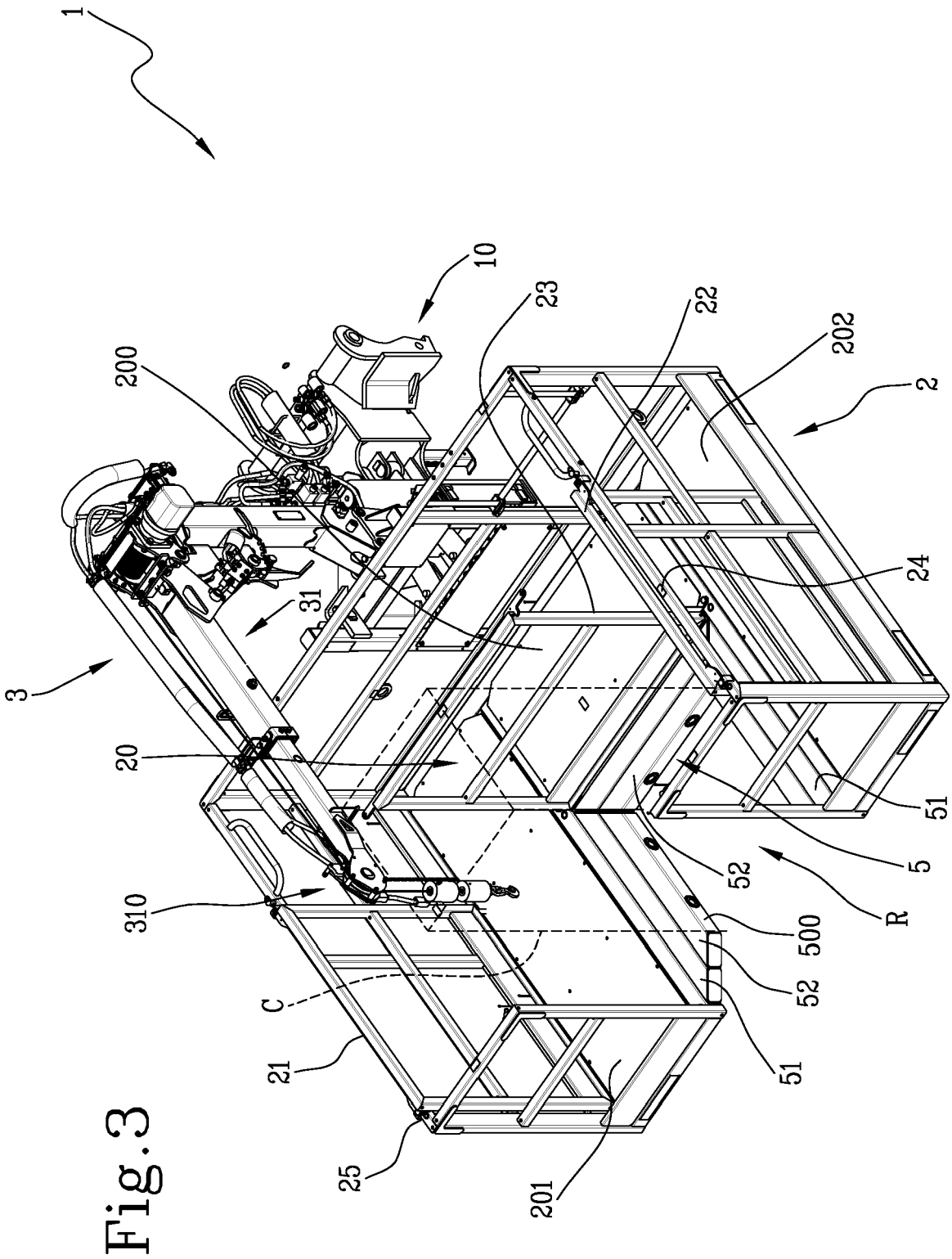

Fig.3

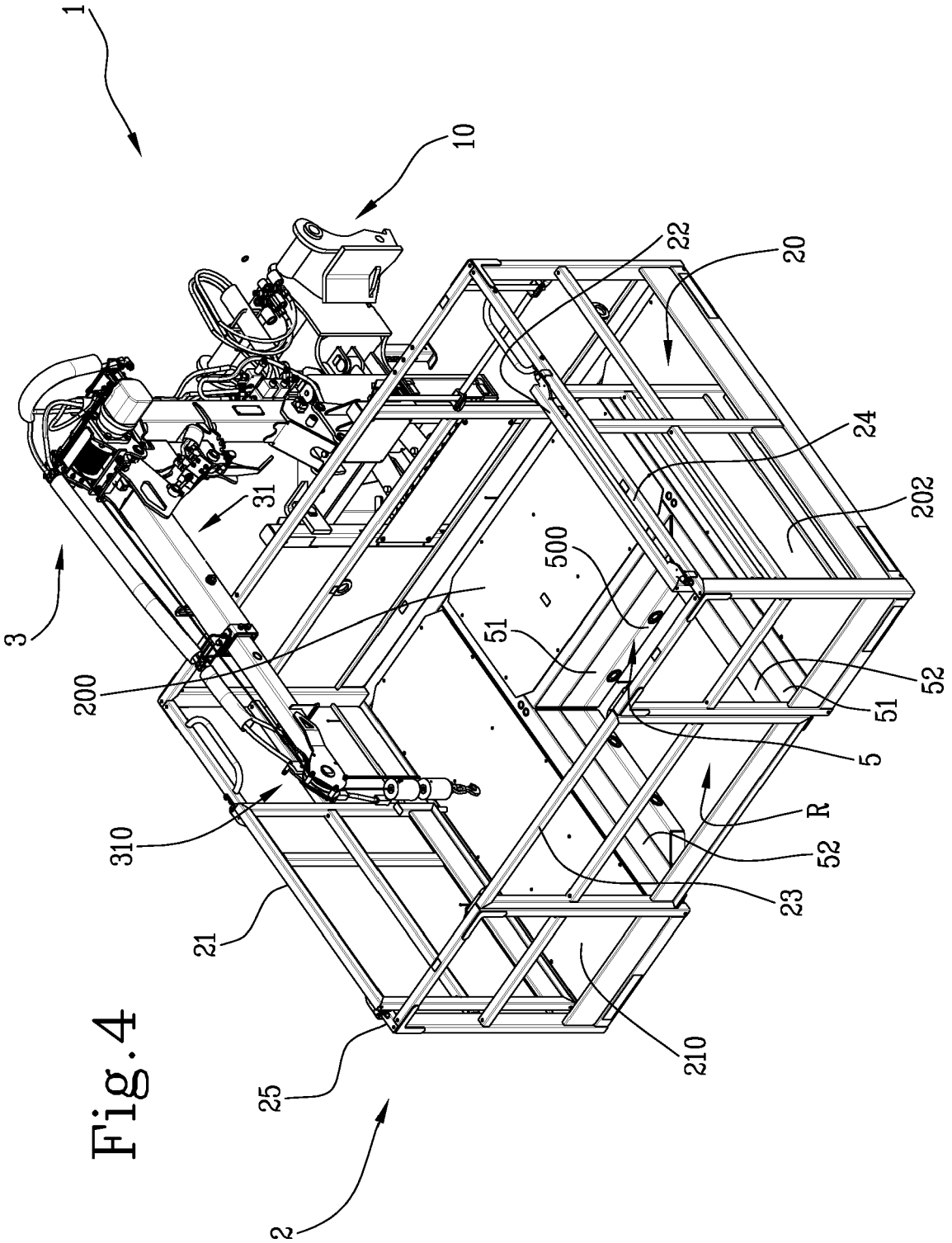

Fig.4

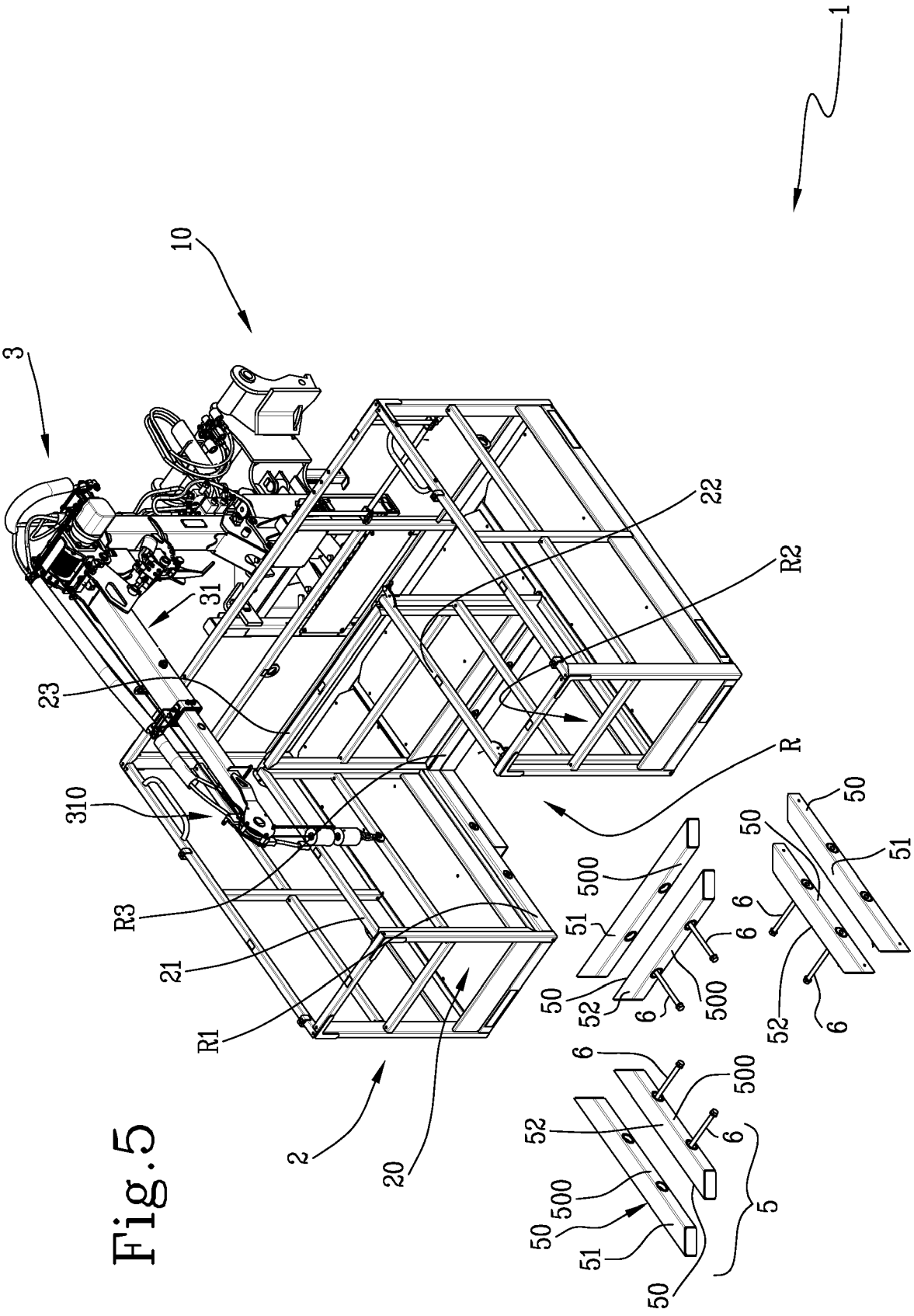

Fig.5

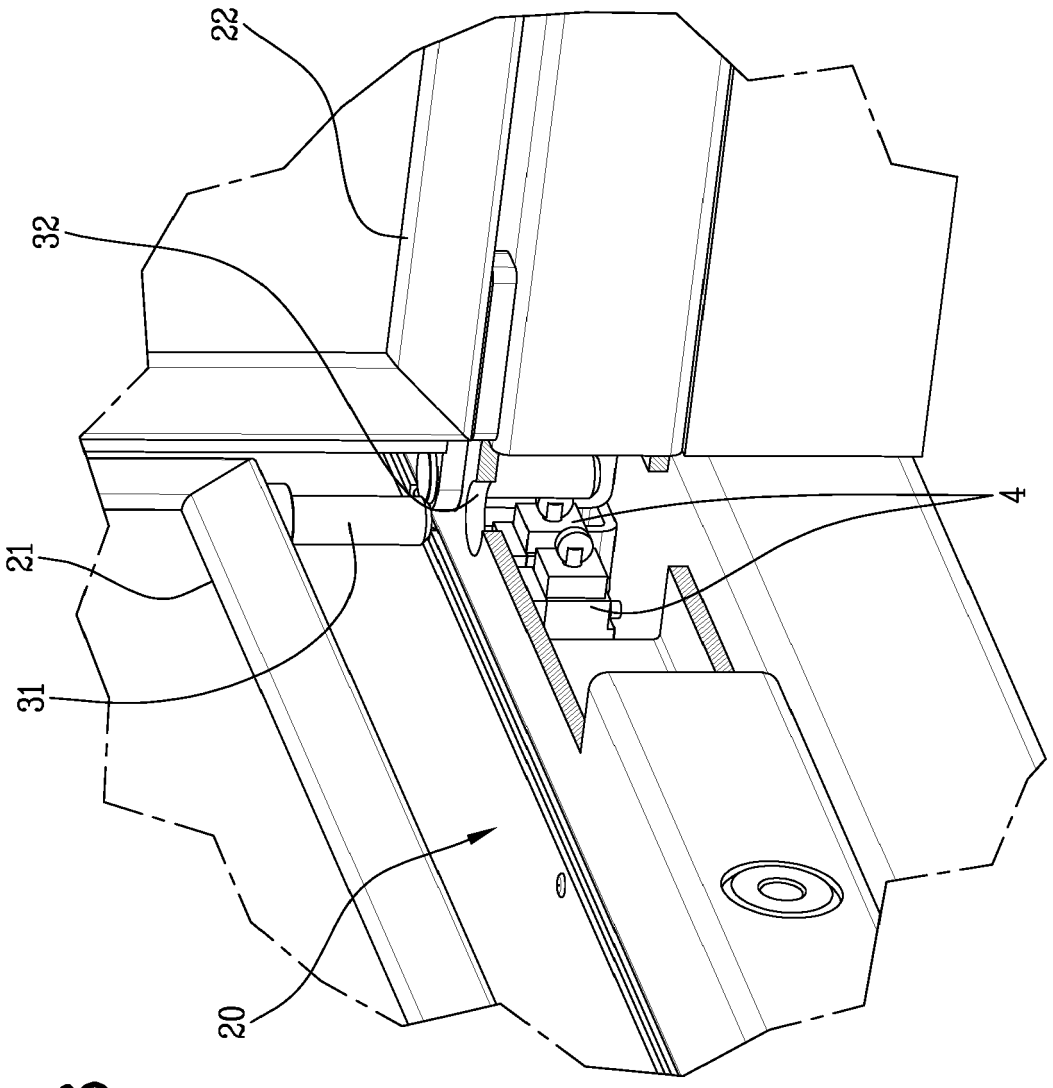

Fig.6

Europäisches Patentamt
European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 18 17 6581

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	US 2010/276228 A1 (LOMBARDI DONALD F [US]) 4 November 2010 (2010-11-04) * paragraphs [0016] - [0017], [0045], [0048], [0052], [0054] * * abstract * * figures *	1-6, 12-14,18 15-17 7-11	INV. B66F11/04
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Place of search	Date of completion of the search	Examiner
The Hague	12 September 2018	Colletti, Roberta

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