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(54) **CONTAINER LOADER / UNLOADER**

CONTAINERLADER/-ENTLADER

DISPOSITIF DE CHARGEMENT/DÉCHARGEMENT DE CONTENEUR

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(73) Proprietor: **Combilift**
Monaghan Town, County Monaghan (IE)

(72) Inventors:
- **MCVICAR, Martin**
  County Monaghan (IE)
- **MOFFETT, Robert**
  County Monaghan (IE)
- **WHYTE, Mark**
  County Monaghan (IE)

(74) Representative: **FRKelly**
27 Clyde Road
Dublin D04 F838 (IE)

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Description

Field of the Invention

[0001] This invention relates to a lift truck for loading and unloading goods into and out of shipping containers.

Background of the Invention

[0002] Large heavy products are transported in closed top shipping containers from, for example, suppliers to manufacturing plants. Examples of these products include steel coils and billets which may be transported from a foundry to an extrusion plant. Many companies dealing in heavy products transport their products using open top shipping containers so that the heavy products can be off-loaded using a crane. Open top containers are much more expensive than closed top containers, and so the use of closed top containers is often more desirable. However, the removal of heavy loads from closed top shipping containers requires high capacity lift trucks. Such a lift truck is known from DE 44 27 901 A1.

[0003] The basic function of a lift truck is to lift, move and place materials. Lift trucks operate on the simple law of the lever principle - two weights on opposite sides of a fulcrum. As shown in Figure 1, in order for the lift truck to lift and move the load W1 safely, (W1 x L1) must be less than (W2 x L2), wherein W1 = weight of the load; W2 = weight of the lift truck; L1 = distance from the centre of gravity (COG) of the load to the fulcrum point (F); L2 = distance from the COG of the lift truck to the fulcrum point (F). Figure 2 shows a lift truck in the process of lifting/placing a load at the front end of a 20ft container, i.e. at the end of the container distal to the opening. In order to lift the load, the forks or lifting arm need to be long enough to reach the load. As a result, the L3 dimension is quite large and therefore the lift truck must have a high capacity and be very heavy so that (W3 x L3) is less than (W4 x L4), wherein W3 = weight of the load; W4 = weight of the lift truck; L3 = distance from the COG of the load to the fulcrum point (F); L4 = distance from the COG of the lift truck to the fulcrum point (F). Consequently, the lift truck must be quite large and heavy so as to be able to lift/place heavy loads in a container, particularly at the far end of the container distal to the opening. However, such lift trucks can be cumbersome and impractical for use in confined spaces in, for example, the confined spaces of shipping yards and warehouses, and can be expensive to manufacture and maintain.

[0004] Therefore, the present invention has been developed with a view to mitigating the above-mentioned problems.

Summary of the Invention

[0005] Accordingly, the present invention provides a lift truck according to features of the claims. The lift truck comprising a chassis and a lifting mechanism mounted on the chassis, the chassis comprising first and second front ground wheels and at least one rear ground wheel, the chassis further comprising first and second spaced-apart arms with the first front ground wheel being mounted on the first arm and the second ground wheel mounted on the second arm, and wherein the arms are sufficiently spaced apart to allow, in use, the arms of the chassis to straddle a width of a shipping container.

[0006] The front ground wheels can thereby provide a pair of fulcrum points spaced apart from one another, straddling the width of a shipping container. In this way the container is received between the spaced apart arms and the fulcrum line (between the front wheels) is advanced forward along the length of the container. Apart from straddling a container, the arms can also straddle and receive between them a truck body or chassis on which the container may be mounted, or a railcar, etc.

[0007] Thus, in contrast to conventional lift trucks which are driven up to the door of a container and reach into the container, so that the fulcrum axis is adjacent to the back door of the container, The load (particularly when the load is near the far end of the container) is therefore separated from the fulcrum by a longer distance in conventional trucks than in the trucks of the invention,

[0008] Optionally, the arms of the chassis are substantially parallel to each other. Optionally, in use, the arms of the chassis are substantially parallel to the ground.

[0009] Optionally, each arm of the chassis comprises first and second opposing ends. Optionally, the front ground wheels of the lift truck are respectively mounted at or adjacent the first end of each spaced-apart arm.

[0010] Optionally, the chassis comprises a transverse portion arranged perpendicular to the two spaced-apart arms. Optionally, the chassis is substantially U-shaped comprising a transverse portion arranged perpendicular to the two spaced-apart arms. Optionally, the transverse portion is connected to the arms of the chassis proximate to the second end of each arm. Optionally, the transverse portion is connected to the arms of the chassis proximate to the second end of each arm opposing the first end of said each arm to which the front ground wheels are respectively mounted.

[0011] Optionally, the at least one rear ground wheel is mounted to the transverse portion of the chassis. Optionally, the at least one rear ground wheel is a driven wheel. Optionally, the at least one rear ground wheel is a driven, steerable wheel. Optionally, or additionally, the two front ground wheels are driven wheels. Optionally, or additionally, the two front ground wheels are driven, steerable wheels.

[0012] Optionally, the lifting mechanism is attached to the transverse portion of the chassis. Optionally, the lifting mechanism is attached to the chassis rearwardly of the front ground wheels. Optionally, the lifting mechanism is attached to the chassis rearwardly of the front ground wheels and forwardly, or rearwardly, of the at least one rear ground wheel.

[0013] Optionally, the lifting mechanism comprises a

conventional lifting mast and one or more lift forks. Optionally, or additionally, the lifting mechanism comprises a boom. Optionally, the boom further comprises means for engaging a load. Optionally, the lift truck comprises one or more lift forks. Optionally, the lift truck further comprises elevating means for raising and lowering the boom relative to the chassis. Optionally, the elevating means comprise at least one ram for raising and lowering the boom relative to the chassis. Optionally, the or each ram is a hydraulic ram. Optionally, the boom is extendable and/or retractable. Further optionally, the boom is telescopic.

[0014] The chassis comprises a cab from which an operator can control the lift truck. Optionally, the cab is located on the transverse portion of the chassis. Optionally, the cab is located proximate to an end of the transverse portion. Optionally, the cab is located proximate to an end of the transverse portion at or adjacent the second end of an arm of the chassis. The cab is located proximate to an end of the transverse portion such that, in use, the operator's field of vision simultaneously includes the interior of an open shipping container and the exterior of the shipping container when the arms of the chassis straddle the width of the container.

[0015] Optionally, the arms of the chassis are sufficiently spaced apart to straddle a width of a standard shipping container. Thus, the arm may be sufficiently spaced apart to straddle a width of standard container, such as 20, 30, 40 or 45 foot containers. Optionally, the arms of the chassis are spaced apart such that the distance between the arms is at least 1.5 m, 1.75 m, 2 m, 2.25 m, 2.5 m, 2.75 m, 3 m or more. Optionally, the arms of the chassis are sufficiently spaced apart to straddle a container width of 2.44 m (i.e. 8 feet). Optionally, the arms of the chassis are sufficiently spaced apart to allow for clearance at either side of a container, such as a container having a width of 2.44 m, when the arms of the chassis straddle the width of the container. For example, the arms of the chassis may be spaced apart such that the distance between the arms is at least 2.5 m, optionally at least 2.8 m, optionally at least 3 m or more.

Brief Description of the Drawings

[0016] An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG 1 is a side view of a lift truck of the art, in which the centre of gravity of each of the load and lift truck is depicted by a circle with four quadrants;

FIG 2 is a side view of a lift truck of the art, in which the lift truck is in the process of lifting/placing a load out of/into a shipping container on a transport vehicle;

FIG 3 is a side view of a lift truck of the present invention, in which the lift truck is in the process of lifting/placing a load out of/into a shipping container on a transport vehicle; and

FIG 4 is a top view of a lift truck of the present invention, in which the lift truck of the present invention is in the process of lifting/placing a load out of/into a shipping container on a transport vehicle, and in which the arms of the chassis can be seen to straddle the width of the shipping container.

Description of Preferred Embodiments

[0017] With reference to Figure 3, a lift truck (10) of the invention comprises a chassis (12) and a lifting mechanism (14), the chassis comprising left and right front ground wheels (20L, 20R, respectively) and a single rear ground wheel (22) disposed centrally between, but rearwardly displaced, relative to the front ground wheels. In some embodiments, the chassis (12) may comprise more than one rear ground wheel (22). For example, the chassis (12) may comprise left and right rear ground wheels which may be substantially aligned with, and/or rearwardly displaced from, the left and right front ground wheels (20L, 20R), respectively. The chassis (12) further comprises two spaced-apart left and right arms (16L, 16R, respectively) to each of which a respective one of said front ground wheels (20L, 20R) is respectively mounted, and wherein the arms (16L, 16R) are sufficiently spaced-apart to allow, in use, the arms of the chassis to straddle a width of a shipping container (C). As illustrated in Figure 4, the arms (16L, 16R) of the chassis may be spaced-apart and disposed substantially parallel to each other.

[0018] The front ground wheels (20L, 20R) act as the fulcrum point (F) when the lift truck (10) is used to lift/place a load. In use, the front ground wheels (20L, 20R) of the lift truck (10) of the invention can be positioned closer to the load to be lifted/placed since the arms (16L, 16R) are sufficiently spaced apart to allow the arms to straddle the width of a shipping container containing the load (see Figures 3 and 4). As a result of this configuration, the distance from the load to the fulcrum point (F), designated L5 in Figure 3, is reduced for the lift truck (10) of the present invention. Based on the principle of the lever, (W5 x L5) must be less than (W6 x L6). (W5 = weight of the load; L5 = distance from the COG of the load to the fulcrum point (F); W6 = weight of the lift truck; L6 = distance from the COG of the lift truck to fulcrum point (F).) Since W6 and L6 are fixed, the weight of the load to be lifted (W5) may be greater as a result of the shortening of the L5 distance. Consequently, the lift truck (10) of the present invention can lift relatively heavier loads than conventional lift trucks of a similar size but without the innovative design of the present lift truck (10).

[0019] As illustrated in Figure 3, the front ground wheels (20L, 20R) may be respectively mounted adjacent a first end of the spaced-apart arms (16L, 16R). The chassis may also comprise a transverse portion (18) ar-

ranged perpendicular to the two spaced-apart arms (16L, 16R). In a plan view of the lift truck of the invention (Figure 4), the chassis (12) may be seen to be substantially U-shaped comprising the transverse portion (18) arranged perpendicular to the two spaced-apart arms (16L, 16R), wherein the transverse portion (18) is connected at the second end of each arm (16L, 16R) opposing the first ends to which the front ground wheels (20L, 20R) are mounted.

[0020] The rear ground wheel (22) may be mounted to the transverse portion (18) of the chassis (12), and thus may be rearwardly displaced relative to the front ground wheels (20L, 20R). The rear ground wheel (22) may be a driven wheel and/or may be steerable by an operator (O). In embodiments of the invention, the front ground wheels (20L, 20R) may alternatively, or additionally, be driven wheels and/or may be steerable by the operator (O). In other embodiments, the lift truck (10) may comprise more than one rear ground wheel (22) which may be driven and/or steerable, and which may be mounted to the transverse portion (18) of the chassis (12), or to the arms (16L, 16R), rearwardly of the front ground wheels (20L, 20R). The lift truck (10) may further comprise means to control and/or synchronise the rotation and direction of each wheel (not shown).

[0021] As depicted in Figure 3, the lift truck (10) of the invention also comprises a lifting mechanism (14) attached to the chassis (12), optionally to the transverse portion (18) of the chassis (12). Advantageously, the lifting mechanism (14) is attached to the chassis (12) rearwardly of the front ground wheels (20L, 20R), thus contributing to moving the COG of the lift truck (10) away from the fulcrum point (P). In some embodiments, the lifting mechanism (14) is attached to the chassis rearwardly of the front ground wheels (20L, 20R). The lifting mechanism (14) may comprise a conventional lifting mast and lift forks. Advantageously, the lifting mechanism (14) comprises a boom (24), which may further comprise a set of lift forks (26), as depicted in Figure 3. The boom (24) is particularly useful to allow the lift truck (10) to reach into a shipping container (C) to lift/place a load at the far end of the container, i.e. the end of the container distal to the opening. In this regard, the boom (24) may be extendable and/or retractable so that when the lift truck (10) is positioned at the opening of a shipping container (C), the boom (24) may be extended/retracted to lift/place a load at the far end of the container. In some embodiments of the invention, the boom (24) may be telescopic.

[0022] The lift truck (10) may also comprise elevating means for raising and lowering the boom (24) relative to the chassis (12) and/or relative to the ground on which the lift truck (10) is positioned. Suitable elevating means include a ram (28), such as a hydraulic ram. The ram (28) may be located between the chassis (12) and the boom (24). Operation of the ram (28) may cause the boom (24) to by raised/lowered relative to the chassis (12). Alternatively, or additionally, the lift truck (10) may comprise pushing means (not shown) for extending and/or retracting the extendable/retractable boom (24). Suitable pushing means include a ram, such as a hydraulic ram.

[0023] The lift truck (10) of the invention may further comprise a cab (30), that is, an operator's cabin, located on the chassis (12). An operator (O) may control the operation of the lift truck (10) from the cab (30), including the operation of the driven wheel(s) and the lifting mechanism (14). As depicted in Figure 3, the cab (30) may be located on the transverse portion (18) of the chassis (12) proximate to an end of the transverse portion. In other words, the cab (30) may be located to one side of the chassis (12). Advantageously, this arrangement allows the operator's field of vision (V) to simultaneously include the interior of an open shipping container (C) and the exterior of the shipping container (C) when the operator (O) is operating the lift truck (10) to lift/place a load out of/into the shipping container (C). This allows for safer and more accurate control of the lift truck (10) and the loading/unloading process. It will further be appreciated that a container (C) can be off-loaded while being on a transport vehicle or positioned at ground level. In a further modification of the lift truck (10), the operator's cab (30) may be removed and the lift truck (10) controlled remotely.

[0024] As will be understood from the present description, the arms (16L, 16R) of the chassis (12) are sufficiently spaced apart to straddle a width of a standard shipping container (C). Conventional standard shipping containers include 20, 30, 40 or 45 foot containers. The width of shipping containers may vary and so the distance between the arms (16L, 16R) of the chassis (12) may depend on the width of the container (C) in respect of which the lift truck (10) of the invention is to be used. Therefore, the distance between the arms (16L, 16R) may be at least 1.5 m, 1.75 m, 2 m, 2.25 m, 2.5 m, 2.75 m, 3 m or more. The width of commonly used shipping containers is typically 2.44 m (i.e. 8 feet). Therefore, the arms (16L, 16R) of the chassis (12) may be sufficiently spaced apart to straddle a container width of 2.438 m. In some embodiments, the arms (16L, 16R) of the chassis (12) may sufficiently spaced apart to allow for clearance at either side of a container (C) when the arms (16L, 16R) of the chassis (12) are positioned to straddle the width of the container. Such clearance may be necessary to allow the arms (16L, 16R) to straddle a container located on a transport vehicle, i.e. to straddle the container and the transport vehicle, and to take account of the transport vehicle having a greater width than the container. For example, the chassis of the transport vehicle, or features or appendages of the transport vehicle, e.g. side marking lights, may protrude past the width of the container when positioned on the transport vehicle. Therefore, the arms (16L, 16R) of the chassis (12) may be spaced apart such that the distance between the arms is at least 2.5 m, optionally at least 2.8 m, optionally at least 3 m, or more.

[0025] The advantages of the lift truck (10) described

above include:

1. The lift truck (10) can be lighter than conventional lift trucks for a particular load weight that is required to be lifted.
2. The lift truck (10) is more compact and manoeuvrable than conventional lift trucks as a result of it being smaller and lighter.
3. The ground pressure at the fulcrum point is lower for the lift truck (10) of the invention.
4. The lift truck (10) is more economical to manufacture than conventional lift trucks due its lighter weight.
5. The lift truck (10) has lower fuel consumption than conventional lift trucks due to the overall construction being lighter and, as a consequence, a smaller power unit may be used.
6. The lift truck (10) can off-load / load a container while the container is on a transport vehicle.
7. Loading docks/bays are not required by the lift truck (10) to off-load / load a container.

[0026] The invention is not limited to the embodiment described herein but can be amended or modified without departing from the scope of the present invention as defined by the appended claims.

Claims

1. A lift truck (10) comprising a chassis (12) and a lifting mechanism (14) mounted on the chassis, the chassis comprising first and second front ground wheels (20L, 20R) and at least one rear ground wheel (22), the chassis further comprising first and second spaced-apart arms (16L, 16R) with the first front ground wheel being mounted on the first arm and the second ground wheel mounted on the second arm, and wherein the arms are sufficiently spaced apart to allow, in use, the arms of the chassis to straddle a width of a shipping container (C), **characterised in that** the chassis further comprises a cab (30) from which an operator (O) can control the lift truck (10) and in use, the operator's field of vision simultaneously includes the interior of an open shipping container (C) and the exterior of the shipping container (C) when the arms of the chassis (12) straddle the width of the container (C).

2. The lift truck (10) of Claim 1, wherein the arms (20L, 20R) of the chassis (12) are spaced apart and substantially parallel to each other.

3. The lift truck (10) of Claim 1 or 2, wherein, in use, the arms (20L, 20R) of the chassis (12) are substantially parallel to the ground.

4. The lift truck of (10) any one of Claims 1 to 3, wherein each arm of the chassis (12) has first and second opposing ends, and wherein the front ground wheels (16L, 16R) are respectively mounted at or adjacent the first end of each spaced-apart arm (20L, 20R).

5. The lift truck (10) of any one of Claims 1 to 4, wherein the chassis (12) comprises a transverse portion (18) arranged perpendicular to the two spaced-apart arms (20L, 20R).

6. The lift truck (10) of Claim 5, wherein the transverse portion (18) is connected to the arms proximate to the second end of each spaced-apart arm.

7. The lift truck (10) of claim 5 or 6, wherein the at least one rear ground wheel (22) is mounted to the transverse portion of the chassis.

8. The lift truck (10) of any one of the preceding claims, wherein the at least one rear ground wheel (22) is a driven wheel, optionally, a driven, steerable wheel, optionally wherein the two front ground wheels (16L, 16R) are driven wheels, optionally, driven, steerable wheels.

9. The lift truck (10) of any one of Claims 5 to 8, wherein the lifting mechanism is attached to the transverse portion (18) of the chassis (12).

10. The lift truck (10) of any one of the preceding claims, wherein the lifting mechanism is attached to the chassis (12) rearwardly of the front ground wheels (16L, 16R).

11. The lift truck (10) of any one of the preceding claims, wherein the lifting mechanism comprises a conventional lifting mast and one or more lift forks.

12. The lift truck (10) of any one of the preceding claims, wherein the lifting mechanism comprises a boom (24).

13. The lift truck (10) of Claim 12, wherein the boom (24) further comprises means for engaging a load.

14. The lift truck (10) of Claim 13, wherein lift truck further comprises elevating means for raising and lowering the boom relative to the chassis (12).

15. The lift truck (10) of Claim 1, wherein the cab is located on the transverse portion of the chassis, optionally wherein the cab (30) is located proximate to an end of the transverse portion (18), optionally, proximate to an end of the transverse portion (18) at or adjacent the second end of an arm of the chassis (12).

Patentansprüche

1. Hubwagen (10), umfassend ein Fahrgestell (12) und einen Hubmechanismus (14), der auf dem Fahrgestell montiert ist, wobei das Fahrgestell erste und zweite vordere Bodenräder (20L, 20R) und zumindest ein hinteres Bodenrad (22) umfasst, wobei das Fahrgestell ferner erste und zweite beabstandete Arme (16L, 16R) umfasst, wobei das erste vordere Bodenrad auf dem ersten Arm und das zweite Bodenrad auf dem zweiten Arm montiert ist, und wobei die Arme ausreichend beabstandet sind, um im Gebrauch zu ermöglichen, dass die Arme des Fahrgestells eine Breite eines Versandcontainers (C) überspannen, **dadurch gekennzeichnet, dass** das Fahrgestell ferner eine Kabine (30) umfasst, von der aus ein Bediener (0) den Hubwagen (10) steuern kann, und im Gebrauch das Sichtfeld des Bedieners gleichzeitig das Innere eines offenen Versandcontainers (C) und das Äußere des Versandcontainers (C) beinhaltet, wenn die Arme des Fahrgestells (12) die Breite des Containers (C) überspannen.

2. Hubwagen (10) nach Anspruch 1, wobei die Arme (20L, 20R) des Fahrgestells (12) voneinander beabstandet und im Wesentlichen parallel zueinander sind.

3. Hubwagen (10) nach Anspruch 1 oder 2, wobei im Gebrauch die Arme (20L, 20R) des Fahrgestells (12) im Wesentlichen parallel zum Boden sind.

4. Hubwagen (10) nach einem der Ansprüche 1 bis 3, wobei jeder Arm des Fahrgestells (12) ein erstes und ein zweites entgegengesetztes Ende aufweist, und wobei die vorderen Bodenräder (16L, 16R) jeweils am oder angrenzend an das erste Ende jedes beabstandeten Arms (20L, 20R) montiert sind.

5. Hubwagen (10) nach einem der Ansprüche 1 bis 4, wobei das Fahrgestell (12) einen Querabschnitt (18) umfasst, der senkrecht zu den beiden beabstandeten Armen (20L, 20R) angeordnet ist.

6. Hubwagen (10) nach Anspruch 5, wobei der Querabschnitt (18) mit den Armen nahe dem zweiten Ende jedes beabstandeten Arms verbunden ist.

7. Hubwagen (10) nach Anspruch 5 oder 6, wobei das zumindest eine hintere Bodenrad (22) am Querabschnitt des Fahrgestells montiert ist.

8. Hubwagen (10) nach einem der vorstehenden Ansprüche, wobei das zumindest eine hintere Bodenrad (22) ein angetriebenes Rad, optional ein angetriebenes, lenkbares Rad ist, optional wobei die beiden vorderen Bodenräder (16L, 16R) angetriebene Räder, optional angetriebene, lenkbare Räder sind.

9. Hubwagen (10) nach einem der Ansprüche 5 bis 8, wobei der Hubmechanismus an dem Querabschnitt (18) des Fahrgestells (12) befestigt ist.

10. Hubwagen (10) nach einem der vorstehenden Ansprüche, wobei der Hubmechanismus am Fahrgestell (12) hinter den vorderen Bodenrädern (16L, 16R) befestigt ist.

11. Hubwagen (10) nach einem der vorstehenden Ansprüche, wobei der Hubmechanismus einen herkömmlichen Hubmast und eine oder mehrere Hubgabeln umfasst.

12. Hubwagen (10) nach einem der vorstehenden Ansprüche, wobei der Hubmechanismus einen Ausleger (24) umfasst.

13. Hubwagen (10) nach Anspruch 12, wobei der Ausleger (24) ferner Mittel zum Eingreifen in eine Last umfasst.

14. Hubwagen (10) nach Anspruch 13, wobei der Hubwagen ferner Hebemittel zum Anheben und Absenken des Auslegers in Bezug auf das Fahrgestell (12) umfasst.

15. Hubwagen (10) nach Anspruch 1, wobei sich die Kabine auf dem Querabschnitt des Fahrgestells befindet, optional wobei sich die Kabine (30) in der Nähe eines Endes des Querabschnitts (18) und optional in der Nähe eines Endes des Querabschnitts (18) am oder angrenzend an das zweite Ende eines Arms des Fahrgestells (12) befindet.

Revendications

1. Chariot élévateur (10) comprenant un châssis (12) et un mécanisme de levage (14) monté sur le châssis, le châssis comprenant des première et seconde roues porteuses avant (20L, 20R) et au moins une roue porteuse arrière (22), le châssis comprenant en outre des premier et second bras espacés (16L, 16R) avec la première roue porteuse avant montée sur le premier bras et la seconde roue porteuse montée sur le second bras, et dans lequel les bras sont suffisamment espacés pour permettre, en cours d'utilisation, aux bras du châssis d'enfourcher une largeur d'un conteneur d'expédition (C),
caractérisé en ce que le châssis comprend en outre une cabine (30) à partir de laquelle un opérateur (0) peut commander le chariot élévateur (10) et, en cours d'utilisation, le champ de vision de l'opérateur inclut simultanément l'intérieur d'un conteneur d'expédition ouvert (C) et l'extérieur du conteneur d'expédition (C) lorsque les bras du châssis (12) enfourchent la largeur du conteneur (C).

2. Chariot élévateur (10) selon la revendication 1, dans lequel les bras (20L, 20R) du châssis (12) sont espacés et sensiblement parallèles l'un à l'autre.

3. Chariot élévateur (10) selon la revendication 1 ou 2, dans lequel, en cours d'utilisation, les bras (20L, 20R) du châssis (12) sont sensiblement parallèles au sol.

4. Chariot élévateur (10) selon l'une quelconque des revendications 1 à 3, dans lequel chaque bras du châssis (12) a des première et seconde extrémités opposées, et dans lequel les roues porteuses avant (16L, 16R) sont respectivement montées au niveau de, ou de manière adjacente à la première extrémité de chaque bras espacé (20L, 20R).

5. Chariot élévateur (10) selon l'une quelconque des revendications 1 à 4, dans lequel le châssis (12) comprend une partie transversale (18) disposée perpendiculairement aux deux bras espacés (20L, 20R).

6. Chariot élévateur (10) selon la revendication 5, dans lequel la partie transversale (18) est reliée aux bras à proximité de la seconde extrémité de chaque bras espacé.

7. Chariot élévateur (10) selon la revendication 5 ou 6, dans lequel l'au moins une roue porteuse arrière (22) est montée sur la partie transversale du châssis.

8. Chariot élévateur (10) selon l'une quelconque des revendications précédentes, dans lequel l'au moins une roue porteuse arrière (22) est une roue motrice, éventuellement une roue orientable motrice, éventuellement dans lequel les deux roues porteuses avant (16L, 16R) sont des roues motrices, éventuellement des roues orientables motrices.

9. Chariot élévateur (10) selon l'une quelconque des revendications 5 à 8, dans lequel le mécanisme de levage est fixé à la partie transversale (18) du châssis (12).

10. Chariot élévateur (10) selon l'une quelconque des revendications précédentes, dans lequel le mécanisme de levage est fixé au châssis (12) à l'arrière des roues porteuses avant (16L, 16R).

11. Chariot élévateur (10) selon l'une quelconque des revendications précédentes, dans lequel le mécanisme de levage comprend un mât de levage classique et une ou plusieurs fourches de levage.

12. Chariot élévateur (10) selon l'une quelconque des revendications précédentes, dans lequel le mécanisme de levage comprend une flèche (24).

13. Chariot élévateur (10) selon la revendication 12, dans lequel la flèche (24) comprend en outre un moyen de mise en prise d'une charge.

14. Chariot élévateur (10) selon la revendication 13, dans lequel le chariot élévateur comprend en outre un moyen d'élévation pour lever et abaisser la flèche par rapport au châssis (12).

15. Chariot élévateur (10) selon la revendication 1, dans lequel la cabine est située sur la partie transversale du châssis, éventuellement dans lequel la cabine (30) est située à proximité d'une extrémité de la partie transversale (18), éventuellement à proximité d'une extrémité de la partie transversale (18) au niveau de, ou de manière adjacente à la seconde extrémité d'un bras du châssis (12).

Figure 1

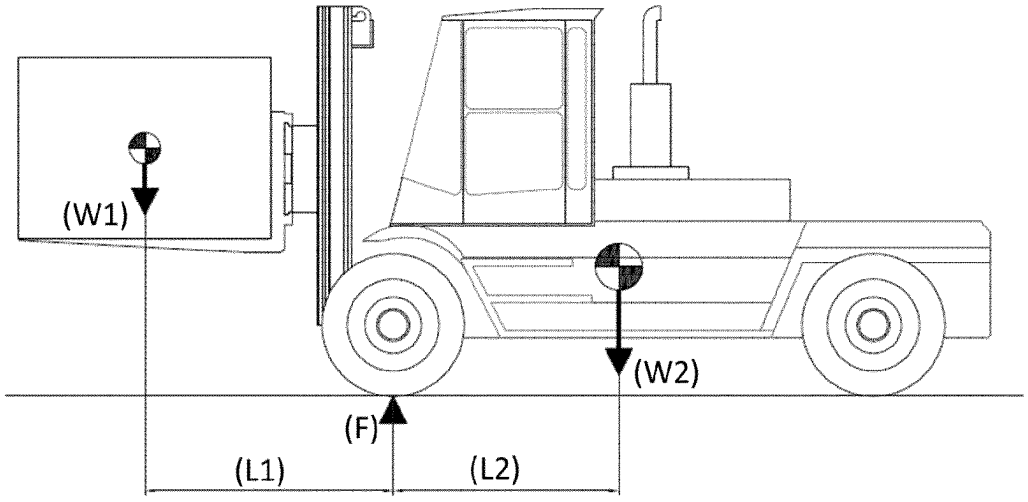


Figure 2

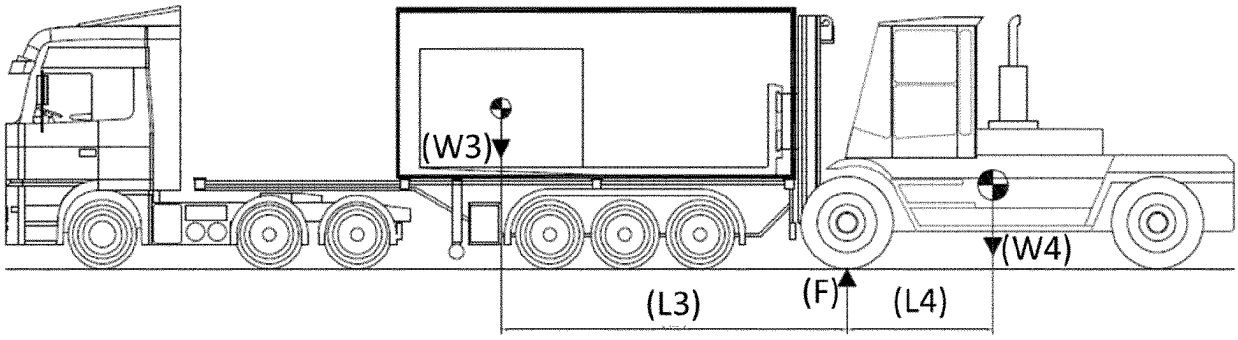


Figure 3

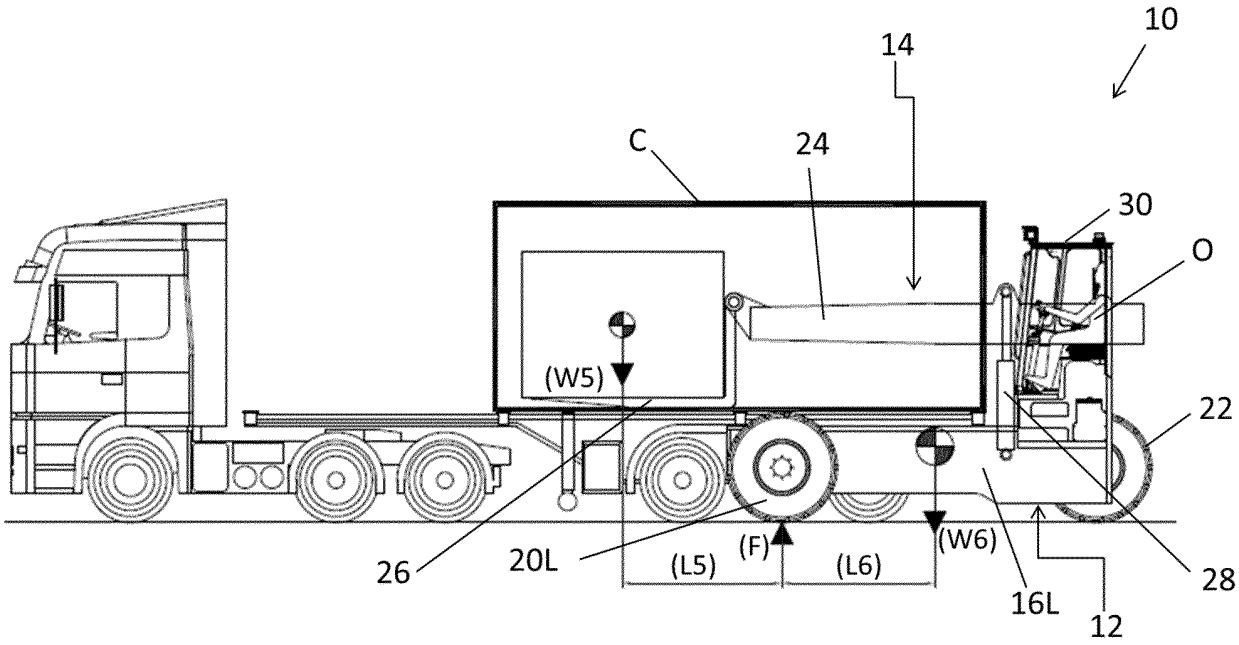
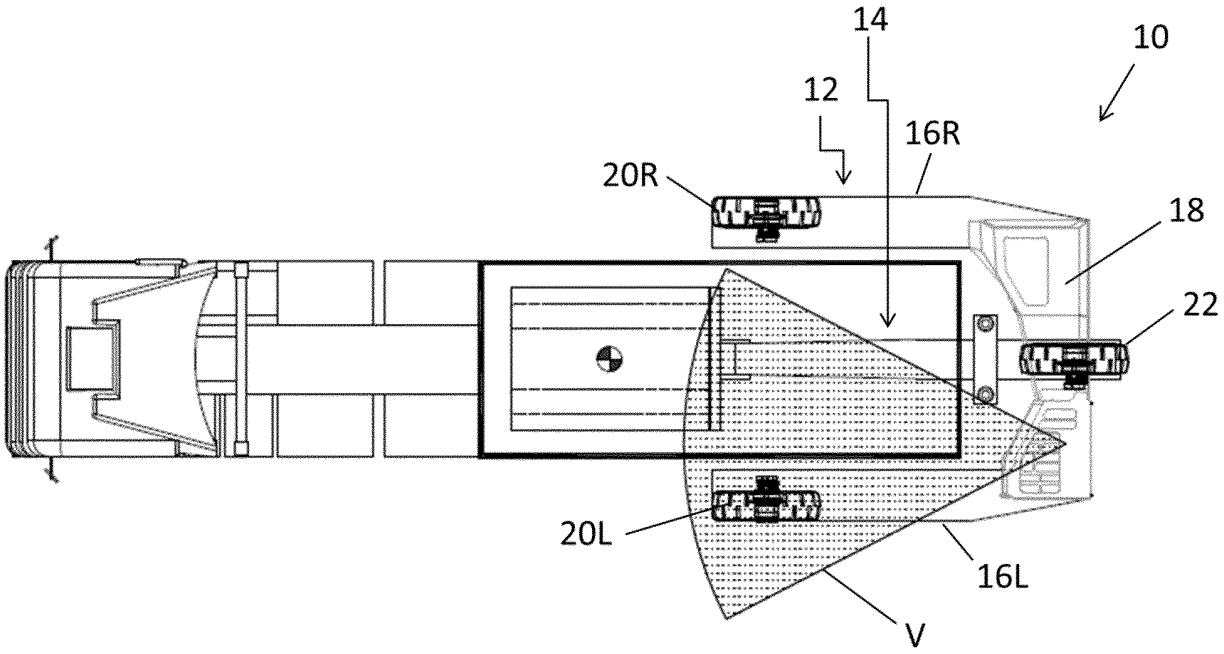


Figure 4



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Patent documents cited in the description

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