

Joint Examination Board

Advanced
Examinations
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Paper P3
Sample Scripts



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SAMPLE SCRIPT A

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Container loading system

This invention relates to a container loading system, and in particular to a container loading system for lorry transport.

Known lorry transport systems comprise a lorry with a raised load platform, and a container, such as a skip which can be hoisted onto and off the load platform by means of two hydrolically actuated arms.

The arms are typically mounted on the lorry itself, though they could also be provided as part of a separate loading apparatus, at a distribution depot for example, for loading up a number of lorries.

During loading, the container or skip is suspended free of the ground so that it can be manoeuvred into place onto the load platform of the lorry. This requires the full weight of the container to be lifted requiring heavy duty lifting equipment. Furthermore, as the container is manoeuvred its only support is provided by the actuator arms. As a result it can swing relative to the arms causing extra strain on the lifting machinery.

Known lorries having actuator arms address this lack of stability during the loading operation by having a strut attached near each back corner of the lorry chassis, which can be locked in a position engaging the ground to provide additional stability and a counter balance for the weight of the skip.

We have therefore appreciated that there are a number of problems with existing loading systems and have developed a new container loading system according to the present invention. The invention provides a new transport vehicle for loading and carrying containers, a separate apparatus for loading a transport vehicle, a container for use with both the vehicle and the apparatus, and a new method of loading.

According to the invention in a first aspect there is provided [*WORDING OF CLAIM 1*].

During the loading of the vehicle, the container remains in contact with either the floor beside the vehicle or the loading edge of the vehicle platform. As a result the container is supported throughout the entire loading operation, and cannot move around relative to the loading arm on the vehicle as much as if it was freely suspended. As a result the loading process can be more stably controlled.

Also, as the loading operation comprises a sliding action the loading arm is never required to lift the full weight of the container, which is always borne at least partly by the floor or the load

platform. This means that the loading arm can be less powerful than known loading arms and operate with as much pull.

Preferably, the loading arm comprises a hook arm and a base arm, the hook arm being pivoted on the base arm which is in turn pivoted on the load platform.

This allows the sliding and hoisting actions to be performed separately for the most part by the respective arms. Although the two arms do act together, the shape and operation of the hook arm can be optimized to aid the hoisting operation, and the shape and operation of the base arm can be optimized to aid the sliding operation.

To this end, the hook arm preferably has a hook for engaging a container which extends away from the vehicle. This allows the hook to be easily positioned under a lifting bar on the container by extending the hook arm and reversing the vehicle into position. As a result engaging the arm with the container and the subsequent loading operation can be carried out by the driver of the vehicle alone, operating the arm from his cab, without the need for assistance from a driver's mate.

It is also advantageous if the hook arm is L-shaped as this assists engaging the hook as well as the hoisting action.

Preferably, the vehicle comprises rails along the sides of the load platform to guide the container into place during the sliding operation. This improves stability and control during the loading process even more.

It is also advantageous if the loading edge of the load platform comprises a roller. Preferably the roller can be locked to aid the retention of the container in position on the load platform. This is especially useful if locks are not otherwise provided.

In a second aspect of the invention, there is provided a container having a bar for engaging with the loading arm.

Preferably the container has assisting means so that it is assisted in sliding across the floor during the loading operation. This prevents wear and tear on the container and damage to the floor.

The invention will now be described in more detail by way of example and with reference to the drawings in which...

Claims

1. A transport vehicle comprising:
a raised load platform for bearing a container; and a loading arm for slideably hoisting the container onto the load platform,
wherein in use the loading slides and hoists the container over a loading edge of the load platform such that the container is always in contact with at least one of the floor beside the vehicle and the loading edge.

2. A transport vehicle according to claim 1 wherein the loading arm comprises a hook arm for engaging the container, and a base arm; the hook arm being pivoted on the base arm, and the base arm being pivoted at one end on the load platform.
3. A transport vehicle according to claim 2 wherein the hook arm comprises a hook which extends away from the vehicle.
4. A transport vehicle according to claim 2 or 3 wherein the base arm is pivoted on the local platform at a position between the mid point of the load platform and its loading edge.
5. A transport vehicle according to any of claims 2 to 4 wherein the hook arm is pivoted on the base arm at or near a point half way along the base arm.
6. A transport vehicle according to any of claims 2 to 5 wherein the hook arm is L-shaped.
7. A transport vehicle according to claim 6 wherein the loading arm has a folded position in which one side of the L-shaped hook arm is at the edge of the load platform opposite the loading edge and extends upwards from the load platform.
8. A transport vehicle according to any previous claim wherein the load platform has rails at its side edges for guiding the movement of the container onto the load platform.
9. A transport vehicle according to claim 8 wherein the loading arm has a folded position in which at least part of the loading arm lies behind the rails.
10. A transport vehicle according to any previous claim wherein the loading edge comprises a roller.
11. A transport vehicle according to claim 10 wherein the roller can be locked in position to keep the container in position on the load platform.
12. An apparatus for loading a container onto a vehicle, comprising a loading arm for slideably hoisting the container onto a raised load platform of the vehicle, wherein in use the loading arm slides and hoists the container over a loading edge of the load platform such that the container is always in contact with at least one of the floor beside the vehicle and the loading edge.
13. A container for containing a load and for use with the transport vehicle of claim 1 or the apparatus of claim 12, the container comprising a bar at one end for engaging with the loading arm.
14. A container according to claim 13, comprising assisting means for assisting the container's sliding movement across the floor beside the vehicle.
15. A container according to claim 14 wherein the assisting means comprise wheels locked on the bottom of the container at or near the end opposite that having the bar.

16. A container according to claim 14 wherein the assisting means comprise skids located on the bottom of the container at or near the end opposite that having the bar.
17. A transport vehicle according to any of claims 1 to 11 wherein the vehicle is a lorry.
18. A container transport system comprising the transport vehicle of claim 1, and the container of claim 13.
19. A method of loading a container onto a vehicle having a load platform for bearing the container and apparatus for loading the container onto the load platform, the method comprising operating the apparatus to:

- i) hoist one end of the container off the floor;
- ii) slide the container towards the load platform until it engages the loading edge of the platform;
- iii) urge the container further towards the load platform such that the container pivots about the loading edge; and
- iv) slide the container into position on the load platform;

such that the container is always in contact with at least one of the floor beside the vehicle and the loading edge.

20. A transport vehicle as substantially described herein and with reference to the drawings.
21. An apparatus for loading a container onto a transport vehicle as substantially described herein and with reference to the drawings.
22. A container as substantially described herein and with reference to the drawings.
23. A method of loading a container onto a transport vehicle as substantially described herein and with reference to the drawings.

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PREAMBLE

CONTAINER LOADING SYSTEM

This invention relates to a container loading system for loading a container onto a lorry.

In container loading systems known for the prior art, a container (for example a trapezoidal skip) is positioned on the ground, and when it is full it has to be placed on a lorry for removal. The four top corners of the container are provided with fixings to attach chain members to. These chain members can then be attached to hydraulically actuated arms on the lorry. The arms are provided on each side of the lorry and are hydraulically actuated to extend out over the rear of the lorry. The chains are attached to the extended hydraulic arms to enable the container to be lifted off the ground. As the arms raise the container from the ground the entire skip is lifted clear of the ground and is suspended behind the lorry before it is hoisted onto the lorry.

The act of suspending the skip in the air behind the lorry means that the lorry has to be counter balanced, as if it were not the weight of the container may cause the lorry to tip backwards and cause serious damage.

In a lorry used with a container of this sort and with this mechanism of raising the container the lorry is provided with struts attached near the back corners of the lorry. Before the skip is raised these struts are lowered and locked against the ground to counter balance the weight of the skip as it is hoisted off the ground into position behind the lorry, before being lowered onto the lorry.

In this prior art system, it is necessary to ensure that the lorry is fully secured so not likely to tip backwards before the container is lifted. The struts are needed to counter the effect of the skip being hoisted from the ground and being suspended from the chains attached to the hydraulic arm, behind (and clear of) the lorry.

According to the invention there is provided a container loading system for loading from the ground onto a lorry including a hydraulic lifting mechanism on the lorry which engages with the container, the mechanism lifts one end of the container clear of the ground and causes the container to pivot about its opposite end and move forward along the ground until said one end of the container is positioned over the lorry and the underside of the container abuts the rear of the lorry, the container pivots about the rear of the lorry to rest on the lorry and said opposite end of the container is raised clear of the ground.

CLAIMS

1. A container loading system for loading a container from the ground onto a lorry including a hydraulic lifting mechanism on the lorry which engages with the container, the mechanism lifts one end of the container clear of the ground and causes the container to pivot about its opposite end and move forward along the ground until said one end of the container is positioned over the lorry and the underside of the container abuts the rear of the lorry, the container pivots about the rear of the lorry to rest on the lorry and said opposite end of the container is raised clear of the ground.
2. A container loading system according to claim 1 wherein said hydraulic lifting mechanism engages with said one end of said container.
3. A container loading system according to claim 2 wherein said hydraulic lifting mechanism engages with a bail bar on said one end of said container.
4. A container loading system according to any preceding claim wherein said hydraulic lifting mechanism includes a hook which engages with the container.
5. A container loading system according to claim 4 wherein the hydraulic lifting mechanism includes a hook arm terminating in the hook for engagement with the container and a base arm connecting the hook arm to the lorry chassis.
6. A container loading system according to claim 5 wherein the hook arm is pivotally connected to the base arm and the base arm is pivotally connected to the lorry chassis.
7. A container loading system according to claim 6 wherein hydraulic rams are provided between the hook arm and the base arm and between the base arm and the lorry chassis to control the position of the lifting mechanism.
8. A container loading system according to any preceding claim wherein the hydraulic lifting mechanism is located behind the cab of the lorry in the centre of the chassis.
9. A container loading system according to any preceding claim including rails along each side of the lorry chassis.
10. A container loading system according to claim 9 wherein said hydraulic lifting mechanisms folds down between said side rails when said container is fully home.
11. A container loading system according to any preceding claim wherein a set of rollers are provided at the rear of the lorry.
12. A container loading system according to any preceding claim wherein locks are provided on the lorry chassis to lock the container to the chassis.
13. A container loading system according to claim 5 wherein the the orientation of the hook on the hook arm is such that the hook automatically engages with the container when the hydraulic mechanism is actuated.

14. A container for use with a container loading system of any preceding claim wherein said opposite end of said container about which the container pivots is provided with rollers.
15. A container loading system, for loading a container onto a lorry substantially as herein described with reference to the accompanying figures.

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Container Loading System

The present invention relates to container loading systems. In particular, but not exclusively, it relates to container loading systems for vehicular transport.

The known skip lorries use two hydraulically actuated arms, one each side of the lorry chassis, to the ends of which chains are attached. These chains attach to a trapezoidal skip at each of its top corners so that the skip can be hoisted onto and off the lorry. The skip has to be suspended, free of the ground, behind the lorry as the skip is being hoisted onto the lorry. To counter-balance the weight of the skip as it is being hoisted, and prevent the lorry tipping backwards, struts attached near each back corner of the lorry chassis need to be lowered and locked against the ground.

The present invention provides a more efficient lifting and lowering system which address the counter-balance problem in the prior art.

According to the present invention, there is provided a vehicle.... [insert claim 1].

The lifting and slidably pivoting of the container against and about the pivot point on the vehicle ensures that the vehicle does not have to suspend the full weight of the container but that when the container is moved onto the vehicle, the container itself provides a counter-balance at the pivot point on the vehicle.

Further provided according to the invention... [insert claim 2].

The advantage achieved when loading the container onto the vehicle is repeated in reverse when the container is removed from the vehicle.

In one embodiment, the loading means... [insert claim 3].

An arm mechanism allows lifting or lowering of the container. The invention in this embodiment is able to function in the absence of chains used in the prior art.

The loading means may further comprise [insert claim 4]. The base arms may be pivotally mounted.... [insert claim 5].

The dual arm mechanism allows mechanically efficient lifting and/or lowering of the container. Preferably, the engaging arm and/or the base arm are hydraulically actuated. This allows, for example,

known hydraulic operating mechanisms to be situated on the vehicle and operated by a vehicle driver.

The engaging arm may comprise... [insert claim 7]. A hook allows easy engage and release of the container as if is open at one end so can be lifted into or out of position by raising or lowering of the engaging arm, respectively.

The one end of the container may have a hook attaching means for engaging the hook. This may be, for example, a bar at the front of container which will allow the hook to engage the container along the length of the one end.

The hook may be oriented away from the engaging arm. This will enable, for example a driver of the vehicle to singly operate the loading means by placing the hook lower than the end of the container or the hook actuating means and activating the loading means which will engage and lift the container.

The pivot point on the vehicle may comprise a guide. The guide in a preferred embodiment comprises rollers. The guide facilitates loading and unloading, and may also align the container with the vehicle. The guide may also maintain the position of the container on the vehicle during transportation, particular if loads are not used to lock the container to the vehicle.

The vehicle may further comprise... [insert claim 12]. The support may, for example, comprise rails along the sides of the vehicle. The support serves to support the container on the vehicle.

The loading means may be located ... [insert claim 13]. This arrangement provides efficient spatial location of the components of the vehicle when loaded (in particular).

In a further aspect of the invention, there is provided ... [insert claim 14]. The loading means may slidably pivot ... [insert claim 15].

[insert claims 16 to 26].

The advantages of the container transporter system as mentions above as defined for the vehicle.

The container of the container transporter ... [insert claim 27]. The friction-reducing means may comprise rollers. The friction-reducing means may also or alternatively comprise a skid.

These friction-reducing means allow the container to easily move along the ground, for example, when the container is being loaded or unloaded. Thus ground scouring can be minimised.

In another aspect of the invention there is provided... [insert claim 30]. The container itself has advantages as discussed above over the prior art skip.

Further provided is a method ... [insert claims 31-33]. The method allows more efficient lifting or lowering of containers from vehicles, in that the container provides a counter-balance weight itself on the pivot point on the vehicle. Support struts used in the prior art method are therefore not required.

The skilled reader would appreciate that the improved loading means as described herein will not be

limited to use in vehicular container transport system. Therefore, also provided according to the invention is ... [insert claims 34 & 35].

Specific embodiments of the invention ...

Claims

1. A vehicle comprising a loading means for lifting one end of a container against a pivot point on the vehicle and slidably pivoting the container onto the vehicle about the pivot point.
2. The vehicle of claim 1, in which the loading means slidably pivots the container off the vehicle about the pivot point and lowers the one end of the container against the pivot point.
3. The vehicle of claim 1 or claim 2, in which the loading means comprises an engaging arm for lifting or lowering the one end of the container.
4. The vehicle of claim 3, in which the loading means further comprises a base arm connected to the engaging arm.
5. The vehicle of claim 4, in which the base arm is pivotally mounted onto the vehicle and pivotally connected to the engaging arm.
6. The vehicle of any of claim 3 to 5, in which the engaging arm and/or the base arm are hydraulically actuated.
7. The vehicle of any of claims 3 to 6, in which the engaging arm comprises a hook for engaging the one end of the container.
8. The vehicle of claim 7, in which the one end of the container has a hook actuating means for engaging the hook.
9. The vehicle of claims 7 or claim 8, in which the hook is oriented away from the engaging arm.
10. The vehicle of any preceding claim, in which the pivot point comprises a guide.
11. The vehicle of claim 10, in which the guide comprises rollers.
12. The vehicle of any preceding claim, further comprising a support upon which the container rests when loaded home on the vehicle.
13. The vehicle of claim 12, in which the loading means is located beneath the support when the container is loaded home on the vehicle.
14. A container transporter comprising a vehicle and a container, in which the vehicle has a loading means for lifting one end of the container against a pivot point on the vehicle and slidably

pivoting the container onto the vehicle about the pivot point.

15. The container transporter of claim 14, in which the loading means slidably pivots the container off the vehicle about the pivot point and lowers the one end of the container against the pivot point.
16. To 26. The container transporter... [insert features of claims 3-13, respectively].
27. The container transporter of any of claims 14 to 26, in which the container has at an end diagonally opposite the one end a friction-reducing means for facilitating movement against a surface.
28. The container transporter of claim 27, in which the friction-reducing means comprise rollers.
29. The container transporter of claim 27 or claim 28, in which the friction-reducing means comprise a skid.
30. A container for vehicular transport, comprising at one end an actuating means for engaging a vehicle loading means and at an end diagonally opposite the one end a friction-reducing means for facilitating movement against a surface.
31. A method for loading a container onto a vehicle, comprising the steps of lifting one end of a container against a pivot point on the vehicle and slidably pivoting the container onto the vehicle about the pivot point.
32. The method of claim 31, in which during the step of lifting one end of the container, the opposite end of the container pivot and slides towards the vehicle;
33. A method for off-loading a container from a vehicle, comprising the steps of slidably pivoting the container off the vehicle about a pivot point on the vehicle and lowering one end of the container against the pivot point.
34. A loading means for moving a container from a lower surface to an upper surface, the loading means comprising a loader for lifting one end of the container against a pivot point on the upper surface and slidably pivoting the container onto the upper surface about the pivot point.
35. A loading means for moving a container from an upper surface to a lower surface, the loading means comprising a bader for slidably pivoting the container off the upper surface about a pivot point on the upper surface and lowering one end of the container against the pivot point onto the lower surface.

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