

DEVICE FOR COUPLING A TRAILER TO A TRACTOR

FIELD OF INVENTION

5 The present invention relates to an apparatus by which a trailer vehicle can be coupled to a tractor vehicle. The present invention particularly relates to a trailer vehicle with a towing arm that is pivotally mounted to the trailer chassis for coupling the trailer vehicle to a tractor vehicle.

10 BACKGROUND

It is known to use articulated vehicles comprising a tractor coupled to one or more trailers for towing by the tractor. A trailer is coupled to a powered tractor which is then used to move the trailer from a starting location to a destination.

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In a typical application freight is carried directly in or on trailers, or may be loaded into containers which are carried in or on trailers, and the trailers coupled to tractors for moving the freight between locations.

20 In one known arrangement, a towing arm is mounted to the forward end of a trailer. A forward end of the towing arm is coupled to a tractor towing point at the rear end of a tractor, to couple the trailer to the tractor.

25 The tractor and trailer combination is usually articulated; that is, the combination is configured so that it can readily make turns to the left and right, and can negotiate undulations. In one configuration that provides this articulation the rear end of the trailer towing arm is attached to the forward end of a chassis of the trailer by a pivotal connection, the pivot axis being arranged horizontally to allow the eye at the forward end of the towing arm to rise and fall relative to the chassis of the trailer. This pivotal
30 connection allows the tractor-trailer combination to flex, such as when traversing an undulating road surface.

In one typical current practice, a tractor is backed up to a trailer under direction from a ground crew who position the trailer towing arm so that the eye is located between a pair of tractor flanges and aligned with apertures in the flanges. The ground crew can then couple the trailer to the tractor by inserting the coupling pin through the apertures and the eye. This requires at least two personnel, one driving the tractor and at least one to manipulate the towing arm. Additional crew are usually required in the case of large trailers, for example when the towing arm is too heavy for one person to manage.

10 The manipulation of heavy trailer towing tackle and the close proximity between a reversing tractor and a stationary trailer makes this operation particularly hazardous for the ground crew. High noise levels and other distractions are common in such situations and can make communication between ground crew and tractor driver difficult. The crew can be exposed to increased risk of injury if communications
15 between the driver and ground crew are not heard or are mis-understood.

Hence, it is accordingly an object of the present invention to provide an apparatus for facilitating the coupling of trailers to tractors which addresses at least some the abovementioned disadvantages or which will at least provide the public with a useful
20 choice.

BRIEF DESCRIPTION OF THE INVENTION

The present invention may be broadly said to be a trailer vehicle consisting at least in
25 part of:

- (a) a chassis,
- (b) a towing arm, and
- (c) a support link,

wherein;

30 the towing arm is pivotally attached to the chassis for rotation of the towing arm relative to the chassis about a substantially horizontal pivot axis,
the towing arm has a distal end remote from the pivot axis,

a first end of the support link is connected to the chassis at an attachment point that is higher than the pivot axis, and

a second end of the support link is connected to the trailer towing arm at a connection point that is between the pivot axis and the distal end.

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Preferably, the towing arm is pivotally attached to the chassis at two separate locations along the pivot axis and the two separate locations are arranged symmetrically about a fore and aft centreline of the trailer vehicle. The connection point preferably lies on a fore and aft centreline of the trailer vehicle.

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The connection point is preferably offset below a straight line between the pivot axis and the distal end of the towing arm.

The attachment point preferably lies on a fore and aft centreline of the trailer vehicle.

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Preferably, the link supports the towing arm to hold the distal end of the trailer towing arm substantially at a predetermined height relative to the chassis.

The link may include an adjustable length portion; for example, a turnbuckle.

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Adjustment of the length of the adjustable length portion adjusts the height of the distal end of the towing arm relative to the chassis.

The link may include a resiliently extendible length portion; for example, an extension spring. The length of the resiliently extendible length portion changes to accommodate changes in the height of the distal end of the towing arm relative to the chassis.

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This invention may also be broadly said to consist in the parts, elements and features referred to or indicated herein, individually or collectively, including any or all combinations of any two or more of said parts, elements or features. Where specific integers mentioned herein have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if specifically set forth.

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BRIEF DESCRIPTION OF THE DRAWINGS

5 A preferred form of the present invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a side elevation of a portion of a trailer vehicle, and

Figure 2 is a plan view of a portion of the trailer vehicle seen in part in
10 Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

The figures show a portion of a trailer vehicle, hereinafter called a trailer. The trailer has a chassis 1 (only a fragment of which is shown in the figures), a towing arm 2,
15 and a support link 3. The towing arm is attached to the chassis by a pivotal attachment 4 which allows the towing arm to be rotatable relative to the chassis about a substantially horizontal pivot axis 5. The towing arm has a distal end 6 that is remote from the pivot axis. The trailer can be coupled to a tractor vehicle (not shown) using a towing eye provided at the distal end 6 of the towing arm.

20 One end of the support link 3 is connected to the chassis 1 at an attachment point 8 that is higher than the pivot axis 5. The attachment point 8 preferably lies on a fore and aft centreline 10 of the trailer vehicle.

25 The other end of the support link 3 is connected to the trailer towing arm 2 at a connection point 12 that is between the pivot axis 5 and the distal end 6 of the towing arm. The connection point 12 preferably lies on a fore and aft centreline 10 of the trailer vehicle.

30 As best seen in the plan view of Figure 2, the towing arm is pivotally attached to the chassis at two separate locations 14, 16 that are spaced apart along the pivot axis, and arranged symmetrically about the fore and aft centreline 10 of the trailer vehicle.

In the preferred embodiment shown in the figures, the connection point 12, at which the support link 3 attaches to the towing arm 2, is offset below a straight line between the pivot axis 5 and the distal end 6 of the towing arm.

- 5 The link 3 supports the towing arm 2 to hold the distal end 6 of the trailer towing arm substantially at a predetermined height relative to the chassis.

The link includes an adjustable length portion such as a turnbuckle 18, by which the height of the distal end 6 of the towing arm relative to the chassis 1 can be adjusted.

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The link 3 includes a resiliently extendible length portion, for example an extension spring 20, the length of which changes to accommodate changes in the height of the distal end of the towing arm relative to the chassis.

- 15 The turnbuckle 18 may be adjusted to bring the distal end 6 of the trailer towing arm 2 to a predetermined height relative to the chassis. In one preferred configuration, the length of the support link 3 is adjusted by the turnbuckle 18 to support the towing arm 2 substantially horizontally, as shown in Figure 1. The spring 20 then allows the towing arm to pivot about axis 5, for example when the trailer is coupled to a tractor
20 and the coupled combination is traversing an undulating surface.

- The angle of the resiliently supported towing arm, relative to the trailer chassis, is adjusted using the turnbuckle to bring the towing eye at the distal end of the towing arm to the height of the coupling point of a tractor with which the trailer is to be
25 coupled. The tractor can then readily engage the towing eye without intervention of a ground crew because the towing eye is held at the correct height. The resiliency of the spring allows the distal end of the towing arm to rise or fall when engaging the tractor towing point to accommodate minor differences in height between the tractor towing point and the disengaged towing arm when supported by the link. By
30 simplifying the tractor-trailer coupling operation and substantially eliminating the need to lift a heavy towing arm to a height suitable to engage a tractor towing point, the present invention provides an increased efficiency of tractor-trailer coupling and decoupling operations, a reduction in the number of personnel needed to connect and

disconnect trailer couplings to a tractor, a reduced time spent coupling and decoupling a trailer-tractor combination, and an increased level of safety.

5 Although the invention has been described by way of example and with reference to particular embodiments, it is to be understood that modifications and/or improvements may be made without departing from the scope or spirit of the invention. For one example, the adjustable length portion of the support link may be provided by a chain, with the number of links of the chain selected to incrementally adjust the length of the support link and the height of the towing arm.

LIST OF FEATURES LABELLED IN THE DRAWINGS

chassis 1	fore and aft centreline 10
towing arm 2	10 connection point 12
support link 3	pivotal attachment locations 14, 16
5 pivotal attachment 4	turnbuckle 18
horizontal pivot axis 5	spring 20
distal end 6	
attachment point 8	

CLAIMS

1. A trailer vehicle consisting at least in part of:
 - (a) a chassis,
 - 5 (b) a towing arm, and
 - (c) a support link,wherein;

the towing arm is pivotally attached to the chassis for rotation of the towing arm relative to the chassis about a substantially horizontal pivot axis,

 - 10 the towing arm has a distal end remote from the pivot axis,

a first end of the support link is connected to the chassis at an attachment point that is higher than the pivot axis, and

a second end of the support link is connected to the trailer towing arm at a connection point that is between the pivot axis and the distal end.

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2. A trailer vehicle as claimed in claim 1, wherein the towing arm is pivotally attached to the chassis at two separate locations along the pivot axis and the two separate locations are arranged symmetrically about a fore and aft centreline of the trailer vehicle.- 20
3. A trailer vehicle as claimed in claim 2, wherein the connection point lies on a fore and aft centreline of the trailer vehicle.
4. A trailer vehicle as claimed in any one of the preceding claims, wherein the
25 connection point is offset below a straight line between the pivot axis and the distal end of the towing arm.
5. A trailer vehicle as claimed in any one of the preceding claims, wherein the attachment point lies on a fore and aft centreline of the trailer vehicle.- 30
6. A trailer vehicle as claimed in any one of the preceding claims, wherein the link supports the towing arm to hold the distal end of the trailer towing arm substantially at a predetermined height relative to the chassis.

7. A trailer vehicle as claimed in any one of the preceding claims, wherein the link includes an adjustable length portion.
- 5 8. A trailer vehicle as claimed in claim 7, wherein the adjustable length portion is a turnbuckle.
9. A trailer vehicle as claimed in claim 7 or 8, wherein adjustment of the length of the adjustable length portion adjusts the height of the distal end of the towing arm
10 relative to the chassis.
10. A trailer vehicle as claimed in any one of the preceding claims, wherein the link includes a resiliently extendible length portion.
- 15 11. A trailer vehicle as claimed in claim 10, wherein the resiliently extendible length portion is an extension spring.
12. A trailer vehicle as claimed in claim 10 or 11, wherein the length of the resiliently extendible length portion changes to accommodate changes in the height of
20 the distal end of the towing arm relative to the chassis.