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(71) Applicant(s): L&T TECHNOLOGY SERVICES LIMITED

(72) Inventor(s): Shah, Sameer Suryakant

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(54) Title: A BOOM ASSEMBLY FOR AN EARTHMOVER

(57) Abstract: The present disclosure discloses a boom assembly (100) for an earthmover (200). The boom assembly (100) comprises a boom, a first actuator (2), a connecting member (31) and a second actuator (32). The boom is coupled to a portion of a chassis (21) and is defined with a first portion (11) and a second portion (12). The boom is pivotable between an actuated state, an intermediate state and a lowered state relative to a cabin (40) of the earthmover (200). The second actuator (32) is connectable between the chassis (21) and the connecting member (31) and is configured to pivot the boom between the intermediate state and the lowered state. With such configuration, visibility of an operator in a cabin (40) of the earthmover (200) is enhanced and obstruction by the boom of the boom assembly (100) may be reduced or eliminated.

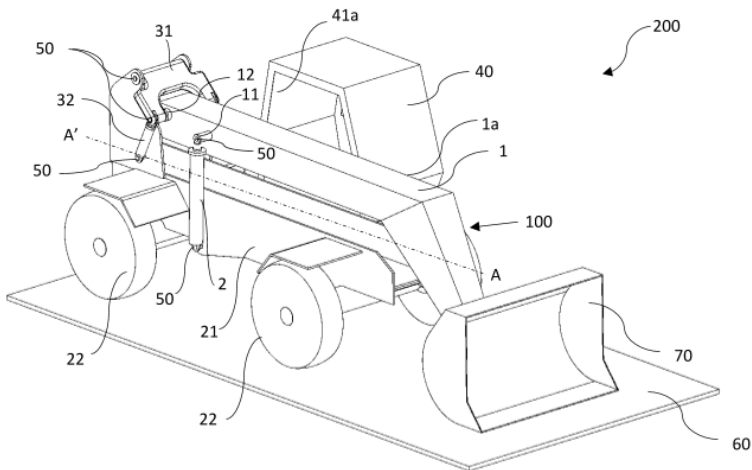


Figure 1a

FORM 2

THE PATENTS ACT 1970
(39 OF 1970)

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The Patent Rules, 2003

Complete Specification

(See Section 10 and Rule 13)

1. TITLE OF THE INVENTION

A BOOM ASSEMBLY FOR AN EARTHMOVER

2. APPLICANT(S)

(a) NAME : **L&T TECHNOLOGY SERVICES LIMITED**

(b) NATIONALITY : **INDIAN**

(c) ADDRESS : **DLF IT SEZ Park, 2nd Floor – Block 3
1/124, Mount Poonamallee Road,
Ramapuram, Chennai – 600 089,
INDIA.**

3. PREAMBLE TO THE DESCRIPTION

COMPLETE

The following specification describes the invention and the manner in which it is to be performed

TECHNICAL FIELD

[001] Present disclosure, in general, relates to the field of mechanical engineering. Particularly, but not exclusively, the present disclosure relates to material handling equipment such as an earthmover. Further, embodiments of the present disclosure relate to a boom assembly of the earthmover adapted to enhance visibility of an operator of the earthmover.

BACKGROUND OF THE DISCLOSURE

[002] Earthmoving operations generally employ various types of earthmovers, such as telehandlers, and skid steer loaders among others, for a broad range of operations (such as material movement, loading-unloading, heavy lifting, and so on). Conventional earthmoving operations typically involve use of a particular implement connected to a boom assembly of the earthmovers, based on a task performed by the earthmover. The boom assembly is pivotably coupled to a body and/or a chassis of the earthmover, where the boom is adapted to pivot between various positions corresponding to the earthmoving operation.

[003] In some of the conventional earthmovers, the boom assembly is mounted at a rear end of the body and proximal to an operator cabin of the earthmover. In such earthmovers, while the boom assembly is lowered, a part of the boom assembly may substantially block at least a portion of field of view of the operator being seated in the cabin. Such configuration of the boom assembly may cause the operator to be blind at one side of the cabin for operating the earthmover. Such hindrance and obstruction to the field of view of the operator may cause industrial/ public accidents, resulting from operational errors of the earthmover.

[004] Conventional earthmovers may be categorized in two classes based on designs. Namely, one class of earthmovers are designed with boom assembly having enhanced visibility while compromising on height of the boom assembly, while the other class of earthmovers are designed with boom assembly having greater height. In such conventional earthmovers, compromise on either visibility of the operator or height of operation and functionality is to be made, which is not desirable in terms of safety and/or economic significance of such earthmovers.

[005] With advent of technology, various attempts have been made to modify the boom assembly and impart enhanced visibility of the operator while the boom assembly is in lowered position. One such conventional modification which has been observable is that the boom

assembly being connected by a plurality of linkages between the body and the cabin. However, such linkages are complex in construction, which inherently increases cost of production, assembly, servicing and/or maintenance. Also, some of such linkages may extend to substantial length of the boom, which may render the boom assembly bulky. Furthermore, some of the conventional linkages of the boom assembly may require distinct or multiple actuators to facilitate driving forces for operation of the boom assembly, whereby increasing cost associated with operation, servicing and handling of the boom assembly.

[006] The present disclosure is directed at overcoming one or more limitations stated above or any other limitations associated with the conventional mechanisms.

SUMMARY OF THE DISCLOSURE

[007] One or more shortcomings of the prior art are overcome by an assembly as claimed and additional advantages are provided through the assembly as claimed in the present disclosure. Additional features and advantages are realized through the techniques of the present disclosure. Other embodiments and aspects of the disclosure are described in detail herein and are considered a part of the claimed disclosure.

[008] In one non-limiting embodiment of the present disclosure a boom assembly for an earthmover is disclosed. The boom assembly comprises a boom, a first actuator, a connecting member and a second actuator. The boom is coupled to a portion of a chassis and is defined with a first portion and a second portion. The boom is pivotable between an actuated state, an intermediate state and a lowered state relative to a cabin of the earthmover. The first actuator is connected between the first portion of the boom and the chassis. The first actuator is configured to pivot the boom relative to the chassis between the actuated state and the intermediate state. The connecting member is adapted to connect to the second portion of the boom and the chassis and is configured to pivot the boom relative to the chassis. The second actuator is connectable between the chassis and the connecting member and is configured to pivot the boom between the intermediate state and the lowered state. The second actuator is configured to pivot the boom about the second portion to pivot the boom relative to the cabin between the intermediate state and the lowered state.

[009] In an embodiment, the second portion is defined proximal to an end of the boom, the end of the boom being connected to the chassis and the first portion is defined away from the second portion.

[0010] In an embodiment, the connecting member defines at least one arcuate surface along a longitudinal direction to pivotably accommodate a portion of the boom relative to the second portion.

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[0011] In an embodiment, wherein the first actuator is adapted to pivot the boom away from the cabin to the actuated state.

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[0012] In an embodiment, the first actuator is adapted to pivot the boom towards the cabin in the intermediate state, wherein the boom comprises at least one edge.

[0013] In an embodiment, the at least one edge of the boom is inclined with a lateral axis of the cabin in the intermediate state.

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[0014] In an embodiment, the second actuator is adapted to pivot the boom towards the cabin, wherein the at least one edge of the boom is inclined at a predetermined angle relative to the lateral axis of the cabin in the lowered state.

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[0015] In an embodiment, the second actuator is connectable on one end to one of the connecting member and the second portion of the boom and is connectable to the chassis on an other end opposite to the one end.

[0016] In an embodiment, the boom assembly comprises a plurality of pins disposed at the first portion, the second portion, and the chassis.

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[0017] In an embodiment, the plurality of pins operatively connects the first actuator, the second actuator and the connecting member to the boom and the chassis.

[0018] The foregoing summary is illustrative only and is not intended to be in any way limiting.

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In addition to the illustrative aspects, embodiments, and features described above, further aspects, embodiments, and features will become apparent by reference to the drawings and the following detailed description.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

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[0019] The novel features and characteristic of the disclosure are set forth in the appended claims. The disclosure itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed

description of an illustrative embodiment when read in conjunction with the accompanying figures. One or more embodiments are now described, by way of example only, with reference to the accompanying figures wherein like reference numerals represent like elements and in which:

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[0020] Figure 1a is a perspective view of an earthmover in accordance with an embodiment of the present disclosure.

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[0021] Figure 1b is a top perspective view of the earthmover in accordance with an embodiment of the present disclosure.

[0022] Figure 1c is a rear perspective view of the earthmover in accordance with an embodiment of the present disclosure.

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[0023] Figure 1d is a top view of the earthmover in accordance with an embodiment of the present disclosure.

[0024] Figure 2a is a magnified view of the boom assembly in a lowered state, in accordance with an embodiment of the present disclosure.

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[0025] Figure 2b is a magnified view of the boom assembly in an actuated state, in accordance with an embodiment of the present disclosure.

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[0026] Figure 3a is a side view of the earthmover depicting the position of the boom assembly relative to the cabin in the actuated state, in accordance with an embodiment of the present disclosure.

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[0027] Figure 3b is a side view of the earthmover depicting the position of the boom assembly relative to the cabin in the intermediate state, in accordance with an embodiment of the present disclosure.

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[0028] Figure 3c is a side view of the earthmover depicting the position of the boom assembly relative to the cabin in the lowered state, in accordance with an embodiment of the present disclosure.

[0029] Figure 3d is a side view of the earthmover depicting the positions of the boom assembly relative to the cabin superimposed in the intermediate state and the lowered state, in accordance with an embodiment of the present disclosure.

5 [0030] Figure 4a is a perspective view of the earthmover without a cabin depicting the boom assembly in the actuated state, in accordance with an embodiment of the present disclosure.

[0031] Figure 4b is a side view of the earthmover without the cabin depicting the boom assembly in the lowered state, in accordance with an embodiment of the present disclosure.

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[0032] Figure 4c is a side view of the earthmover without the cabin, depicting the boom assembly in the lowered state in comparison with a conventional earthmover, in accordance with an embodiment of the present disclosure.

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[0033] Figure 4d is a side view of the earthmover without the cabin, depicting the boom assembly in the actuated state in comparison with the conventional earthmover, in accordance with an embodiment of the present disclosure.

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[0034] The figures depict embodiments of the disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the assembly illustrated herein may be employed without departing from the principles of the disclosure described herein.

DETAILED DESCRIPTION

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[0035] While the embodiments in the disclosure are subject to various modifications and alternative forms, specific embodiment thereof has been shown by way of example in the figures and will be described below. It should be understood, however, that it is not intended to limit the disclosure to the particular forms disclosed, but on the contrary, the disclosure is to cover all modifications, equivalents, and alternative falling within the scope of the disclosure.

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[0036] The terms “comprises”, “comprising”, or any other variations thereof used in the disclosure, are intended to cover a non-exclusive inclusion, such that a device, assembly, mechanism and machine that comprises a list of components does not include only those components but may include other components not expressly listed or inherent to such system, or assembly, or device. In other words, one or more elements in a system preceded by

“comprises... a” does not, without more constraints, preclude the existence of other elements or additional elements in the system or method.

5 [0037] Embodiments of the present disclosure discloses a boom assembly for an earthmover is disclosed. The boom assembly comprises a boom, a first actuator, a connecting member and a second actuator. The boom is coupled to a portion of a chassis and is defined with a first portion and a second portion. The boom is pivotable between an actuated state, an intermediate state and a lowered state relative to a cabin of the earthmover. The first actuator is connected between the first portion of the boom and the chassis. The first actuator is configured to pivot
10 the boom relative to the chassis between the actuated state and the intermediate state. The connecting member is adapted to connect to the second portion of the boom and the chassis and is configured to pivot the boom relative to the chassis. The second actuator is connectable between the chassis and the connecting member and is configured to pivot the boom between the intermediate state and the lowered state. The second actuator is configured to pivot the
15 boom about the second portion to pivot the boom relative to the cabin between the intermediate state and the lowered state. With such configuration, field of view of an operator in a cabin of the earthmover is improved and obstruction by the boom of the boom assembly may be reduced or eliminated. Further, such boom assembly may reduce the number of components required for pivoting the boom relative to the cabin of the earthmover without compromising on reach
20 and/or functioning thereof.

[0038] The disclosure is described in the following paragraphs with reference to Figures 1 to 5. In the figures, the same element or elements which have same functions are indicated by the same reference signs. One skilled in the art would appreciate that the assembly as disclosed in
25 the present disclosure may be used in any material handling machines including but not limiting to light, medium and heavy earthmovers and the like. The assembly of the present disclosure may also be implemented in the earthmovers having a boom mounted relative to a cabin of the earthmover without deviating from the principles of the present disclosure.

30 [0039] Figures 1a and 1b refer to an exemplary embodiment of the present disclosure which illustrates an earthmover (200). The earthmover (200) may be a material handling equipment including but not limited to telehandler, skid steer loader and the like. The earthmover (200) comprises a chassis (21) configured to receive and secure a body [explicitly not shown in Figures]. The body may define a cabin (40) to accommodate an operator of the earthmover
35 (200). The cabin (40) may be accommodated on the chassis (21) of the earthmover (200). The

earthmover (200) may include a power unit [not explicitly shown in Figures], and a boom assembly (100). The power unit may be disposed on the chassis (21) and surrounded by a portion of the body. The boom assembly (100) may be connectable to the chassis (21) and actuable by the first actuator (2) and the second actuator (32), which may be connected
5 between the boom assembly (100) and the chassis (21) for earthmoving operations. In an embodiment, the cabin (40) may be defined with a plurality of windows such as a first window (41a) and a second window (41b) as can be seen in Figures 1a and 1b. The boom assembly (100) may be positioned proximal to at least one window of the plurality of windows. In the illustrative embodiment, the boom (1) is positioned proximal to at least one window at lateral
10 side of the cabin (40), where such window is configured to provide field of view along lateral direction of the earthmover (200) for operation. The earthmover (200) and the first actuator (2) and the second actuator (32) may be driven by the power unit. In an embodiment, the first actuator (2) and the second actuator (32) may be driven by a separate actuation mechanism.

[0040] The earthmover (200) may include a transmission unit [not shown in Figures], which may be operatively coupled to the power unit and a plurality of wheels (22) to drive and maneuver the earthmover (200) on a ground (60). The power unit of the earthmover (200) may be an engine or a motor or a plurality of motors. In an embodiment, the motor or plurality of motors may be electrically coupled and may be driven by a battery and the same shall not be
20 considered a limitation. The earthmover (200) may be configured to house a control dashboard including a steering, accelerator, brake and the like, to control the engine and/or motor and thereby control movement of the earthmover (200).

[0041] Referring now to Figures 1c and 1d, the boom assembly (100) of the earthmover (200)
25 may be operatively coupled to the chassis (21). In the illustrative embodiment, the boom assembly (100) is coupled at a rear portion of the chassis (21) and positioned proximal (i.e., on lateral side and adjacent) to an end of the cabin (40) as can be seen in Figure 1d. The boom assembly (100) may include an implement (70) connected on an end of the boom assembly (100) positioned away from the cabin (40). For sake of explanation, the implement (70) is
30 depicted as a scooper. The chassis (21) may be defined with a plurality of vertical extensions (21a, 21b) on the rear portion of the chassis (21) to accommodate a portion of the boom assembly (100) as can be seen in Figure 1c. The at least two vertical extensions (21a, 21b) may be spaced apart (as best seen in Figure 1d) to accommodate the boom assembly (100) and operatively couple the boom assembly (100) to the chassis (21).

[0042] Referring now to Figures 2a to 2c, the boom assembly (100) may comprise a boom (1) coupled to a portion of the chassis (21). The boom may be coupled to the at least two vertical extensions (21a, 21b) defined on the rear portion of the chassis (21), where the boom is pivotable relative to the rear portion between an actuated state, an intermediate state and a lowered state. The actuated state may be defined as a condition in which the boom (1) may be pivoted relative to chassis (21) and the implement (70) may be positioned away from the ground (60) as can be seen in Figure 2a. The intermediate state may be defined as a condition in which the boom (1) may be pivoted relative to chassis (21) and the implement (70) may be lowered from the actuated state and proximal to and/or on the ground (60) as can be seen in Figure 2b. In the intermediate state, at least one edge (1a) of the boom (1) defined at intersection of at least two surfaces of the boom (1) may be inclined at an angle relative to a lateral axis (AA') of the cabin (40) defined across lateral direction of the earthmover (200) as can be seen in Figure 2b. The lowered state may be defined as a condition in which an end of the boom (1) may be lowered from the intermediate state relative to an edge of the cabin (40), while the implement (70) may be positioned on the ground (60) as can be seen in Figure 2c. In the lowered state, a portion of the boom such as the at least one edge (1a) of the boom (1) may be inclined at a predetermined angle relative to the lateral axis (AA'). The predetermined angle may be defined as the angle relative to the lateral axis (AA'), where such angle enhances field of view of the operator in the cabin. The predetermined angle may be less than the inclination between the at least one edge (1a) and the lateral axis (AA') in the intermediate state. For example, the predetermined angle may be in a range of 0 to 25 degrees relative to the lateral axis (AA'). In the illustrative embodiment, the at least one edge (1a) is depicted substantially parallel to the lateral axis (AA') of the cabin (40) as can be seen in Figure 2c. For example, the inclination between the end and the lateral axis (AA') may be in a range of 50 to 80 degrees in the actuated state, where such angle may vary based on requirement and configuration of the boom assembly (100), the connecting member (31) and the earthmover (200). The inclination between the end of the boom (1) and the lateral axis (AA') may be in a range of 15 to 50 degrees in the intermediate state. The inclination between the end of the boom (1) and the lateral axis (AA') may be in a range of -10 to 15 degrees in the lowered state.

[0043] Referring now to Figures 3a and 3b, the boom (1) may be defined with a first portion (11) and a second portion (12). The second portion (12) may be defined proximal to the end of the boom (1) being connected to the at least two vertical extensions (21a, 21b) of the chassis

(21). The first portion (11) may be defined along length of the boom (1) and away from the second portion (12). The first portion (11) and the second portion (12) may be selected from the group consisting of a cylindrical projection, a slot, an aperture, a groove and the like. In an embodiment, the first portion (11) and the second portion (12) may be defined in a spaced apart configuration and defined proximal to the end of the boom (1) being connected to the rear portion of the chassis (21). The first portion (11) may receive a first actuator (2) of the boom assembly (100) and the second portion (12) may receive a second actuator (32) of the boom assembly (100). The first portion (11) and the second portion (12) of the boom may pivotably receive the first actuator (2) and the connecting member (31) respectively to pivot the boom (1) relative to the chassis (21) of the earthmover (200). In the illustrative embodiment, the first portion (11) and the second portion (12) are depicted proximal to the end of the boom (1) being connected to the rear portion of the chassis (21) as can be seen in Figure 3a to minimize length of components required to couple the boom (1) to the chassis (21). Such a configuration of the first portion (11) and the second portion (12) shall not be construed as a limitation as positions and profiles of the first portion (11) and the second portion (12) may be varied based on design requirements. In an embodiment, the first actuator (2) and the second actuator (32) may be coupled to the first portion (11) and the second portion (12) respectively by a plurality of pins (50) accommodated in the first portion (11) and the second portion (12) as can be seen in Figure 3a. In the illustrative embodiment, the boom (1) may be defined by two first portions and two second portions defined on either sides of the boom (1) as can be seen in Figure 3a for uniform actuation of the boom (1) by the first actuator (2) and the second actuator (32) and the same shall not be construed as a limitation.

[0044] Further, the boom assembly (100) may include a connecting member (31) adapted to connect to the second portion (12) of the boom (1) and the chassis (21). The connecting member (31) may extend between the boom (1) and the at least two vertical extensions (21a, 21b) of the chassis (21) to couple the boom (1) to the chassis (21) by an offset as best seen in Figure 3b. In an embodiment, profile of the connecting member (31) may be defined by at least one of a U-shaped profile, rectangular profile, C-shaped profile and the like. In the illustrative embodiment, the connecting member (31) is depicted with an elongated U-shaped profile connectable between the at least two vertical extensions (21a, 21b) on one end and connectable to the second portion (12) of the boom (1) on an other end opposite to the one end to reduce length of the connecting member (31) as best be seen in Figure 3a. However, other profiles of the connecting member (31) may also be used based on design requirements of the boom

assembly (100). In an embodiment, the connecting member (31) may be defined with at least one arcuate surface (31a) along a longitudinal direction to pivotably accommodate a portion of the boom (1) relative to the second portion (12) as can be seen in Figure 3a. In an embodiment, the connecting member (31) may be defined by two binary links positioned on either sides of the boom (1) and connectable between the at least two vertical extensions (21a, 21b) and the first portion (11).

[0045] Referring again to Figures 3a and 3b, the boom assembly (100) includes the first actuator (2) and the second actuator (32). The first actuator (2) may be connected between the first portion (11) of the boom (1) and the chassis (21). The first actuator (2) may be configured to pivot the boom (1) relative to the chassis (21) between the actuated state and the intermediate state as can be seen in Figures 2a and 2b. Referring back to Figures 3a and 3b, the first actuator (2) may be connected to the chassis (21) and the first portion (11) of the boom (1) by the plurality of pins (50) as can be seen in Figure 3a. The second actuator (32) may be connectable between the chassis (21) and the connecting member (31). The second actuator (32) may be configured to pivot the boom (1) between the intermediate state and the lowered state as can be seen in Figures 2b and 2c. In an embodiment, the second actuator (32) may be connected to one of the second portion (12) and end of the connecting member (31) being connected to the boom (1). For sake of explanation, the second actuator (32) is depicted to be connected between the chassis (21) and the second portion (12) of the boom (1), where the second actuator (32) directly pivots the connecting member (31). Such configuration of the second actuator (32) shall not be construed as a limitation, as the second actuator (32) may be directly connected to the end of the connecting member (31) being connected to the boom (1) or may be connected to a portion between ends of the connecting member (31) being connected to the second portion (12) of the boom (1) and the chassis (21). In the illustrative embodiment, the first actuator (2) and the second actuator (32) are depicted as hydraulic actuators, each comprising a plunger and a cylinder. However, other actuators such as pneumatic actuators, electric actuators and other linear actuators may also be connected between the boom (1) and the chassis (21).

[0046] Referring again to Figures 2a to 2c, the first actuator (2) may pivot the boom (1) relative to the chassis (21) of the earthmover (200) between the actuated state and the intermediate state. For example, the first actuator (2) may be retracted to pivot the boom (1) relative to the chassis (21) from the actuated state to the intermediate state as can be seen in Figures 2a and 2b to lower the implement (70) toward the ground (60). During retraction of the first actuator

(2), the connecting member (31) pivots about the at least two vertical extensions (21a, 21b) of the chassis (21) to pivot the boom (1) relative to the chassis (21) from the actuated state to the lowered state. In the intermediate state, the boom (1) may partially block the first window (41a) as can be seen in Figure 2b. The second actuator (32) may be configured to pivot the boom (1) relative to the cabin (40) from the intermediate state to the lowered state. For example, the second actuator (32) may be retracted to pivot the connecting member (31) relative to the at least two vertical extensions (21a, 21b) of the chassis (21), to pivot the boom (1) relative to the cabin (40) from the intermediate state to the lowered state as can be seen in Figures 2b and 2c to lower the boom (1) toward the chassis (21). In the lowered state where a portion of the boom (1) such as the at least one edge (1a) is parallel to the lateral axis (AA') of the cabin (40) as can be seen in Figure 2c, the visibility through the first window (41a) for the operator seated in the cabin (40) may be increased due to lowering of the boom (1) from the intermediate as indicated by a superimposed portion (80) as clearly seen in Figure 5. In an embodiment, the second actuator (32) may be retracted to pivot the connecting member (31) where a portion of the boom (1) such as the at least one edge (1a) (1a) may be inclined at an angle with the lateral axis (AA'), where the angle may be defined in a direction opposite to the direction opposite to that of the angle defined in the actuated state of the boom (1).

[0047] Figures 4a and 4b illustrate an exemplary embodiment of the present disclosure depicting the earthmover (200) with the boom assembly (100) without the cabin (40).

[0048] Referring now to Figures 4c and 4d, which illustrate side views of the earthmover (200) without the cabin (40), depicting the boom assembly (100) in the lowered state and the actuated state in comparison with a conventional earthmover (200'). The second actuator (32) pivots the boom (1) relatively lower than that of the conventional earthmover (200') as can be seen in Figure 4c. Further, the boom assembly (100) includes the connecting member (31) positioned between the boom (1) and the chassis (21) of the earthmover (200), thereby reducing length of the boom (1) required for pivoting the implement (70) to same height as that of the conventional earthmover (200') as depicted in Figure 4d. Such reduction in length of the boom (1) may reduce material required for the boom (1) of the boom assembly (100). In an embodiment, the proposed boom assembly (100) provides enhanced visibility to the operator of the earthmover (200) without compromising on reach and/or functioning of the earthmover (200).

EQUIVALENTS

With respect to the use of substantially any plural and/or singular terms herein, those having skill in the art can translate from the plural to the singular and/or from the singular to the plural as is appropriate to the context and/or application. The various singular/plural permutations may be expressly set forth herein for sake of clarity.

It will be understood by those within the art that, in general, terms used herein, and especially in the appended claims (e.g., bodies of the appended claims) are generally intended as “open” terms (e.g., the term “including” should be interpreted as “including but not limited to,” the term “having” should be interpreted as “having at least,” the term “includes” should be interpreted as “includes but is not limited to,” etc.). It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent will be explicitly recited in the claim, and in the absence of such recitation no such intent is present. For example, as an aid to understanding, the following appended claims may contain usage of the introductory phrases “at least one” and “one or more” to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles “a” or “an” limits any particular claim containing such introduced claim recitation to inventions containing only one such recitation, even when the same claim includes the introductory phrases “one or more” or “at least one” and indefinite articles such as “a” or “an” (e.g., “a” and/or “an” should typically be interpreted to mean “at least one” or “one or more”); the same holds true for the use of definite articles used to introduce claim recitations. In addition, even if a specific number of an introduced claim recitation *is* explicitly recited, those skilled in the art will recognize that such recitation should typically be interpreted to mean *at least* the recited number (e.g., the bare recitation of “two recitations,” without other modifiers, typically means *at least* two recitations, or *two or more* recitations). Furthermore, in those instances where a convention analogous to “at least one of A, B, and C, etc.” is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., “a system having at least one of A, B, and C” would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). In those instances where a convention analogous to “at least one of A, B, or C, etc.” is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., “a system having at least one of A, B, or C” would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C

together, B and C together, and/or A, B, and C together, etc.). It will be further understood by those within the art that virtually any disjunctive word and/or phrase presenting two or more alternative terms, whether in the description, claims, or drawings, should be understood to contemplate the possibilities of including one of the terms, either of the terms, or both terms. For example, the phrase “A or B” will be understood to include the possibilities of “A” or “B” or “A and B.”

In addition, where features or aspects of the disclosure are described in terms of Markush groups, those skilled in the art will recognize that the disclosure is also thereby described in terms of any individual member or subgroup of members of the Markush group.

While various aspects and embodiments have been disclosed herein, other aspects and embodiments will be apparent to those skilled in the art. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope and spirit being indicated by the following claims.

Referral Numeral:

Component	Referral numeral
Boom assembly	100
Earthmover	200
Boom	1
Edge	1a
Chassis	21
Vertical extensions	21a, 21b
Plurality of wheels	22
First portion	11
Second portion	12
First actuator	2
Connecting member	31
At least one arcuate surface	31a
Second actuator	32
Cabin	40

First Window	41a
Second window	41b
Plurality of pins	50
Ground	60
Implement	70
Lateral axis	AA'
Conventional earthmover	200'
Superimposed portion	80

WE CLAIM:

1. A boom assembly (100) for an earthmover (200), the boom assembly (100) comprising:
 - a boom (1) coupled to a portion of a chassis (21), wherein the boom (1) is defined with a first portion (11) and a second portion (12), and is pivotable between an actuated state, an intermediate state and a lowered state relative to a cabin (40) of the earthmover (200);
 - a first actuator (2) connected between the first portion (11) of the boom (1) and the chassis (21), wherein the first actuator (2) is configured to pivot the boom (1) relative to the chassis (21) between the actuated state and the intermediate state;
 - a connecting member (31), adapted to connect to the second portion (12) of the boom (1) and the chassis (21), wherein the connecting member (31) is configured to pivot the boom (1) relative to the chassis (21);
 - a second actuator (32), connectable between the chassis (21) and the connecting member (31), wherein the second actuator (32) is configured to pivot the boom (1) between the intermediate state and the lowered state, and
 - wherein the second actuator (32) is configured to pivot the boom (1) about the second portion (12) to pivot the boom (1) relative to the cabin (40) between the intermediate state and the lowered state.
2. The boom assembly (100) as claimed in claim 1, wherein the second portion (12) is defined proximal to an end of the boom (1), the end of the boom (1) being connected to the chassis (21) and the first portion (11) is defined away from the second portion (12).
3. The boom assembly (100) as claimed in claim 1, wherein the connecting member (31) defines at least one arcuate surface (31a) along a longitudinal direction to pivotably accommodate a portion of the boom (1) relative to the second portion (12).
4. The boom assembly (100) as claimed in claim 1, wherein the first actuator (2) is adapted to pivot the boom (1) away from the cabin (40) to the actuated state.
5. The boom assembly (100) as claimed in claim 1, wherein the first actuator (2) is adapted to pivot the boom (1) towards the cabin (40) in the intermediate state, wherein the boom (1) comprises at least one edge (1a).

6. The boom assembly (100) as claimed in claim 5, wherein the at least one edge (1a) of the boom (1) is inclined with a lateral axis (AA') of the cabin (40) in the intermediate state.
7. The boom assembly (100) as claimed in claim 6, wherein the second actuator (32) is adapted to pivot the boom (1) towards the cabin (40), wherein the at least one edge (1a) of the boom (1) is inclined at a predetermined angle relative to the lateral axis (AA') of the cabin (40) in the lowered state.
8. The boom assembly (100) as claimed in claim 1, wherein the second actuator (32) is connectable on one end to one of the connecting member (31) and the second portion (12) of the boom (1) and is connectable to the chassis (21) on an other end opposite to the one end.
9. The boom assembly (100) as claimed in claim 8, wherein the boom assembly (100) comprises a plurality of pins (50) disposed at the first portion (11), the second portion (12), and the chassis (21).
10. The boom assembly (100) as claimed in claim 9, wherein the plurality of pins (50) operatively connects the first actuator (2), the second actuator (32) and the connecting member (31) to the boom (1) and the chassis (21).

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-- Digitally Signed--

Bhanu Prasad
(INPA No: **3253**)
Head, IPR Dept.,
L&T Technology Services Limited,
DLF 3rd Block, 2nd Floor,
Manapakkam, Chennai - 600089.

ABSTRACT

A BOOM ASSEMBLY FOR AN EARTHMOVER

The present disclosure discloses a boom assembly (100) for an earthmover (200). The boom assembly (100) comprises a boom, a first actuator (2), a connecting member (31) and a second actuator (32). The boom is coupled to a portion of a chassis (21) and is defined with a first portion (11) and a second portion (12). The boom is pivotable between an actuated state, an intermediate state and a lowered state relative to a cabin (40) of the earthmover (200). The second actuator (32) is connectable between the chassis (21) and the connecting member (31) and is configured to pivot the boom between the intermediate state and the lowered state. With such configuration, visibility of an operator in a cabin (40) of the earthmover (200) is enhanced and obstruction by the boom of the boom assembly (100) may be reduced or eliminated.

Figure 1a is a representative figure.

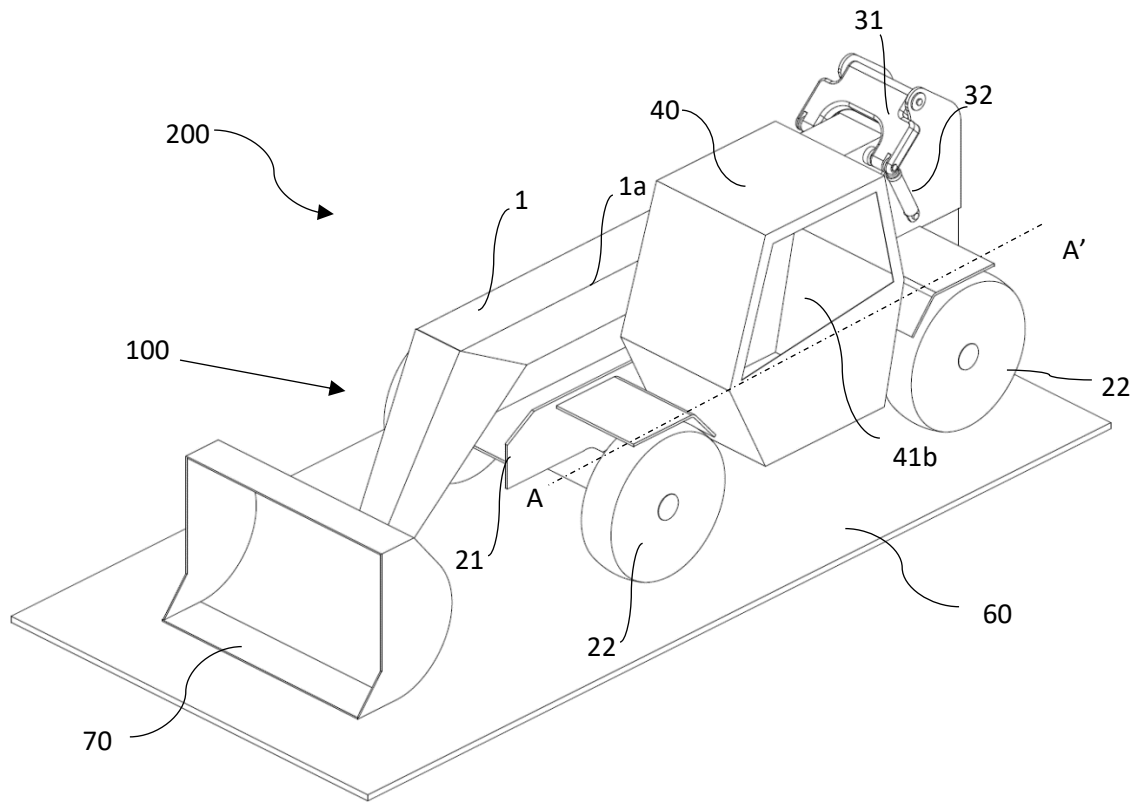


Figure 1b

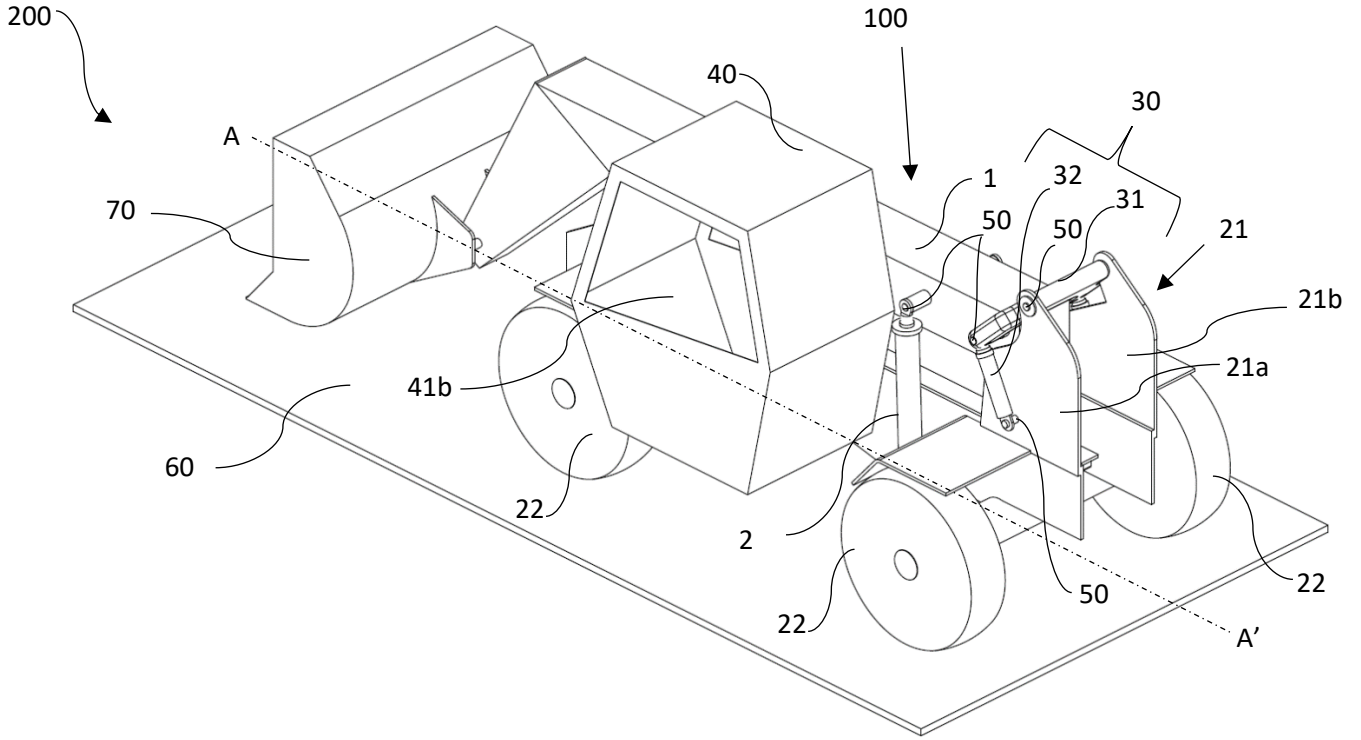


Figure 1c

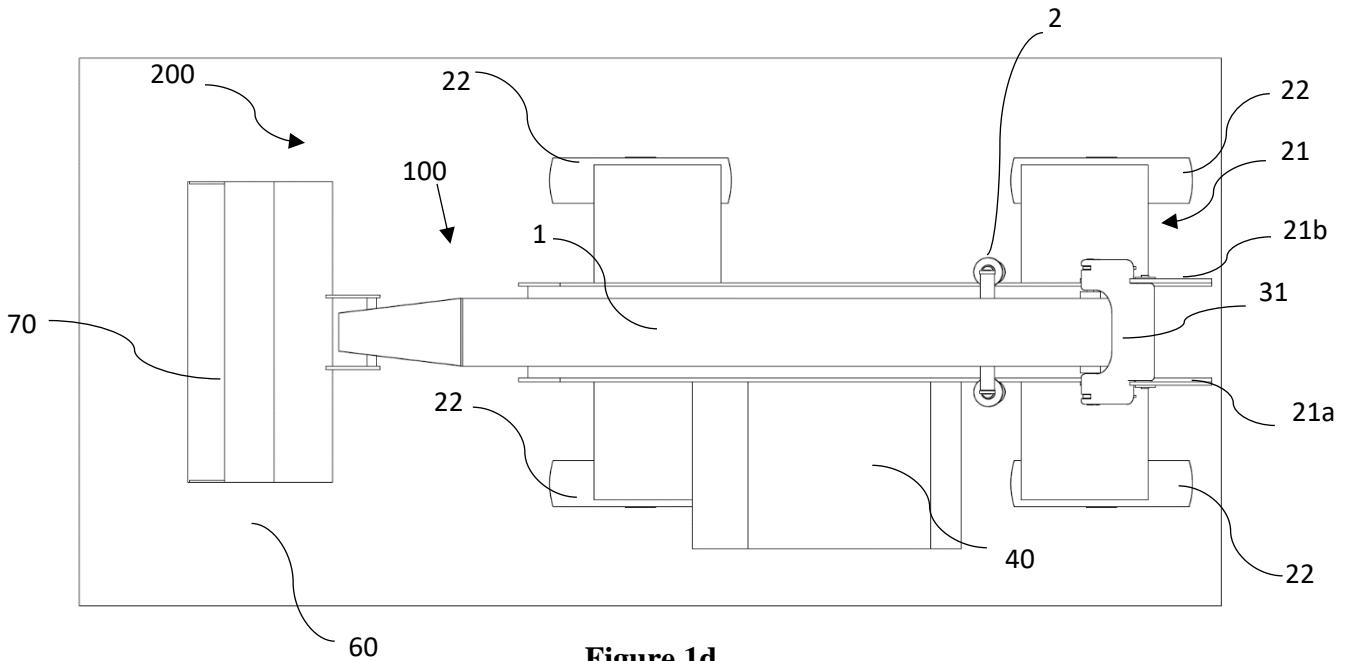


Figure 1d

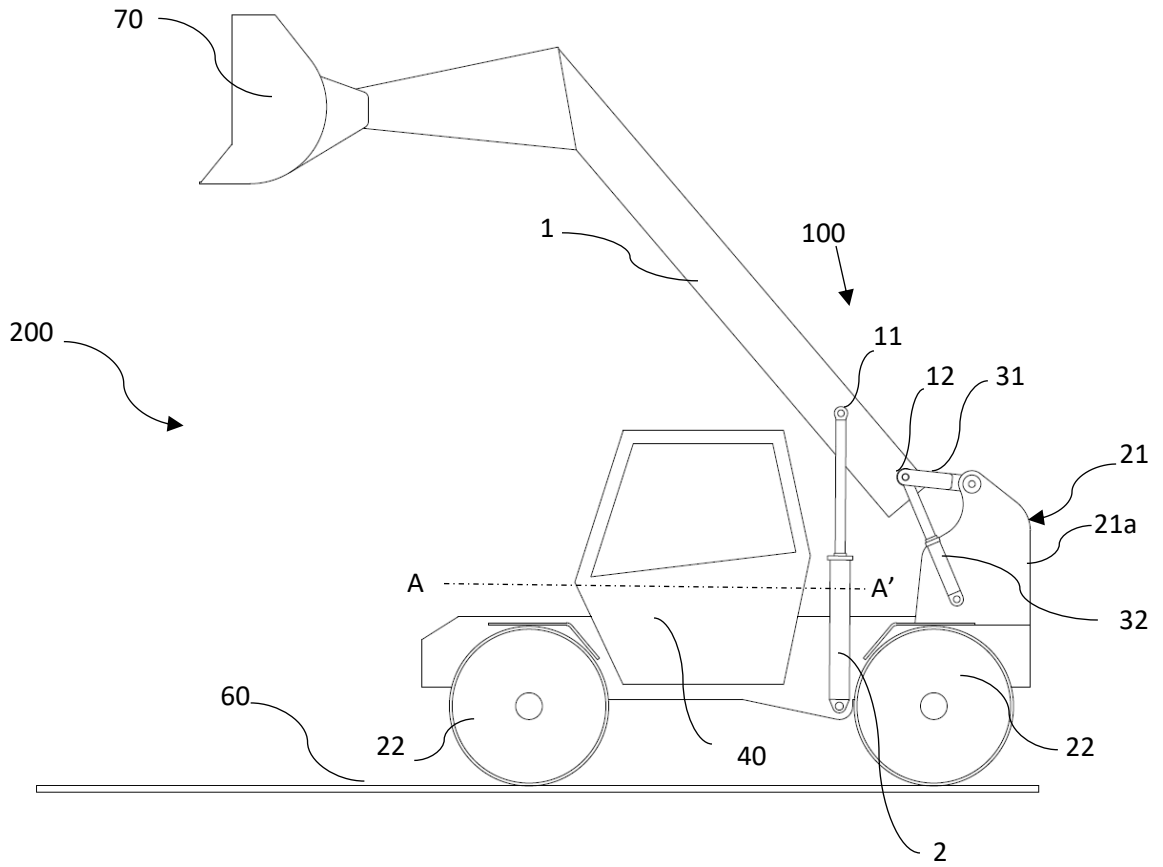


Figure 2a

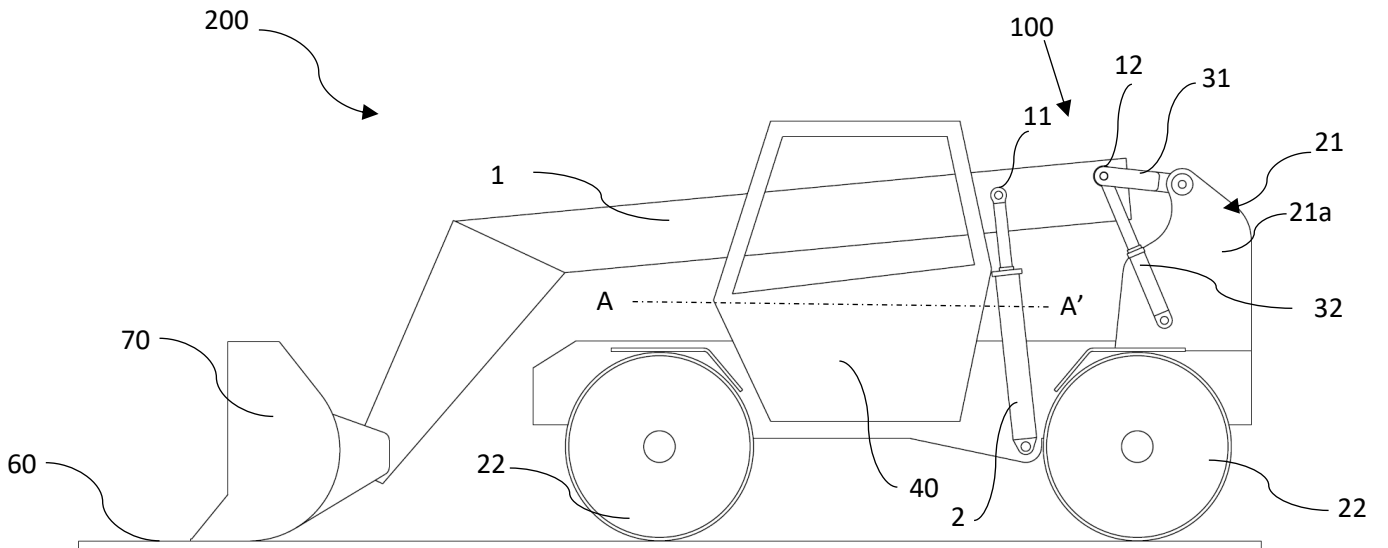


Figure 2b

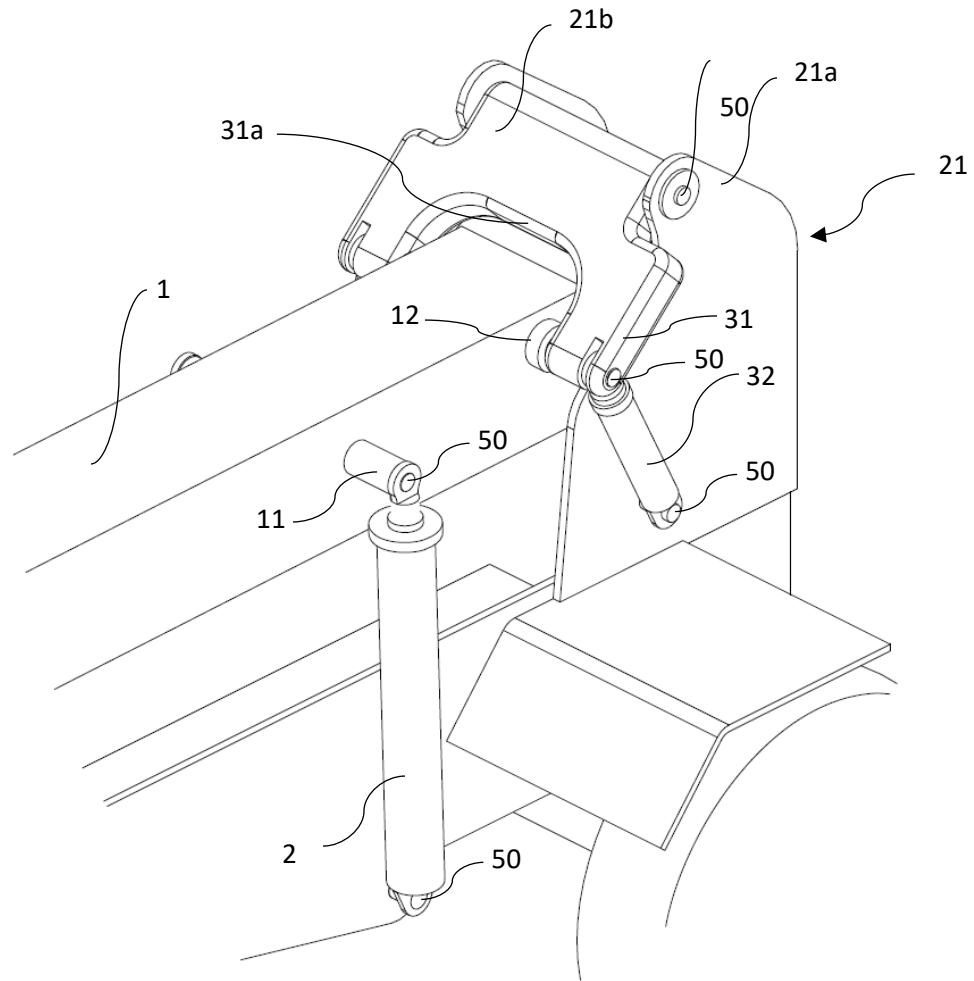


Figure 3a

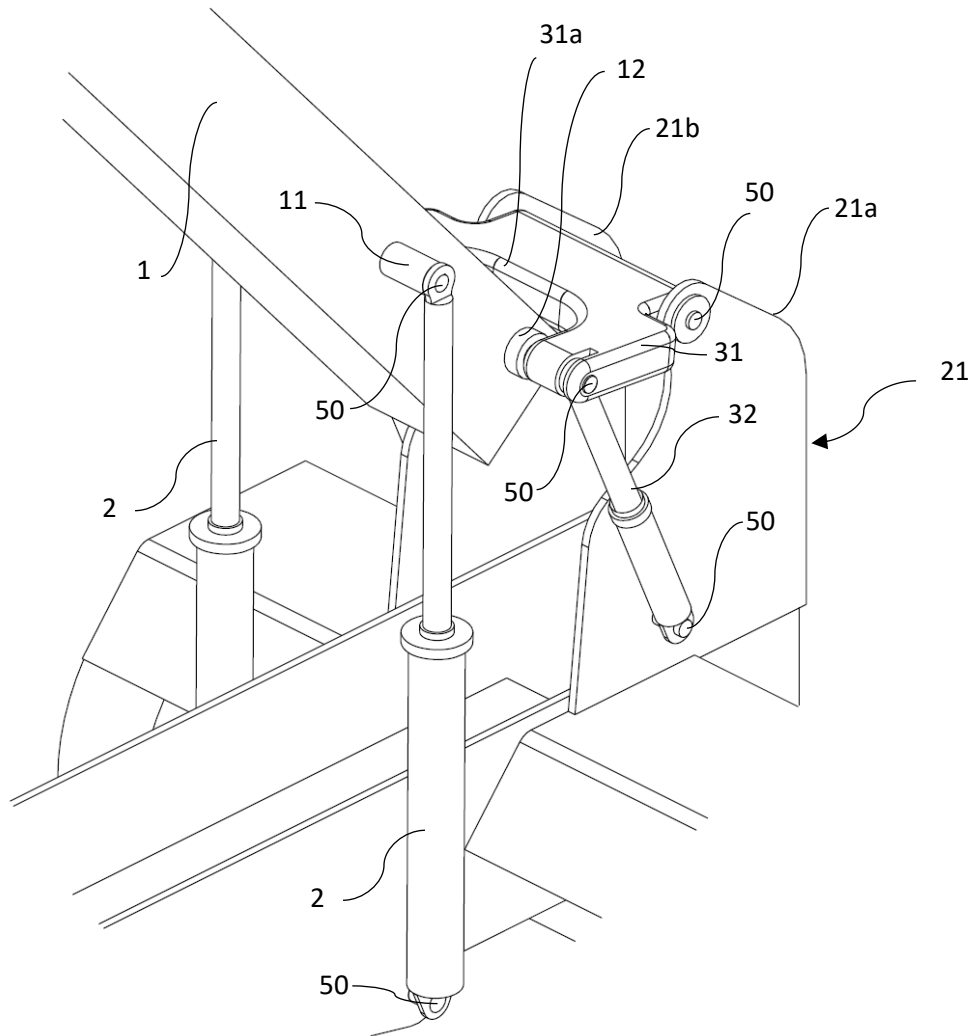


Figure 3b

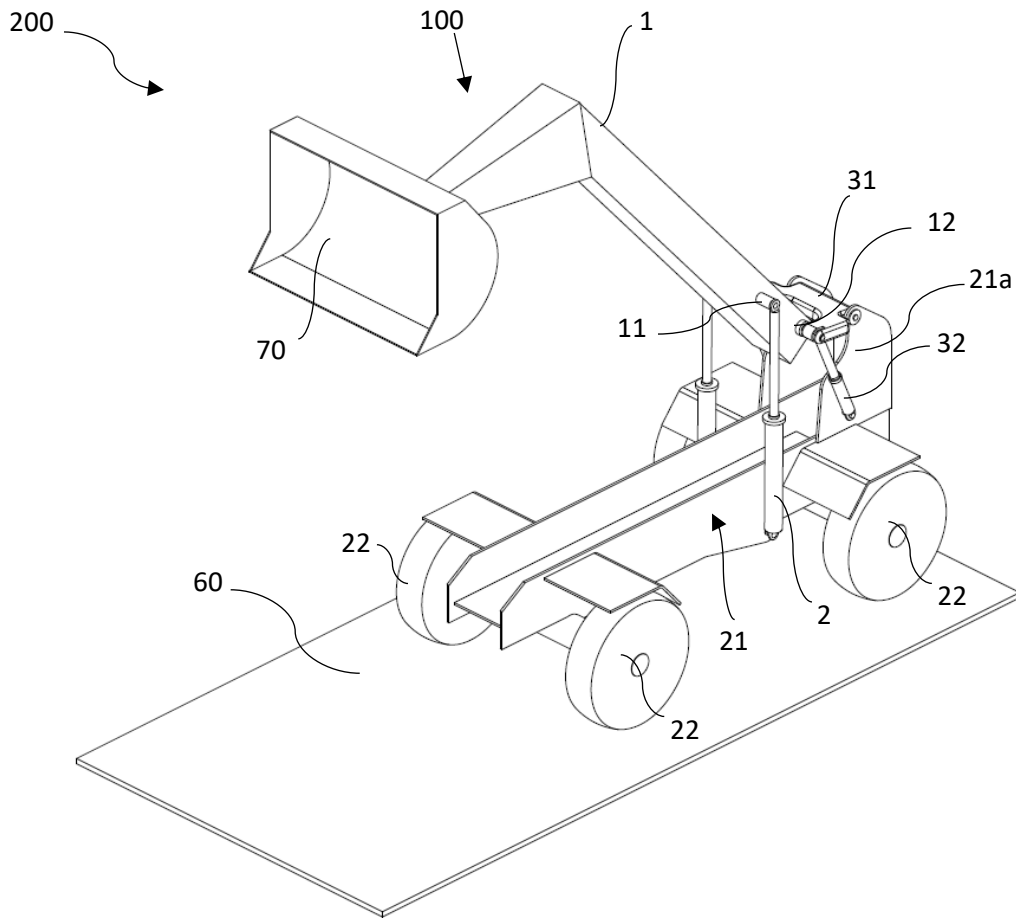


Figure 4a

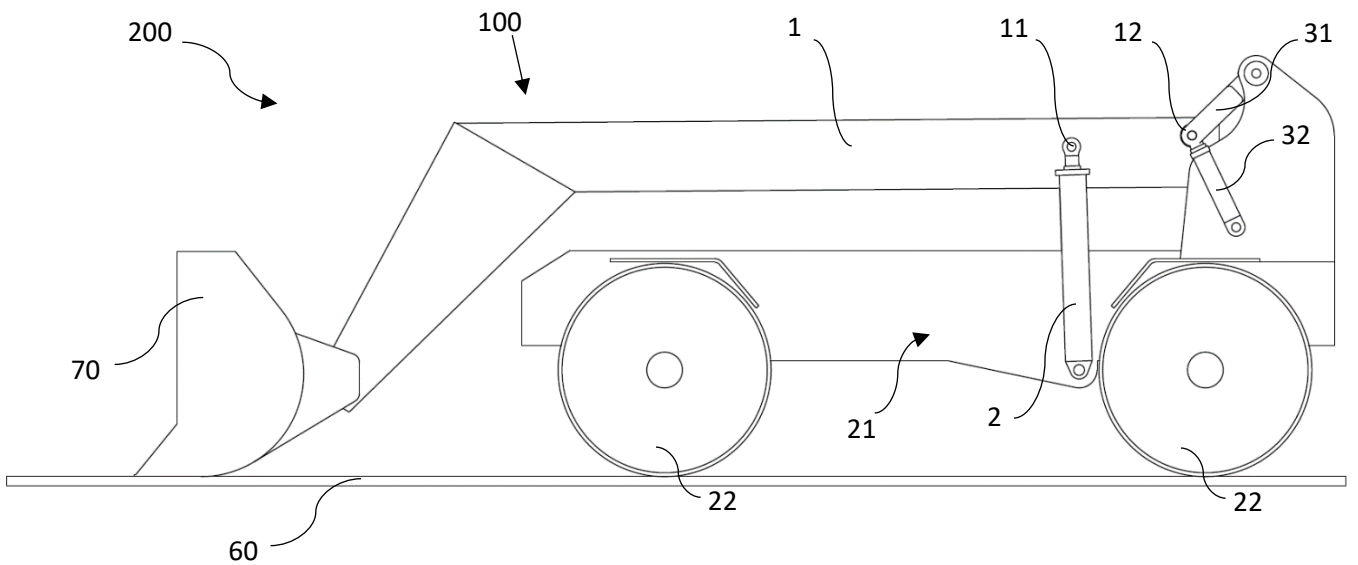


Figure 4b

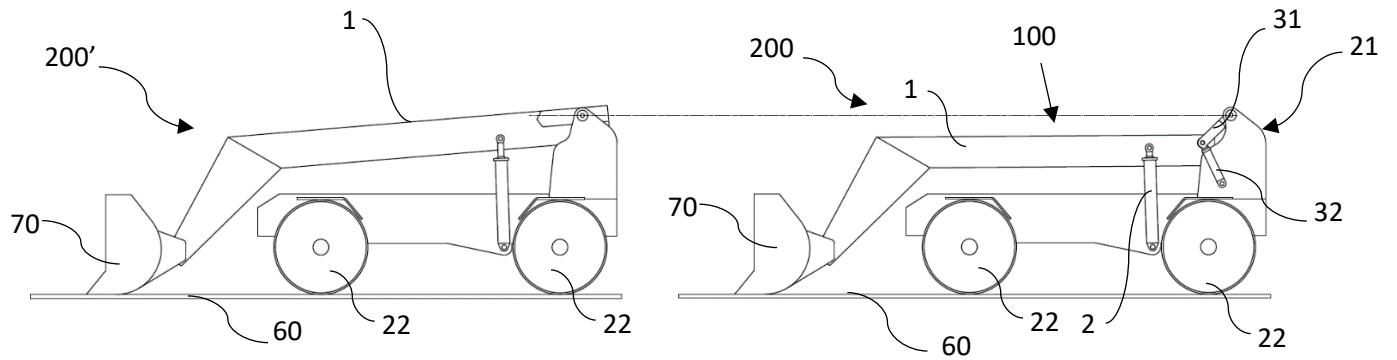


Figure 4c

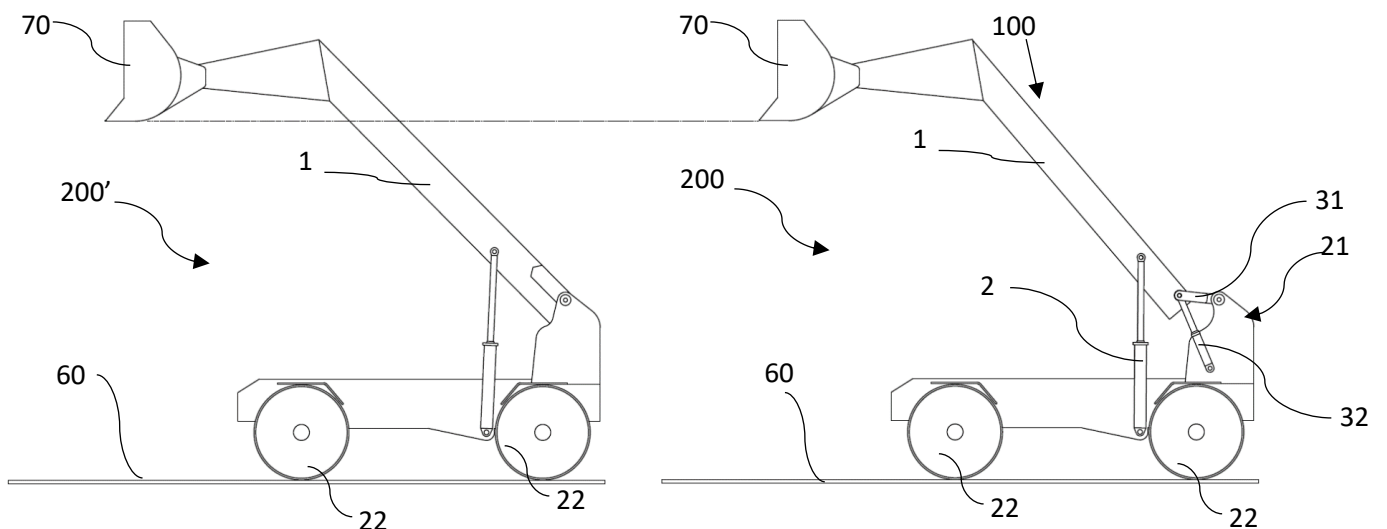


Figure 4d

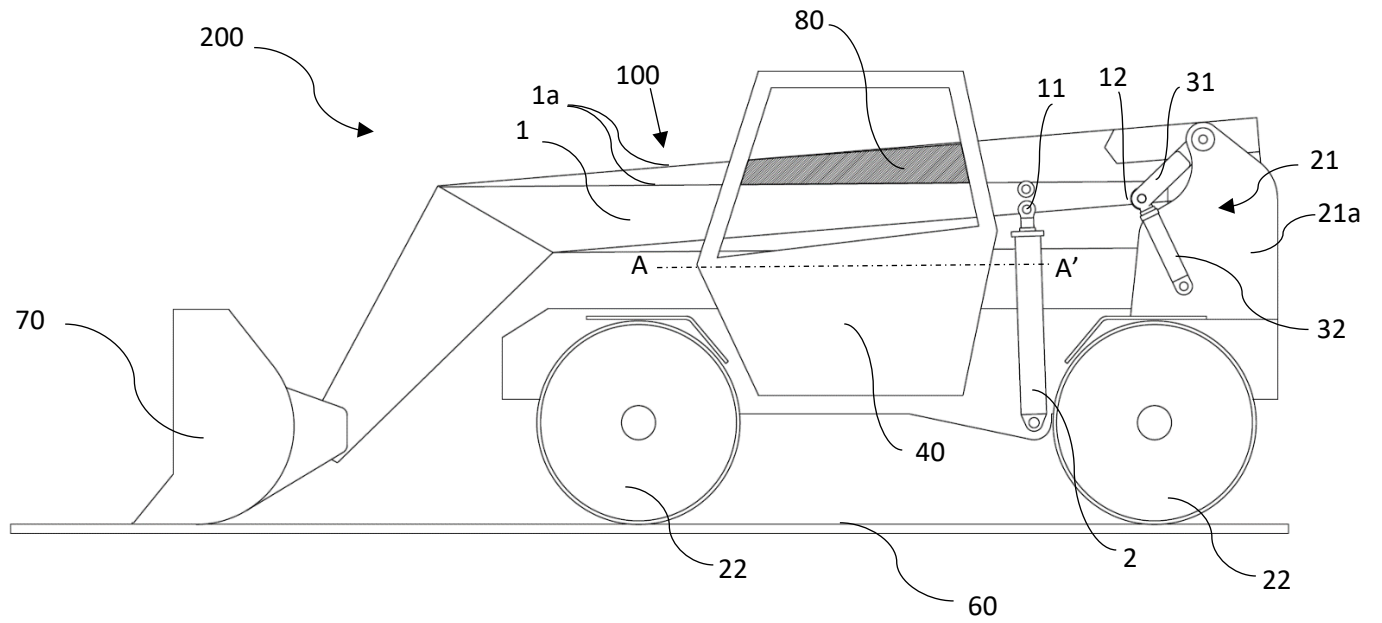


Figure 5