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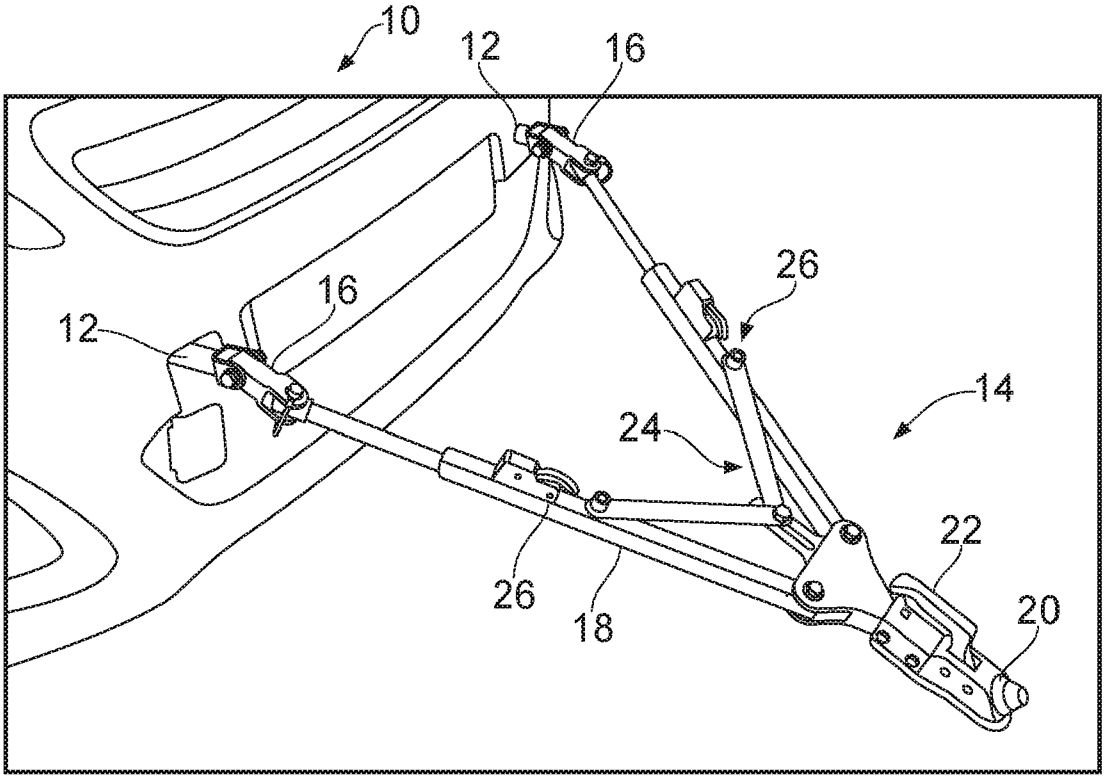

FIG. 1

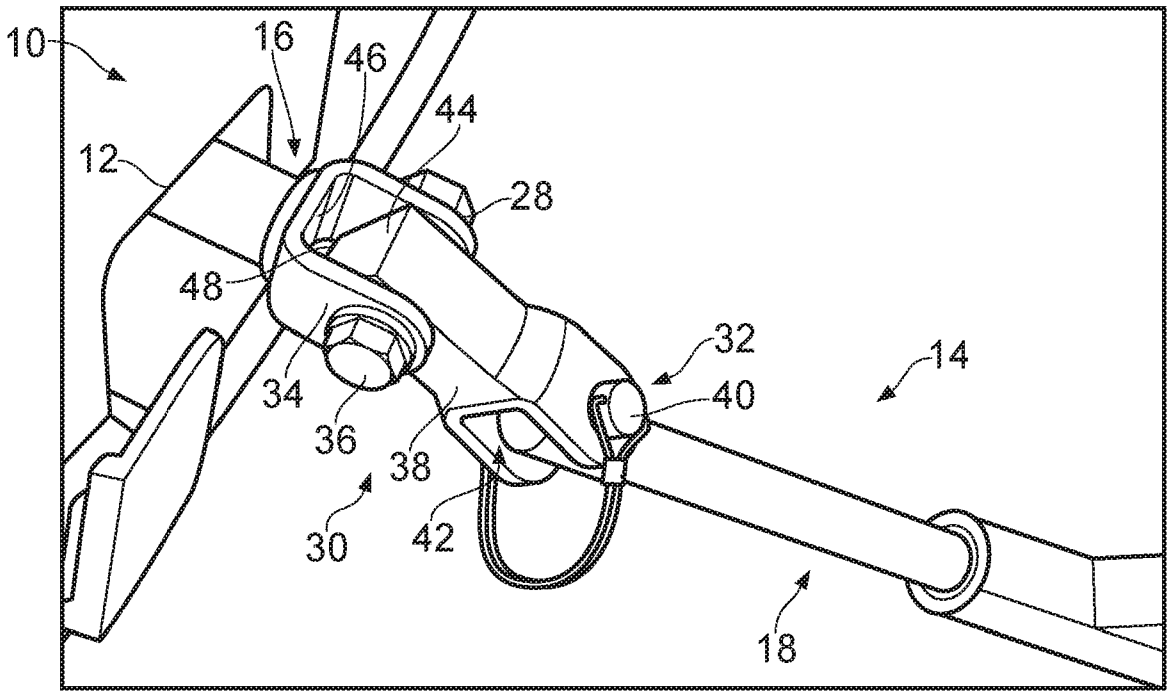

FIG. 2

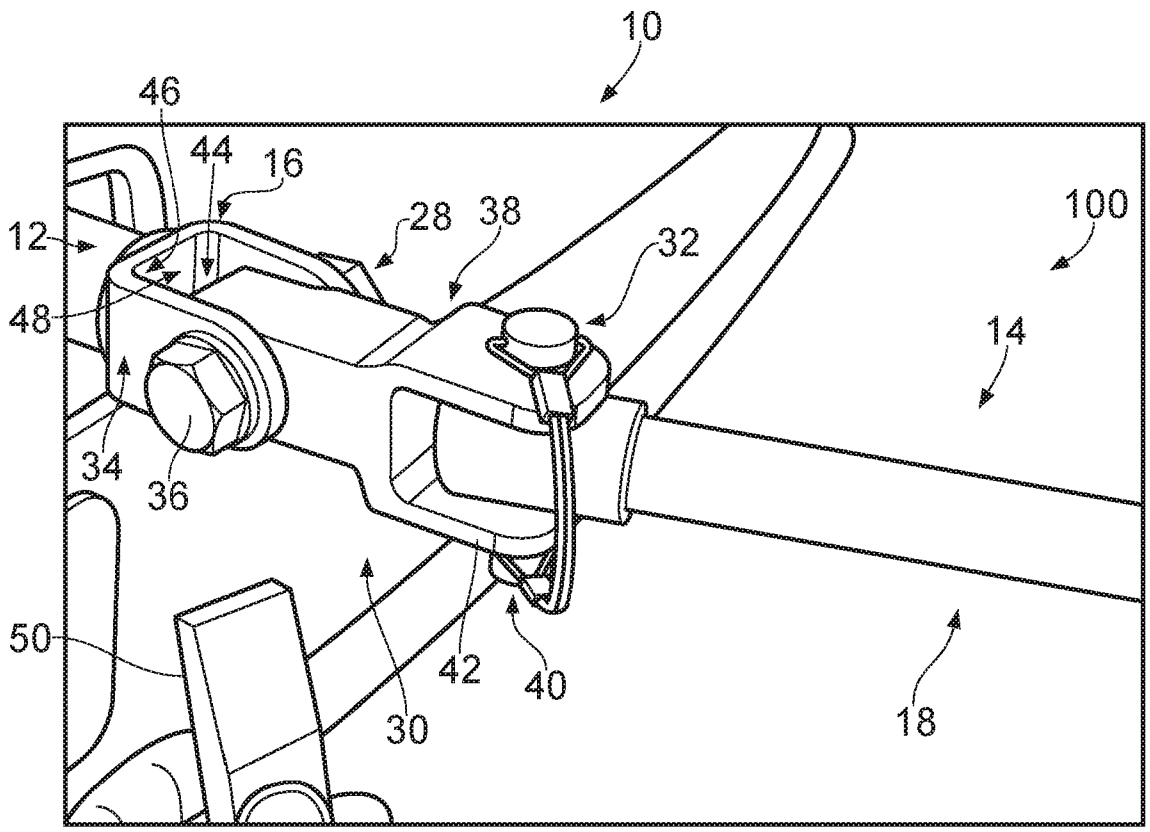

FIG. 3

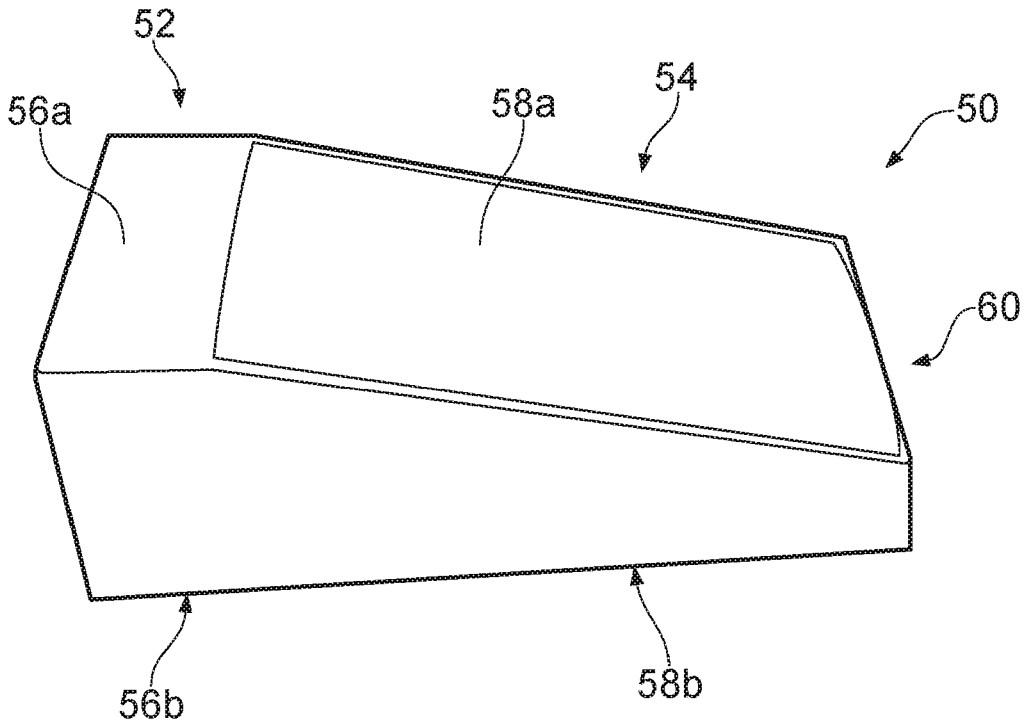

FIG. 4

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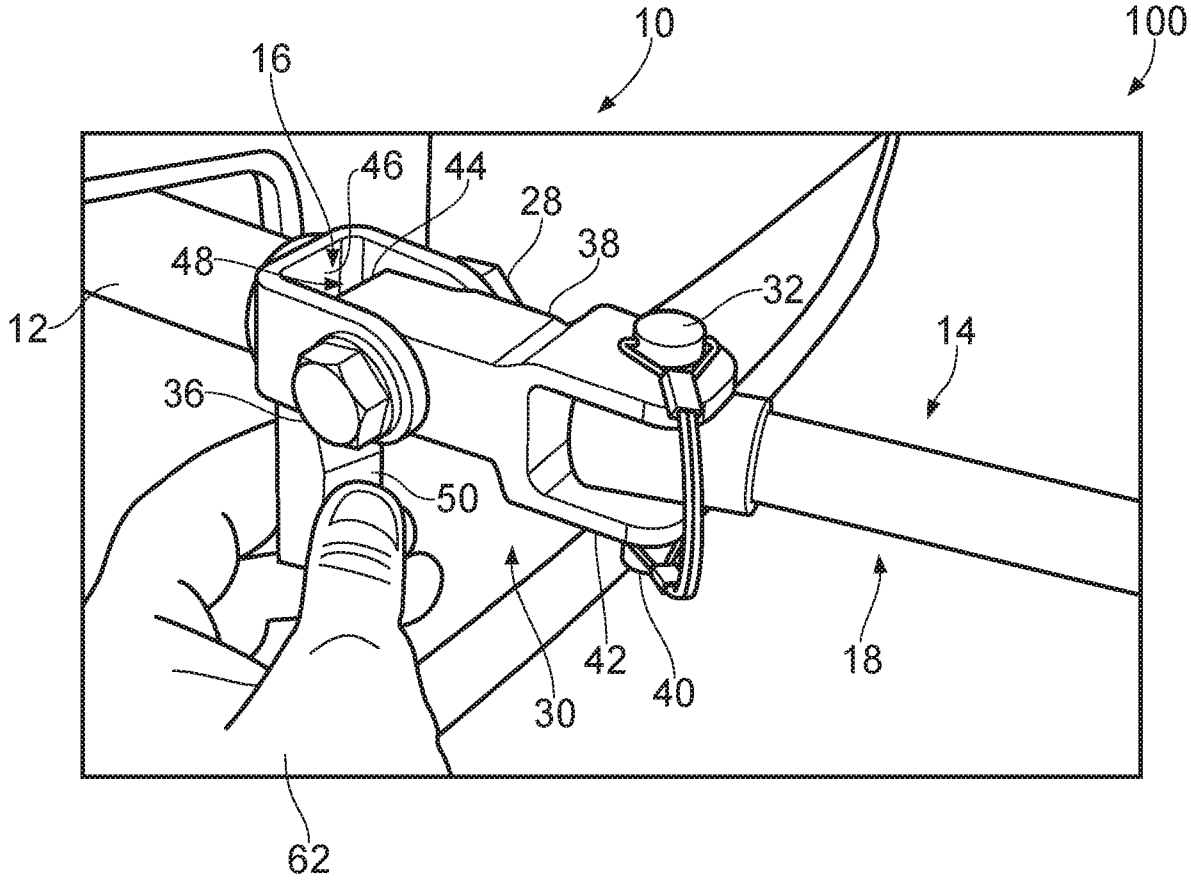

FIG. 5

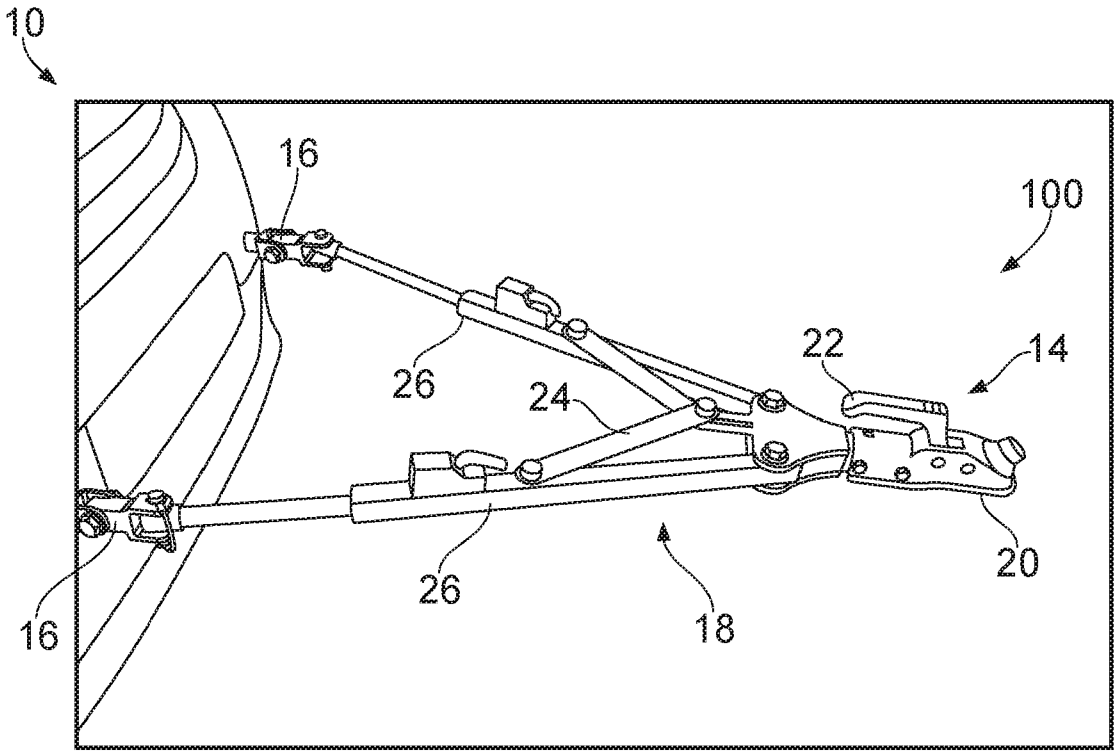

FIG. 6

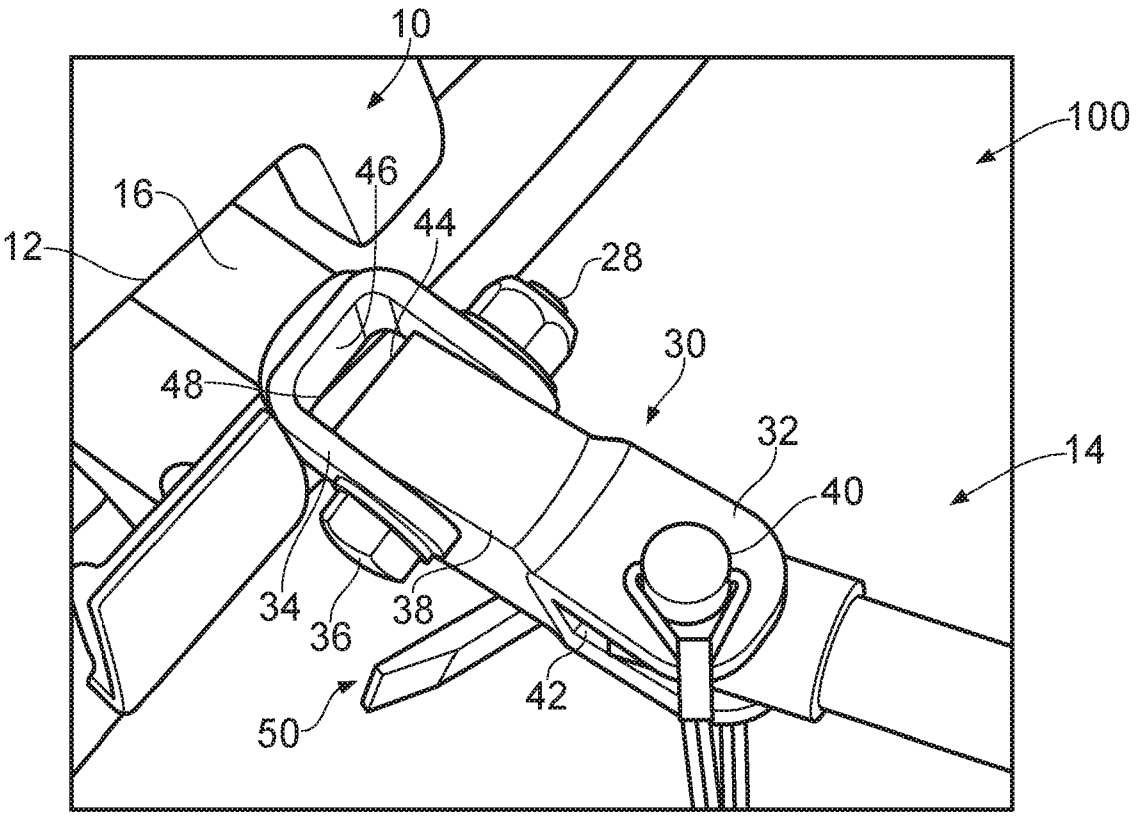

FIG. 7

Vehicular Towbar Locking System

The present invention relates to a vehicular towbar locking system, preferably but not necessarily exclusively for use with an A-frame type towbar. The invention further relates to a method of securing a vehicular towbar for engagement with a towing vehicle and a towed vehicle.

Vehicles are often towed when they can either not be driven, or there are insufficient drivers for the number of vehicles present. This is particularly prevalent for caravanners or camper vans, which may tow other cars for use at a particular destination.

The traditional method of towing a vehicle behind a caravan or camper van is to attach a towbar to the front of the vehicle needing to be towed, and then attaching the other end of the towbar to the rear of the towing vehicle. One common form of towbar is the A-frame towbar, in which a single hitch is made to the towing vehicle, and then two points of contact are made with the towed vehicle. The A-frame is at least in part pivotable, to allow for cornering and turning of the pair of vehicles to be achieved.

A towbar is generally attached to the towed vehicle first, and then the towbar is hitched to the towing vehicle. This can, however, be very difficult for an individual to achieve, since the handbrake on the towed vehicle must be released in order to engage the towbar with the towing vehicle.

Whilst this may be safe on a flat surface, on an incline, it is challenging to safely hitch the towbar to the towing vehicle once the handbrake has been removed. The A-frame will pivot downwardly making it difficult to access the handle to readily engage the towbar with the towing vehicle. This can be particularly challenging for elderly or infirm users, who may not be able to bend down very easily to engage with the handle of the A-frame if pivoted to ground level.

The present invention seeks to provide a product which is able to obviate the above-referenced problems.

According to a first aspect of the invention, there is provided a vehicular towbar locking system comprising: a towbar having a first frame portion which is engagable with a

towed vehicle, and a second frame portion which is engagable with a towing vehicle, the first and second frame portions being at least in part planar, the first and second frame portions being pivotably engaged with one another at at least one pivot between a co-planar or substantially co-planar condition and a non-co-planar condition; and a locking element which is insertably engagable at or adjacent the at least one pivot to lock the first and second frame portions in the co-planar or substantially co-planar condition.

The provision of a mechanical locking element which is able to lock a planar condition of a towbar significantly reduces the strain on a user when attempting to pick up part of the towbar for attachment to another vehicle. This is particularly important for elderly users, or users having limited dexterity who may not be so capable of bending over. The removal of the need for the user to hold the towbar in position for much of the connection process also reduces the load burden for the user.

The system also has the advantage of the user being able to lock the towbar into position in the planar condition, and then either driving the towed vehicle or reversing the towing vehicle towards the other so that a single user can hitch the towbar in position. The user need only lift the second frame portion slightly once the vehicles are correctly positioned so that the hitch of the towbar can fit over the tow ball of the towing vehicle securely. This negates the need for the user to release the handbrake of the vehicles and attempt to secure the hitch simultaneously, which is far safer for the user, particularly on a slope. This also has the additional benefit of the towed vehicle being carefully manoeuvrable whilst the towbar is connected to the front thereof, which would not otherwise be feasible for a non-locking arrangement.

Preferably, the or each pivot may comprise a saddle which is connected to one of the first or second frame portions, and a coupling which is connected to the other of the first or second frame portions and which is receivable within the saddle so as to be pivotably engagable therewith.

The saddle shape provides a freely pivotable region into which a locking element can be readily inserted to effect the locking of the first and second frame portions to one another.

An in-use inserted end of the coupling may be spaced apart from a seat of the saddle, and wherein the locking element comprises a wedge which is insertable between the coupling and the seat of the saddle.

A wedge is a simple mechanism by which a planar condition of the towbar can be created, since it acts to block the natural pivoting action of the pivot between the first and second frame portions, without having complicated components which might interfere with the ease of use.

Optionally, the locking element may be held in position by the coupling under gravity.

Rather than needing to provide a specific locking or catch mechanism, it is advantageous to use the natural weight of the towbar to hold the locking element in position to maintain the planarity of the towbar for use. This significantly simplifies the operation of the hitching of the towbar.

In a preferred embodiment, the wedge may have a tapered profile.

A tapered profile of the wedge may advantageously improve the ease of insertion into the pivot to prevent relative rotational movement of the pivotable components.

Optionally, the wedge may be adjustably insertable between the coupling and the seat of the saddle to alter a pivot angle between the first and second frame portions.

The ability to alter the relative pivot angle between the first and second frame portions may assist with coupling the towbar between vehicles where the hitch and tow points are not themselves co-planar, but are instead slightly vertically offset relative to one another.

Preferably, the wedge may be dimensioned to contact lateral sides of the saddle when inserted.

Lateral wedging may assist with retention of the locking element within the gap, limiting the potential for the locking element to fall out of position before the second frame portion can be lowered into the planar condition.

The saddle may be releasably engagable with the second frame portion.

Releasable engagement of the second frame portion may simplify the ease of attachment and detachment of the towbar to the towed vehicle by reducing the weight of the apparatus which may need to be lifted at any given point.

Optionally, the second frame portion may comprise an A-frame towbar portion.

An A-frame towbar is a suitable towing mechanism for a pair of vehicles, and can be readily pivoted for engagement with a locking mechanism, in particular, a wedging locking mechanism.

Preferably, a plurality of first frame portions may be provided.

The number of first frame portions will likely be dependent on the number of towing points on the towed vehicle.

The or each pivot may comprise part of a universal joint between the first and second frame elements.

A universal joint advantageously allows for movement of the A-frame towbar portion in each direction as required, enabling a more convenient driving condition for the towing vehicle.

In one embodiment, the locking element may comprise a locking pin engagable with the or each pivot.

Whilst a wedge may be a simple mechanical mechanism by which planarity of the towbar can be achieved, it will be appreciated that other arrangements are feasible, not least of which is a locking pin which can engage with both the first and second frame portions simultaneously to lock their relative positions.

Optionally, the locking element may be insertably engagable at or adjacent to the at least one pivot to lock the first and second frame portions in a perpendicular or substantially perpendicular condition.

Insertion of the locking element once the A-frame portions have been pivoted into a stowed condition has the advantage of locking the towbar into a position in which the length of the towed vehicle is not significantly extended. This may be advantageous when manoeuvring the vehicle.

According to a second aspect of the invention, there is provided a method of securing a vehicular towbar for engagement with a towing vehicle and a towed vehicle, the method comprising the steps of: a] engaging a first frame portion of the vehicular towbar with the towed vehicle; b] engaging a second frame portion of the vehicular towbar with the first frame portion, the first and second frame portions being pivotably engaged with one another at at least one pivot between a co-planar or substantially co-planar condition and a non-co-planar condition; c] inserting a locking element so as to engage at or adjacent the at least one pivot to lock the first and second frame portions in the co-planar or substantially co-planar condition; d] engaging the second frame portion with the towing vehicle; and e] removing the locking element.

This method of locking the position of a towbar allows for a user to be able to readily engage with the towbar during the hitching process, without needing to perform significant amounts of bending or lifting. The simplifies the process for attaching a towed vehicle to a towing vehicle.

Optionally, during step c], the locking element may be inserted from an in-use underside of the pivot.

Whilst it may be more instinctive to insert a locking element from above the pivot, being the more easily accessible direction, it is noted that the insertion from below has many advantages, not least with regards to the simplicity of removal of the locking element in due course.

Preferably, during step c], the locking element may be held in position by the pivot under gravity.

The use of the weight of the frame portions under gravity is sufficiently robust to hold the planar condition of the towbar safely, without then becoming fiddly or complicated to disengage.

In one embodiment, during step c], the locking element may be insertable so as to be wedgingly engagable with the pivot.

Optionally, during step c], the locking element may be adjustably insertable to alter the pivot angle between the first and second frame portions.

By allowing the locking element to be inserted at different positions to adjust the pivot angle thereof, the ease with which the hitch can be engaged by the user can be increased, depending on a relative positioning of the towed and towing vehicles.

Wedging engagement is a simple means of blocking the pivoting action without the need to perform complicated locking actions which might be difficult for users with limited dexterity.

Preferably, during step e], the locking element may be released by lifting of the second frame portion.

This has two advantages. Firstly, the lifting release makes removal of the locking element very straightforward. Secondly, the risk of jamming the towbar is significantly reduced, since if the locking element has been forgotten, then it will naturally release due to bumps in the road as the towing vehicle begins to move. This significantly reducing the risk of damage to both the towbar and the vehicles.

The method may further comprise a step f] of pivoting first and second frame portions into a perpendicular or substantially perpendicular condition, and a step g] of inserting the locking element at or adjacent to the at least one pivot to lock the first and second frame portions in a perpendicular or substantially perpendicular condition.

The ability to lock the A-frame towbar into a substantially vertical condition allows for the length of the towbar to be minimised during manoeuvring, without necessarily needing to remove the towbar from the towed vehicle.

According to a third aspect of the invention, there is provided a locking element for insertion into a pivot of an A-frame towbar to secure a co-planarity or substantial co-planarity of first and second frame portions thereof, the locking element comprising a block body portion and a tapered body portion, the tapered body portion having first and

second opposed planar surfaces which converge towards one another to define an insertable end of the locking element, and the block body portion having first and second opposed planar surfaces which are parallel to one another to define pivot-contact surfaces.

A mechanical locking element which can be inserted into a pivot of an A-frame towbar assembly can easily provide a planar and therefore easily-accessible towbar configuration, whilst also being readily removed so that the towbar cannot become accidentally jammed in use.

The invention will now be more particularly described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a front perspective view of an A-frame towbar connected to the front of a towed vehicle;

Figure 2 shows an enlarged view of a pivot associated with the A-frame towbar to allow pivoting relative to a vehicular coupling connected to the towed vehicle, the pivot being positioned so that the A-frame towbar and vehicular coupling are non-co-planar;

Figure 3 shows a perspective view of a vehicular towbar locking system in accordance with the first aspect of the invention, using the A-frame towbar arrangement shown in Figures 1 and 2, including a locking element;

Figure 4 shows a perspective representation of the locking element shown in Figure 3, formed in accordance with the third aspect of the invention;

Figure 5 shows a perspective view of the vehicular towbar locking system of Figure 3 in which the A-frame towbar and vehicular coupling are in a co-planar condition, the locking element being inserted into the pivot;

Figure 6 shows a side view of the vehicular towbar locking system of Figures 3 and 5 following insertion of the locking element; and

Figure 7 shows a perspective view of the vehicular locking system of Figure 6 following lifting of the A-frame towbar to release the locking element.

Referring to Figure 1, there is shown a vehicle 10 which is in need of towing, hereafter referred to as a towed vehicle, though it will be appreciated that this term is used for concision, and need not actually be physically towed to fall within the above definition.

The vehicle 10 has a pair of front tow points 12, known as recovery points, which are preferably formed as hooks or holes that are anchored to the chassis of the vehicle 10 that allow it to be towed with as little damage as possible. A towbar 14 can then be mounted to these tow points 12.

The towbar 14 shown is a multi-part A-frame towbar. There are two first frame portions, formed as vehicle connectors 16 which are engagable with the front tow points 12, though it will be apparent that the total number of vehicle connectors 16 required will be dependent on the towing configuration of the vehicle; smaller vehicles may only have a single tow point, for instance.

The towbar 14 also includes a second frame portion, which is here the A-frame towbar portion 18. This A-frame towbar portion 18 is engagable with the vehicle connectors 16, and includes a hitch 20 or similar attachments means, preferably including a user engagement handle or grip 22 via which a user can lift the A-frame towbar portion 18 to engage the hitch 20 with a rear tow point on the towing vehicle.

Preferably, the A-frame towbar 18 is formed so have an adjustable mechanism 24 via which the length or angle of the structural frame members 26 can be modified to suit the tow points 12 of the towed vehicle 10.

The first and second frame portions of the towbar 14 are pivotably engagable with one another, so as to at least permit raising and lowering of the A-frame towbar portion 18 relative to the vehicle connectors 16. An indicative pivot 28 is illustrated in Figure 2.

The pivot 28 is preferably formed as part of a universal joint 30, in which the pivot 28 has a pivot axis which is or is substantially aligned with the ground when in use, with a

further pivot 32 having a vertically aligned pivot axis to permit some turning action to be achieved between the towing and towed vehicles.

The vehicle connector 16 preferably includes a saddle 34, here formed as a U-shaped metal fixture, through which a bolt or axle 36 is passable to act as the pivot axis. An intermediate coupling 38 is then provided which is receivable within the saddle 34, preferably formed as a block with an aperture therethrough for receiving the axle 36 to allow relative pivoting between the saddle 34 and the intermediate coupling 38.

The intermediate coupling 38 could be directly formed as part of the A-frame towbar portion 18, though in the present embodiment, the intermediate coupling 38 is connected to the further pivot 32 via a locking pin 40. In this case, the intermediate coupling 38 also includes a further saddle 42 through which the locking pin 40 can pass, and via which the A-frame towbar portion 18 can engage with the intermediate coupling 38.

When engaged with one another, it is preferred that an inserted end 44 of the intermediate coupling 38 be spaced apart from a seat 46 of the saddle 34, to a greater extent than would otherwise be required to provide clearance during the pivoting process. This results in a gap 48 at or adjacent to the seat 46 of the saddle 34.

To prevent downward pivoting of the A-frame towbar portion 18 before the hitch 20 can be engaged, there is also provided a locking element 50, which forms a vehicular towbar locking system 100 in conjunction with the towbar 14, and which can be seen in Figure 3, prior to insertion.

The locking element 50 is preferably formed as a wedge, and the locking element 50 is shown in detail in Figure 4. The locking element 50 can be inserted into the gap 48 to prevent pivoting of the intermediate coupling 38 relative to the saddle 34. In this preferred embodiment, the locking element 50 is machined from a single piece of material, and has a block body portion 52 and a tapered body portion 54. The block body portion 52 may have a pair of opposed planar surfaces 56a, 56b which are parallel to one another, whilst the tapered body portion 54 may have a pair of opposed planar surfaces 58a, 58b which are convergent towards one another to create an insertable or

interposable end 60 of the locking element 50. The opposed planar surfaces 56a, 56b, 58a, 58b may preferably be continuous and/or contiguous with one another to provide a smooth surface for the locking element 50.

By way of example only, a suitable locking element 50 may be formed in which the block body portion 52 has dimensions of 20mm length by 20 mm width by 15 mm depth, with the tapered body portion 54 having a 30mm length, a 20 mm width, and a 4mm depth at the insertable end 60, the block body portion therefore tapering by 11 mm over the 30 mm length thereof. These dimensions will fit neatly into a standard gap 48 of an A-frame towbar 14.

Preferably, the block body portion 52 is dimensioned to fill or substantially fill the gap 48 when the pivot 28 is in a planar configuration. This could either be the depth of the block body portion 52 being equal to or approximately the same size as the separation between the seat 46 of the saddle 34 and the inserted end 44 of the intermediate element 38, or could be that the width of the block body portion 52 is equal to or approximately the same size as an internal lateral width of the saddle 34 so as to contact the lateral sides thereof once inserted.

The insertion of the locking element 50 into the gap 48 of the pivot 28 is illustrated in Figure 5. To do this, the user 62 inserts the locking element 50 into the gap 48 from below, having lifted the A-frame towbar portion 18 so as to angle the pivot 28 to increase an acceptance area of the gap 48 from the underside.

Once the locking element 50 has been inserted, preferably so that the opposed parallel planar surfaces 56a, 56b are respectively in contact with the seat 46 of the saddle 34 and the inserted end 44 of the intermediate coupling 38, thereby wedging the locking element 50 in place in the gap 48.

The A-frame towbar portion 18 can then be lowered into position, and the inserted end 44 of the intermediate coupling 38 will abuttably engage with the tapered body portion 54 under gravity. The A-frame towbar portion 18 will rotate about the pivot 28, with the hitch 20 naturally falling. The wedging engagement of the locking element 50 will limit the rotation, however, and will keep the vehicle connectors 16 in a planar or

substantially planar arrangement with respect to the A-frame towbar portion 18, depending on the degree of insertion of the locking element 50. This planar arrangement can be seen from Figure 6. Urging the locking element 50 further or less far into the gap 48, however, can alter the pivot angle of the pivot 28, for example, by raising the height of the A-frame towbar portion 18. This may assist with coupling of the towing vehicle to the towed vehicle 10, if there is a difference between the vertical positioning of the vehicle connectors 16 and the tow point of the towing vehicle.

Adjustable pivotability via the locking element 50 has many advantages, as the towing connector, typically a tow ball, on the towing vehicle can vary significantly in height. Once installed, a tow ball will generally have an elevation from the ground of 350 mm to 420 mm, and the locking element 50 needs to have sufficient adjustability to be able to accommodate for tow balls of differing heights. This is achieved by the tapered shape of the tapered body portion 54 urging the relative pivot angle between the vehicle connectors 16 and A-frame towbar portion 18 to suit.

Once the planar or substantially planar condition has been achieved, it becomes much more straightforward for the user to engage the towbar 12 with a towing vehicle, eliminating the need to bend down and pick the hitch 20 up from the ground. This also simplifies the engagement of the towed vehicle 10 to the towing vehicle when not positioned on a flat road or surface.

The removal of the locking element 50 is illustrated in Figure 7. The A-frame towbar portion 18 can be lifted slightly to relieve the force on the front planar surface 56a by the inserted end 44 of the intermediate element 38. This may allow the locking element 50 to fall out of the gap 48, at which point the A-frame towbar portion 18 can once again be freely pivoted relative to the vehicle connectors 16. The lifting action provides a very simple mechanism for removal, as well as limiting the danger of jamming or seizing of the towbar 14 if, for example, the user 62 forgets to disengage the locking element 50 prior to driving the towing vehicle.

It will be appreciated that whilst a wedging locking element is herebefore described, other suitable mechanical locking elements may be provided which can inhibit the

relative pivoting motion between the first and second frame portions. For instance, a locking pin, or a clamp engagable with the pivot, could also be considered.

It is therefore possible to provide a mechanism for locking an A-frame towbar into a planar configuration via a mechanical or physical means, using a locking element which fixes a pivot of the towbar, preferably under gravity. This improves the ease of use of the A-frame towbar, in particular for elderly or infirm users thereof.

The words 'comprises/comprising' and the words 'having/including' when used herein with reference to the present invention are used to specify the presence of stated features, integers, steps or components, but do not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof.

It is appreciated that certain features of the invention, which are, for clarity, described in the context of separate embodiments, may also be provided in combination in a single embodiment. Conversely, various features of the invention which are, for brevity, described in the context of a single embodiment, may also be provided separately or in any suitable sub-combination.

The embodiments described above are provided by way of examples only, and various other modifications will be apparent to persons skilled in the field without departing from the scope of the invention as defined herein.

Claims

1. A vehicular towbar locking system comprising:

a towbar having a first frame portion which is engagable with a towed vehicle, and a second frame portion which is engagable with a towing vehicle, the first and second frame portions being at least in part planar, the first and second frame portions being pivotably engaged with one another at at least one pivot between a co-planar or substantially co-planar condition and a non-co-planar condition; and

a locking element which is insertably engagable at or adjacent to the at least one pivot to lock the first and second frame portions in the co-planar or substantially co-planar condition.

2. A vehicular towbar locking system as claimed in claim 1, wherein the or each pivot comprises a saddle which is connected to one of the first or second frame portions, and a coupling which is connected to the other of the first or second frame portions and which is receivable within the saddle so as to be pivotably engagable therewith.

3. A vehicular towbar locking system as claimed in claim 2, wherein an in-use inserted end of the coupling is spaced apart from a seat of the saddle, and wherein the locking element comprises a wedge which is insertable between the coupling and the seat of the saddle.

4. A vehicular towbar locking system as claimed in claim 3, wherein the locking element is held in position by the coupling under gravity.

5. A vehicular towbar locking system as claimed in claim 3 or claim 4, wherein the wedge has a tapered profile.

6. A vehicular towbar locking system as claimed in any one of claims 3 to 5, wherein the wedge is adjustably insertable between the coupling and the seat of the saddle to alter a pivot angle between the first and second frame portions.

7. A vehicular towbar locking system as claimed in any one of claims 3 to 6, wherein the wedge is dimensioned to contact lateral sides of the saddle when inserted.

8. A vehicular towbar locking system as claimed in any one of claims 2 to 7, wherein the saddle is releasably engagable with the second frame portion.

9. A vehicular towbar locking system as claimed in any one of the preceding claims, wherein the second frame portion comprises an A-frame towbar portion.

10. A vehicular towbar locking system as claimed in any one of the preceding claims, wherein a plurality of first frame portions is provided.

11. A vehicular towbar locking system as claimed in any one of the preceding claims, wherein the or each pivot comprises part of a universal joint between the first and second frame elements.

12. A vehicular towbar locking system as claimed in any one of the preceding claims, wherein the locking element is insertably engagable at or adjacent to the at least one pivot to lock the first and second frame portions in a perpendicular or substantially perpendicular condition.

13. A vehicular towbar locking system as claimed in any one of the preceding claims, wherein the locking element comprises a locking pin engagable with the or each pivot.

14. A method of securing a vehicular towbar for engagement with a towing vehicle and a towed vehicle, the method comprising the steps of:

a] engaging a first frame portion of the vehicular towbar with the towed vehicle;

b] engaging a second frame portion of the vehicular towbar with the first frame portion, the first and second frame portions being pivotably engaged with one another at at least one pivot between a co-planar or substantially co-planar condition and a non-co-planar condition;

c] inserting a locking element so as to engage at or adjacent the at least one pivot to lock the first and second frame portions in the co-planar or substantially co-planar condition;

d] engaging the second frame portion with the towing vehicle; and

e] removing the locking element.

15. A method as claimed in claim 14, wherein, during step c], the locking element is inserted from an in-use underside of the pivot.

16. A method as claimed in claim 14 or claim 15, wherein, during step c], the locking element is held in position by the pivot under gravity.

17. A method as claimed in any one of claims 14 to 15, wherein, during step c], the locking element is insertable so as to be wedgingly engagable with the pivot.

18. A method as claimed in any one of claims 14 to 17, wherein, during step c], the locking element is adjustably insertable to alter the pivot angle between the first and second frame portions.

19. A method as claimed in any one of claims 14 to 18, wherein, during step e], the locking element is released by lifting of the second frame portion.

20. A method as claimed in any one of claims 14 to 19, further comprising a step f] of pivoting first and second frame portions into a perpendicular or substantially perpendicular condition, and a step g] of inserting the locking element at or adjacent to the at least one pivot to lock the first and second frame portions in a perpendicular or substantially perpendicular condition.

21. A locking element for insertion into a pivot of an A-frame towbar to secure a co-planarity or substantial co-planarity of first and second frame portions thereof, the locking element comprising a block body portion and a tapered body portion, the tapered body portion having first and second opposed planar surfaces which converge towards one another to define an insertable end of the locking element, and the block

body portion having first and second opposed planar surfaces which are parallel to one another to define pivot-contact surfaces.