(54) Title of the Invention: Improved post driver
Abstract Title: Vehicle mounted post driver, the post driver provided vehicle controls

(57) A post driver 100 mounted to a vehicle 5 having motive means, preferable tracks 15, the post driver having first controls 1020 for operating the tracks. The vehicle may have second controls 1005 for operating the tracks mounted in a vehicle cab 20. The post driver may have a weighted member 200, and be mounted on a turntable (25, Figs. 1C-1F), via first and second movable means (105, 120 Figs. 2A, 2B), the movable means having slideable members (110, 120), driven by hydraulic rams for moving the post driver back and forth, or side to side, relative to the turntable. The post driver may also have a mast pivotally mounted to the second movable means (1025, Figs 3A-3E). Movement of the post driver may be hydraulic controlled from the first controls 1025, located next to the mast, facilitating operation of the post driver and vehicle by a single user. There may be a lock (1205, Figs. 1C-F, 11 and 12) to fix the turntable position. Also claimed is the removable carrier 1055 for carrying fence posts and a removable dozer blade (1120, Fig. 9). The vehicle may also carry fence wire dispensers (1110, Fig. 8).
IMPROVED POST DRIVER

FIELD OF INVENTION

The present invention relates to post drivers, for example, for driving fence posts into the ground. The present invention also relates to a vehicle comprising or providing a post driver.

BACKGROUND TO INVENTION

Post drivers are known. GB 2 423 549 B by the present Inventor discloses a post driver comprising: a frame supported on a plurality of legs; a mast adapted to allow a weighted member to travel substantially up and down; wherein there are positioning means provided to enable the position of the mast to be optimised and adapted for alignment with a post to be driven; wherein the mast is telescopic; and the post driver comprises a plurality of pulleys allowing the post driver to be adapted to be used with different heights of post.

GB 2 441 071 B, also by the present Inventor, discloses a post driver comprising: a frame supported on a plurality of legs; a mast adapted to allow a weighted member to travel substantially up and down; wherein there are provided positioning means to enable the position of the mast to be optimised and adapted for alignment with a post to be driven, the positioning means comprising a back shift and a side shift; and wherein the legs are independently hydraulically operable.

GB 2 493 115 A, also by the present Inventor, discloses a vehicle having a post driver and rotational means for selectively deploying the post driver from at least two of one side of the vehicle, another side of the vehicle, and a rear of the vehicle, the post driver comprising a mast and post driver positioning means comprising first moving means and second moving means, the first moving means comprises a forward/backward shift and the second moving means comprises a side shift, and
wherein the forward/backward shift and side shift allow the mast to be moved laterally and longitudinally without having to move the vehicle.

GB 2 485 918 A, by the present Inventor, discloses a post driver having a post driving means comprising positioning means which comprise first movable means comprising at least one first movable member and means for slidably receiving opposing ends of the at least one first movable member and second movable means comprising at least one second movable member and means for slidably receiving the at least one second movable member, wherein the means for slidably receiving the at least one second movable member moves with the first movable member, wherein the post driver means is provided on a rotational means capable of rotating the post driver means from one side of the post driver to another side of the post driver.

GB 2 420 367 A (BRENNAN and BRENNAN) discloses a post driver comprising: three point linkage mounting means for securing the support frame to the three point linkage of a tractor; a main mast mounted on the support frame; a support mast slidably mounted on the main mast; a pile driving hammer slidably mounted on a hammer guide rail on the support mast; a pulley adjacent the upper free end of the support mast; a flexible connector connected to the hammer and to the main mast via the pulley; a hydraulic ram connected between the support mast and the pulley for raising the mast; and a post holder comprising a flat plate carrying a depending post engaging spike, the plate fast on a support member, slidably mounted on the main mast.

Known art suffers from a number of problems/disadvantages. For example, known post drivers are mounted to tractors which are expensive and require specialist operation. Further, due to an increasing problem of finding reliable labour for erecting wire and timber fencing, and increasing requirements by landowners prohibiting use of wheeled vehicles or machines on wet, marshy or boggy ground or land and resultant
damage – particularly to grassland – the present Inventor has identified a need for a small, e.g. one-man, machine and/or tracked vehicle having a post driver.

It is an object of at least one embodiment of at least one aspect of the present invention to obviate or at least mitigate one or more problems/disadvantages in the prior art.

It is an object of at least one embodiment of at least one aspect of the present invention to provide an improved post driver.

**SUMMARY OF INVENTION**

According to a first aspect of the present invention there is provided a post driver, the post driver comprising, being provided on or being mounted on or mountable to a vehicle. The vehicle may comprise motive means or a traction system for moving the vehicle. The post driver may be provided with one or more first controls for controlling a/the motive means and/or traction system of the vehicle. The vehicle may be provided with one or more second controls for controlling the motive means and/or traction system of the vehicle. The second controls may be remote from the first controls. The post driver may comprise a mast assembly.

The post driver may comprise a mast positioning system for moving the mast assembly.

The mast assembly may comprise a mast adapted to allow a weighted member to travel substantially up and down. The mast assembly may comprise an actuation mechanism for moving the weighted member relative to the mast.

The first controls may comprise controls for operating the mast assembly and/or the mast positioning system. The first controls may comprise one or more controls for controlling the actuation mechanism for thereby controlling movement of the weighted member on the mast. For example, the first controls may be or comprise dual controls for operating the mast assembly and/or the mast positioning system and also moving
or operating the vehicle, the second controls may be for operating or moving the vehicle only. The first controls may be mounted or coupled to the post driver, mast assembly and/or mast positioning system, e.g. for movement therewith.

The mast positioning system may comprise one or more of: a front shift, a back shift, a side shift, a rotation system for rotating the mast assembly, e.g. in a first plane, which may comprise a horizontal plane or a plane generally parallel to the ground, and/or a tilt system for tilting the mast, e.g. in second and/or third planes which may be perpendicular to each other and/or the first plane. The second and third planes may comprise vertical planes. The one or more of: a front shift, a back shift, a side shift, a rotation system for rotating the mast assembly, and/or a tilt system for tilting the mast, may be controllable using the first controls.

The first controls may comprise one or more controls for controlling the actuation mechanism to thereby control movement of the weighted member on the mast. The first controls may be linked or linkable, e.g. hydraulically linked or linkable, to a vehicle control system for controlling motion of the vehicle.

According to a second aspect of the present invention there is provided a vehicle, the vehicle comprising or being configured to receive a post driver according to the first aspect of the present invention.

The vehicle may comprise a/the one or more second controls for controlling the motive means and/or the traction system of the vehicle.

The vehicle may be configured to carry a driver. The vehicle may comprise a driver or operator station, such as a cab or seat. The vehicle may comprise at least one seat, e.g. in the driver or operator station. The second controls may be provided at or in the driver or operator station. The first controls may be mounted outwith the driver or operator station, e.g. toward or proximate the mast assembly. The first controls may
be mounted or coupled to the mast assembly and/or mast positioning system, e.g. for movement, such as corresponding movement, therewith. The at least one seat may be rotatable and/or swivel mounted. The second controls may be rotatable and/or swivel mounted, e.g. so as to be rotatable and/or swivel with the seat. The second controls and/or seat may be mounted on a turntable. The second controls may be rotatable or swivellable from one side of the driver or operator station to another. The second controls may be rotatable through at least 180°, e.g. through 360°. The first and/or second controls may comprise levers, switches or other means operated by pushing/pulling, for example. The second controls, seat and/or turntable may be selectively and/or mechanically lockable in position or against rotation, e.g. using a locking system. The locking system may comprise a lock pin or member that may engage or pass through an engaging portion or aperture in the second controls, seat and/or turntable and may engage or pass through an engaging portion or aperture in another or fixed portion of the vehicle, such as a cab, frame or support. The locking system may be or be comprised in a second or further locking system. The first locking system may be a system for rotating the second controls, seat and/or turntable.

The first (set) of controls may be linked or linkable to, or configured to communicate with, a vehicle control system for controlling motion of the vehicle, e.g. by operating the motive means or traction system. The first (set) of controls may be operable to provide control operations and/or commands to the vehicle control system. The first controls may preferably be hydraulically linked or linkable to the vehicle control system. The first controls may be mechanically connected or coupled to the vehicle control system, e.g. by a linkage, cable pull, rod system and/or the like. For example, the first controls may be connected to a mechanical linkage for the vehicle control system via a cable. The first controls may be wirelessly and/or non-physically connected or coupled with the vehicle control system. The first controls may be or be comprised in a remote control unit. The first controls may be electrically or
electronically linked, coupled or connected to the vehicle controller, e.g. via a physical or wired or a non-physical or wireless link, connection or coupling. Both the first and second controls may be linked or linkable to the vehicle control system. The vehicle control system may be operable using both the first and second controls.

The vehicle control system may be operable to selectively move the vehicle forwards, backwards and/or turn the vehicle, e.g. using the first and/or second controls.

Preferably the vehicle comprises a tracked vehicle, e.g. having (preferably solely having) first and second (left and right) tracks. The tracks may be rubber tracks. The motive means or traction system may comprise an engine. The vehicle control system may be operable to individually operate each track, e.g. in order to move the vehicle forward, backward and/or to selectively turn the vehicle, which may be responsive to operation of the first and/or second controls.

The mast positioning system may be operable using the first controls. The first controls may be mounted to or coupled with the mast assembly or mast positioning system. The first controls may be movable with the mast assembly. For example, the first controls may be rotatable, movable forwards, backwards and/or in the sideways directions with the mast assembly.

The second controls may be operable to control motion of the vehicle. The first controls may be operable to control motion of the vehicle and control operation of the mast assembly and/or mast positioning system. In this way, it may be easier for a single operator to control both movement of the vehicle and the mast positioning system. This may result in more freedom in positioning the mast. For example, since both the vehicle and the post driver can be operated by the first controls, which may advantageously be positioned adjacent or proximate the mast, it may be possible to provide extra degrees of freedom in positioning the mast, as it is possible to move the vehicle and position and operate the post driver, e.g. by operating the mast positioning system from the first controls, and without having to move between controls, regardless
of the rotational position of the mast. In this way, for example, the operator can move
the vehicle down the fence line operating the mast assembly to drive in posts,
regardless of whether or not the mast is rotated into a left handed or right handed
configuration or indeed any angle in between, and all using the first controls without
having to return into the driver or operator station (e.g. the cab). In addition, the post
driver, mast assembly and mast positioning system may all be operable from one
location using the first controls regardless of the rotational position of the mast
assembly. At the same time, the vehicle may still be drivable from the driver or
operator station using the second controls, which may provide a better position and
vision whilst driving, particularly in rough ground and challenging terrain.

The vehicle may comprise or be configured to receive a carrier and/or counter-
ballast, which may be mounted or mountable on an end of the vehicle that is opposite
to the mast assembly. The carrier and/or counter-ballast may be mounted or
mountable at the front or cab end of the vehicle. The mast assembly may be mounted
or mountable at or toward a back or rear end of the vehicle, e.g. in at least one position
or configuration of the mast positioning system.

The counter-ballast may be in the form of an elongate member such as a bar or
cylinder. The counter ballast may be formed of metal, such as steel. The counter-
ballast may be fixedly mounted to the vehicle, e.g. to a chassis thereof. The counter
ballast may extend transversely with respect to the vehicle.

The carrier may be removably mounted or mountable to the vehicle, e.g. to the
counter ballast or a chassis of the vehicle. The vehicle may comprise one or more
mounts for selectively and/or removably mounting the carrier. The carrier may be
provided with at least one mounting member. The mounts of the vehicle or the
mounting members of the carrier may be selectively receivable inside the other of the
mounts of the vehicle or the mounting members of the carrier. The mounts of the
vehicle and the mounting members of the carrier may be selectively secured or
securable together, e.g. using pins and/or the like.

The carrier may optionally but not essentially be or comprise a platform. The
carrier may comprise one or more retaining members such as bolsters. The one or
more retaining members may, for example, protrude from the platform. The retaining
members or one or more parts of the retaining members, such as one or both end
parts, may extend generally upwardly, e.g. from the platform, such as from a front
and/or rear edge of the platform. One or both sides or side edges of the platform may
be left open / accessible, e.g. may not be provided with retaining members. The
retaining members may be provided with one or more protrusions. The retaining
members may comprise one or more generally upright or upwardly extending sections
and may comprise a substantially horizontally extending section therebetween. The
generally upright or upwardly extending sections may face each other, and may define
a gap or space therebetween for receiving a load. The retaining members may be
substantially U-shaped. Each retaining member may comprise at least one or more
mounting member for mounting the retaining member to the vehicle. The carrier may
be configured to carry posts, reels of netting or wire, removable ballast and/or the like.
In this way, the posts, reels, ballast or other items may be easily placed onto the carrier
from the side and retained in place by the retaining members, which may be provided
to the front and back of the platform. The retaining members may be provided with one
or more protrusions or spikes, which may help stacking of items, such as posts, reels,
and the like on the platform. The protrusions or spikes may be distributed up and down
at least one or each retaining member. The protrusions or spikes may extend
generally horizontally and/or perpendicularly to the retaining member. The protrusions
or spikes may help inhibit unwanted sliding or rocking of the items being carried in the
carrier. The carrier may be in the form of a cradle.
The carrier may or may not comprise the platform. It will be appreciated that
the provision of a platform allows a wider range of items, such as smaller items, to be
carried and the carrier to be provided as a single unit. However, in some situations, a
lighter weight, cheaper and/or less bulky carrier may be preferred, which may be
provided by a carrier not having the platform, e.g. only having the retaining member(s)
and the mounting member(s) and/or a two or more piece carrier.

In this way, the counter-ballast and carrier may both be provided at an end of
the vehicle (e.g. a front end) that is opposite to the end at which the mast assembly is
provided (in at least one position of the mast assembly).

The vehicle may comprise or be configured to receive at least one carrying
system. The carrying system may extend in the longitudinal direction of the vehicle
and/or may be configured to carry items longitudinally of the vehicle and/or along or
parallel to a long axis of the vehicle. The carrying system may be mounted or
mountable to the top or side of the vehicle, e.g. on a side of the vehicle and/or over an
engine compartment or the like. The carrying system may be removably mounted or
mountable, e.g. so that it can be selectively removed when operations through narrow
gaps and/or in spatially restricted areas is required. The carrying system may be
provided with a mounting system for engaging corresponding mounts on the vehicle in
order to mount the carrying system. The carrying system may be configured to carry
elongated items, such as posts, timbers, poles, strainers, reels, and/or the like. The
carrying system may be arranged such that the elongated items are carried such that
they extend along a long axis of the vehicle, e.g. such that their long axis is generally
parallel with the long axis of the vehicle. The carrying system may be configured such
that it extends no more than 60cm, e.g. no more than 30cm, from the side of the
vehicle. In this way, the centre of gravity and/or stability of the vehicle may not be
significantly affected and/or the effect on the ability of the vehicle to manoeuvre in
redistricted spaces is not unduly large. The carrying system may comprise a cradle, a rack system, one or more substantially U shaped members or carriers and/or the like.

The vehicle may be provided with or configured to receive a tow hitch, e.g. at a distal or front end thereof. The tow hitch may be removably mounted to the vehicle. The tow hitch may be mounted or mountable to the counter-ballast and/or the carrier. The tow hitch may be couplable to an entity to be towed, such as a trailer.

The tow hitch may be movable or reconfigurable between at least a first configuration and a second configuration, which may comprise an operational configuration and a stowed configuration respectively. The tow hitch may be pivotably or swingably mounted and may be swingable or pivotable, e.g. pivotable or swingable upwards, between the first and second configurations. The stowed configuration may be a configuration in which at least part of the tow hitch is moved to a higher position or a position overlapping with the carrier and/or counter-ballast in a plan view of the vehicle, and/or rearwardly, inwardly or behind of a leading or outer edge of the carrier or counter-ballast. In this way, the tow hitch may be reconfigured into a position where it is less likely to contact or dig into the ground or other object when not in use.

The vehicle (e.g. the carrier) may be provided with one or more dispensers, such as netting, mesh and/or wire dispensers, and/or mounts therefor.

The post driver may comprise or be configured to receive a dozer blade, e.g. at a front end thereof. The dozer blade may be removably mounted or mountable to the vehicle. The vehicle may be provided with a sub-frame for receiving the dozer blade. The sub-frame may be pivotably mounted, e.g. to a chassis of the post-driver. The sub-frame or the dozer blade may be provided with one or more fixing members that may be slidably received or receivable within one or more corresponding fixing members on the other of the sub-frame or dozer blade or vice-versa. The respective fixing members may be securable together, e.g. using one or more pins or the like.
The mast positioning system may comprise positioning means comprising first moving (movable) means comprising at least one first movable member and means for slidably receiving opposing ends of the at least one first movable member, and second moving (movable) means comprising at least one second movable member and means for slidably receiving the at least one second movable member, wherein the means for slidably receiving the at least one second movable member moves with the first movable member.

Beneficially, in one embodiment, the opposing ends of the at least one first movable member may comprise male members and the means for slidably receiving opposing ends of the at least one first movable member may comprise female members. In an alternative embodiment the opposing ends of the at least one first movable member may comprise female members and the means for slidably receiving opposing ends of the at least one first movable member may comprise male members.

Beneficially, in one embodiment, an end of the at least one second movable member may comprise a male member and the means for slidably receiving the (end of the) at least one second movable member may comprise a female member. In an alternative embodiment an end of the at least one second movable member may comprise a female member, and the means for slidably receiving the (end of the) at least one second movable member may comprise a male member.

The first moving means and the second moving means may be disposed or disposable in symmetrical or substantially H-shaped relation to one another.

Preferably the second moving means may be movable, e.g. by or in unison with the first moving means, between a rest or substantially symmetric position, and preferably to a selected position on at least one side of the symmetric position, and most preferably, to selected positions on either side of the rest or symmetric position.
The at least one first movable member and the means for slidably receiving the at least one second movable member may be fixed to one another in symmetrical or H-shaped relation to one another.

The first moving means may comprise a forward/backward (back) shift. The second moving means may comprise a side shift.

The first moving means and second moving means may move substantially perpendicular to one another, in use.

The first moving means may comprise first and second first movable members.

The means for slidably receiving opposing ends of the at least one first movable member may comprise means for slidably receiving opposing ends of a first movable member.

The means for slidably receiving opposing ends of the at least one first movable member may comprise at least one pair of female members.

In a preferred embodiment there may be provided a pair of first moving means, which may preferably be spaced, e.g. substantially parallel spaced, from one another.

Preferably the means for slidably receiving the at least one second member is connected or attached to at least one and preferably each first moving means.

Preferably the means for slidably receiving (an end of) the at least one second movable member may comprise at least one and preferably one further female member.

Preferably the further female member is disposed substantially orthogonally to the/each of the first moving means.

Preferably the at least one/one further female member is connected to or operatively associated with at least one/each first movable member, e.g. so as to move therewith.

Preferably, in use, each first movable member moves/slides in synchronisation with each other first movable member.
Preferably the first and second moving means together may be disposed in or comprise a symmetrical arrangement.

Preferably the first and second moving means together may be disposed or comprise an "H" shaped arrangement.

Preferably there may be provided first means for moving the first movable members, e.g. first hydraulic moving means.

The first moving means may move the further female member and thereby the first movable members.

Preferably there are provided second means for moving the second movable member, e.g. second hydraulic moving means.

Preferably there is provided a mast tilt ram bracket. A first end of the tilt mast ram bracket may be connected to the second movable member, e.g. at an upper planar surface at one end of the second movable member.

The mast tilt ram bracket may extend adjacent the further female member, and may be slidable relative thereto, e.g. within a groove on an upper surface of the further female member.

The first movable member may be square in cross-section, e.g. around 90 mm x 90 mm.

The second moveable member may be rectangular in cross-section, and may have a width at least twice and preferably around four times its height, e.g. around 300 mm x 75 mm.

Preferably there are provided first means for pivoting or tilting the mast relative to the first moving means.

Preferably there are provided second means for pivoting or tilting the mast relative to the second moving means.

Preferably the first and second pivoting/tilting means comprise third and fourth hydraulic means.
The first and/or second means for moving and/or the first and/or second pivoting/tilting means may be controllable using the first controls.

Preferably the first tilting means tilts the mast in a first plane; preferably the second tilting means tilts the mast in a second plane; preferably the first plane and the second plane are orthogonal to one another.

Preferably an arm is pivotably attached to an end of the second movable member.

Preferably the second pivoting means is rotatably connected to (an end of) the arm and to an end of the mast tilt ram bracket.

Preferably the first pivoting means is hingeably/rotatably connected notably to (an end of) the arm and to the mast or a bracket fixed or connected to the mast.

Preferably the arm is rotatably connected to the mast.

Preferably the post driver comprises a counter-weight. The counter-weight may, in use, act to counter the weight of the mast and/or weighted member. The counter-weight may be provided on one side of the positioning means and the mast may be provided on another (opposite) side of the positioning means.

Preferably the post driver is provided on a rotational means or turntable.

Preferably the rotation means rotates the post driver in a plane of the positioning means.

Preferably the rotation means rotate the post driver in a plane of the positioning means.

Preferably the rotational means is capable of rotating the post driver through 180°. In this way the post driver may be deployed from either side (or from a rear) of a vehicle upon which the post driver is mounted.

The rotational means may be operable using the first and/or second controls.
Preferably the post driver is mounted or provided on the vehicle, e.g. on a turntable of the vehicle. The post driver may be retro-fitted or retro-fittable to the vehicle.

The post driver may comprise at least one locking mechanism for selectively locking at least one member to, or against relative movement with respect to, at least one other member. The locking mechanism may be switchable or reconfigurable between a locked or engagable or engaged configuration and an unlocked or non-engageable or non-engaged configuration. The at least one member may be locked to, or against relative movement with respect to, the at least one other member when the locking mechanism is in the locked or engagable or engaged configuration. The at least one member may be movable, e.g. rotatable, slidable and/or arranged to translate, on or relative to the at least one other member, e.g. when the locking mechanism is in the unlocked or non-engageable or non-engaged configuration.

The at least one member may be or comprise the rotation means or turntable. The at least one other member may be or comprise another or fixed portion of the vehicle, such as a frame, chassis or support. The locking mechanism may be or comprise a mechanical locking mechanism.

At least one or more or each locking mechanism may comprise a lock pin or member that may be configured to engage or pass through an engaging portion or aperture in the at least one member (e.g. the rotation means or turntable) and may be configured to engage or pass through an engaging portion or aperture in the at least one other member (e.g. another or fixed portion of the vehicle, such as a frame, chassis or support). The at least one locking mechanism may be in the locked or engagable or engaged configuration when the lock pin or member passes through and/or engages respective engaging portions or apertures in the at least one member and the at least one other member. The at least one locking mechanism may be in the unlocked or non-engageable or non-engaged position when the lock pin or member
does not pass through and/or engage the respective engaging portions or apertures in the at least one member and/or the at least one other member.

The at least one member (e.g. the rotation means or turntable) may be movable relative to the at least one other member using a driver, which may comprise one or more hydraulic rams. For example, the rotation means or turntable may be rotatable using the driver. The at least one locking mechanism may be a second or additional locking mechanism, e.g. additional to location of the at least one member using the driver.

At least one of the locking mechanisms may be configured to lock the rotation means or turntable in a position where the post driver or mast is positioned to a side of the vehicle such as to the left and/or right of the vehicle, e.g. in a position where the post driver or mast is located laterally of the vehicle and/or perpendicular to a front/back or direction of movement of the vehicle.

The positioning means may allow the positioning of the mast to be optimised and adapted for alignment with a post to be driven, and may comprise a back/forward shift and a side shift. The back shift and the side shift may comprise the first and second moving means, respectively.

The back shift and side shift may allow the mast to be moved laterally and longitudinally without having to move the frame itself or a connected vehicle.

The back shift and side shift may be at substantially 90° to one another preferably thereby allowing the mast to be moved over a full range of directions.

The back shift and side shift may be hydraulically operated thereby allowing easy and accurate adjustments of the position of the mast to be made.

The back shift and side shift may each have a range of travel of about 100 mm to 1,000 mm.

The back shift and side shift may each comprise telescopic members.
The mast may be telescopic thereby allowing a range of types of post to be driven.

The weighted member may be a hammer which may have a weight of about 100 kilograms to 1,000 kilograms. The weighted member may be or comprise a drop fall hammer.

The post driver may comprise one or more legs which may allow the post driver to have a stable configuration during use.

The legs may be mechanical or hydraulically operated. At least one of the legs may be mounted on the mast assembly or mast.

The mast may be tiltable.

The post driver may comprise a counterbalance or counter-weight which may counter the weight of the weighted member.

The first controls may comprise a plurality of hydraulic control levers for operating the post driver, e.g. for side shift, back shift, mast tilt in front, mast tilt forward/backward, hammer lift.

The post driver may comprise one or more pulleys which may allow the weighted member to travel at least part of the length or the full length of the mast.

The mast may be tiltable;

the back shift and side shift may comprise telescopic members; and

there may be provided a mast tilt ram bracket which may be slidable in and out into the side shift and is not attached to outer blocks of a side shift slide.

The post driver may comprise first means for positioning the post driver in a first direction and a second positioning means for positioning the post driver in a second direction, wherein the first and second positioning means are disposable in a symmetric relation.

and the post driver may comprise means for tilting or pivoting the mast in first and second planes.
Preferably the first and second planes may be substantially orthogonal to one another.

According to a third aspect of the present invention there is provided a vehicle comprising or being configured to receive a post driver according to the first aspect of the present invention. The post driver may comprise, be provided on, or be mounted on or mountable to the vehicle via a turntable, the turntable or rotation means being optionally selectively lockable in position using one or more mechanical locking mechanism.

 Advantageously the vehicle comprises a tracked vehicle, e.g. such as similar to those available under Trade Name CANYCOM.

 Preferably the vehicle may comprise a driver or operator station, such as a driver cab.

 Preferably the post driver may be mounted to the vehicle at or on a rear portion thereof, e.g. behind the driver or operator station, such as the driver's cab. The post driver may be mounted on a rear portion of the vehicle.

 However, it will be appreciated that the vehicle may be a dual direction vehicle, e.g. it is equally operable in opposite directions. For example, the driver's or operator's seat may rotate around 180° or 360° and the vehicle may be equally drivable in opposing directions, e.g. forwards and reverse. As such, it will be appreciated that the use of terms such as "front", "forward", can be construed as simply "a first direction" or a cab end or toward the cab end and that "rear", "back", or "backward" can be construed as “a second direction opposite the first direction” or away from a cab end or toward the post driver end.

 The post driver may be mounted on or comprise a rotatable turntable of the vehicle or may be fixed in position relative to the vehicle.

 The rotation means or turntable may be lockable in position, e.g. mechanically lockable in position. The rotation means or turntable may be lockable in position using
one or more locking mechanism, such as a mechanical locking mechanism. At least one or more or each locking mechanism may comprise a lock pin or member that may engage or pass through an engaging portion or aperture in the rotation means or turntable and may engage or pass through an engaging portion or aperture in another or fixed portion of the vehicle, such as a frame, chassis or support.

The rotation means or turntable may be rotatable using a rotation driver, which may comprise one or more hydraulic rams. The at least one locking mechanism may be a second or additional locking mechanism, e.g. additional to location of the rotation means or turntable in position using the rotation driver or hydraulically. The at least one of the locking mechanisms may be configured to lock the rotation means or turntable in a position where the post driver or mast is positioned to a side of the vehicle.

The vehicle may comprise motive means or a traction system for moving the vehicle. The vehicle may be provided with one or more second controls for controlling the motive means and/or traction system.

The mast assembly and/or post driver may be movably mounted or mountable on the vehicle.

The vehicle may comprise at least one seat in the driver or operator station, e.g. the cab. The second controls may be provided in the driver or operator station. The first controls may be mounted out with the driver or operator station, e.g. toward or proximate the mast assembly. The at least one seat may be rotatable or swivel mounted. The second controls may be rotatable or swivel mounted, e.g. so as to be rotatable with the seat. The seat and/or second controls may be mounted on a turntable. The second controls may be rotatable or swivelable from one side of the driver or operator station to another. The second controls may be rotatable or swivelable through at least 180°, e.g. at least 360°. The first and/or second controls may comprise levers, switches or other means operated by pushing/pulling. The
second controls, seat and/or turntable may be selectively and/or mechanically lockable in position or against rotation, e.g. using a locking system.

The first set of controls may be linked or linkable to a vehicle control system for controlling motion of the vehicle, e.g. by operating the motive means or traction system. The first set of controls may be operable to provide control operations and/or commands to the vehicle control system. The first controls may preferably be hydraulically linked or linkable to the vehicle control system. The first controls may be linked or linkable to the vehicle control system by a cable pull or rod system. Both the first and second controls may be linked or linkable to the vehicle control system. The vehicle control system may be operable using both the first and second controls.

The vehicle control system may be operable to selectively move the vehicle forwards, backwards and/or turn the vehicle, e.g. using the first and/or second controls.

Preferably the vehicle comprises a tracked vehicle, e.g. having (preferably solely having) first and second (left and right) tracks. The tracks may be rubber tracks. The motive means or traction system may comprise an engine. The vehicle control system may be operable to individually operate each track, e.g. in order to move the vehicle forward, backward and/or to selectively turn the vehicle, which may be responsive to operation of the first and/or second controls.

The vehicle may comprise or be configured to receive a carrier and/or counter-ballast, which may be mounted or mountable on an end of the vehicle that is opposite to the mast assembly. The carrier and/or counter-ballast may be mounted or mountable at the front or cab end of the vehicle. The mast assembly may be mounted or mountable at or toward a back or rear end of the vehicle, e.g. in at least one position or configuration of the mast positioning system.

The counter-ballast may be in the form of an elongate member such as a bar or cylinder. The counter ballast may be formed of metal, such as steel. The counter-
ballast may be fixedly mounted to the vehicle, e.g. to a chassis thereof. The counter ballast may extend transversely with respect to the vehicle.

The carrier may be removably mounted to the vehicle, e.g. to the counter ballast or a chassis of the vehicle. The vehicle may comprise one or more mounts for selectively and/or removably mounting the carrier. The carrier may be provided with at least one mounting member. One of the mounts of the vehicle or the mounting members of the carrier may be selectively receivable inside the other of the mounts of the vehicle or the mounting members of the carrier. The mounts of the vehicle and the mounting members of the carrier may be selectively secured or securable together, e.g. using pins and/or the like.

The carrier may be or comprise a platform. The carrier may comprise one or more retaining members protruding from the platform. The retaining members may extend generally upwardly from the platform, e.g. from a front and/or rear edge of the platform. One or both sides or side edges of the platform may be left open / accessible, e.g. may not be provided with retaining members. The carrier may be configured to carry posts, reels of netting or wire, removable ballast and/or the like. In this way, the posts, reels, ballast or other items may be easily placed onto the carrier from the side and retained in place by the retaining members to the front and back of the platform. The retaining members may be provided with one or more protrusions, which may help stacking of items, such as posts, reels, and the like on the platform. The carrier may be in the form of a cradle.

In this way, the counter-ballast and carrier are both provided at an end of the vehicle (e.g. a front end) that is opposite to the end at which the mast assembly is provided (in at least one position of the mast assembly).

The vehicle may be provided with or configured to receive a tow hitch, e.g. at a distal or front end thereof. The tow hitch may be removably mounted or mountable to the vehicle. The tow hitch may be mounted or mountable to the counter-ballast and/or
the carrier. The tow hitch may be couplable to an entity to be towed, such as a trailer. The vehicle (e.g. the carrier) may be provided with one or more dispensers, such as netting, fencing, mesh and/or wire dispensers, and/or mounts therefor.

The post drive may comprise or be configured to receive a dozer blade, e.g. at a front end thereof. The dozer blade may be removably mounted or mountable to the vehicle. The vehicle may be provided with a sub-frame for receiving the dozer blade. The sub-frame may be pivotably mounted, e.g. to a chassis of the post-driver. The vehicle may be provided with one or more actuating mechanisms, such as hydraulic rams, for pivoting the sub-frame, e.g. so as to raise and/or lower the dozer blade. The sub-frame or the dozer blade may be provided with one or more fixing members that may be slidably received or receivable within one or more corresponding fixing members on the other of the sub-frame or dozer blade or vice-versa. The respective fixing members may be securable together, e.g. using one or more pins or the like.

The vehicle may comprise means for selectively deploying the mast assembly from at least two of one side of the vehicle, another side of the vehicle, and a rear of the vehicle.

Preferably the mast assembly may be selectively deployed from any of the one side of the vehicle, the another side of the vehicle, and the rear of the vehicle.

The post driver may comprise means for tilting or pivoting the mast in first and second planes.

Preferably the first and second planes are substantially orthogonal to one another.

According to a fourth aspect of the present invention is a carrier for fitting to the post driver of the first aspect and/or the vehicle of the second or third aspect.

The carrier may be provided with at least one mounting member for fitting to corresponding mounts of the vehicle. The mounts of the vehicle or the mounting members of the carrier may be selectively receivable inside the other of the mounts of
the vehicle or the mounting members of the carrier. The mounts of the vehicle and the
mounting members of the carrier may be selectively secured or securable together,
e.g. using pins and/or the like.

The carrier may be or comprise a platform. The carrier may comprise one or
more retaining members protruding from the platform. The retaining members may
extend generally upwardly from the platform, e.g. from a front and/or rear edge of the
platform. One or both sides or side edges of the platform may be left open /
accessible, e.g. may not be provided with retaining members. The carrier may be
configured to carry posts, reels of netting or wire, removable ballast and/or the like. In
this way, the posts, reels, ballast or other items may be easily placed onto the carrier
from the side and retained in place by the retaining members to the front and back of
the platform. The retaining members may be provided with one or more protrusions,
which may help stacking of items, such as posts, reels, and the like on the platform.
The carrier may be in the form of a cradle.

According to a fifth aspect of the present invention is a dozer blade for mounting
to a post driver according to the first aspect and/or a vehicle according to the second or
third aspect. The dozer blade may be removably mountable to a sub-frame of the
vehicle.

The sub-frame or the dozer blade may be provided with one or more fixing
members that may be slidably received within one or more corresponding fixing
members on the other of the sub-frame or dozer blade or vice-versa. The respective
fixing members may be securable together, e.g. using one or more pins or the like.

According to a sixth aspect of the present invention there is provided a post
driver, the post driver comprising or being mounted on or mountable to a vehicle. The
post driver comprises or is mounted or mountable to a rotation means or turntable.

The rotation means or turntable may be lockable in position, e.g. mechanically
lockable in position. The rotation means or turntable may be lockable in position using
one or more locking mechanism, such as a mechanical locking mechanism. At least
one or more or each locking mechanism may comprise a lock pin or member that may
engage or pass through an engaging portion or aperture in the rotation means or
turntable and may engage or pass through an engaging portion or aperture in another
or fixed portion of the vehicle, such as a frame, chassis or support.

The rotation means or turntable may be rotatable using a rotation driver, which
may comprise one or more hydraulic rams. The at least one locking mechanism may
be a second or additional locking mechanism, e.g. additional to location of the rotation
means or turntable in position using the rotation driver.

At least one of the locking mechanisms may be configured to lock the rotation
means or turntable in a position where the post driver or mast is positioned to a side of
the vehicle such as to the left and/or right of the vehicle, e.g. in a position where the
post driver or mast is located laterally of the vehicle and/or perpendicular to a
front/back or direction of movement of the vehicle.

The post driver may comprise one or more feature described above in relation
to the first aspect.

According to a seventh aspect of the present invention there is provided a post
driver system comprising a post driver mounted on a vehicle, the post driver comprising
or being mounted to the vehicle via a rotation means or turntable. The rotation means
or turntable may be lockable in position using one or more locking mechanism, such as
a mechanical locking mechanism. The post driver may comprise a post driver
according to the sixth aspect.

Any features of any of the foregoing aspects may be employed in any of the
other foregoing aspects, whether singly or in combination, and it will be appreciated
that such are not recited herein merely for reasons of brevity.

BRIEF DESCRIPTION OF DRAWINGS
An embodiment of the present invention will now be described by way of example only, and with reference to the accompany drawings, which are:

**Figure 1A**  
a side view of a vehicle for use in the present invention;

**Figure 1B**  
another side view of a vehicle of Figure 1A;

**Figure 1C**  
a top view of a rear portion of the vehicle 1A in a first configuration;

**Figure 1D**  
a top view of the rear portion of the vehicle 1A in a second configuration;

**Figure 1E**  
a top view of the rear portion of the vehicle 1A in a third configuration;

**Figure 1F**  
a top view of the rear portion of the vehicle 1A in a fourth configuration;

**Figure 2A**  
a top view of a portion of a post driver according to an embodiment of the present invention in a first configuration mounted to a rear portion of the vehicle of Figure 1A;

**Figure 2B**  
a top view of a portion of the post driver of Figure 2A in a second configuration;

**Figure 2C**  
a partial close-up view of the post driver of Figure 2A;

**Figure 2D**  
a further partial close-up view of the post driver of Figure 2A;

**Figure 2E**  
a yet further partial close-up view of the post driver of Figure 2A;

**Figure 2F**  
a still further partial close-up view of the post driver of Figure 2A;
Figure 2G  a still further partial close-up view of the post driver of
Figure 2A;

Figure 2H  a still further partial close-up view of the post driver of
Figure 2A;

Figure 3A  a rear view of the vehicle of Figure 1A with the post driver
of Figure 2A mounted thereto, the mast of the post driver
being in a first disposition;

Figure 3B  the vehicle and post driver of Figure 3A with the mast and
post driver in a second disposition;

Figure 3C  the vehicle and post driver of Figure 3A with the mast in a
third disposition;

Figure 3D  a partial side view of the vehicle and post driver of Figure
3A with the mast in a fourth disposition;

Figure 3E  a partial side view of the vehicle and post driver of Figure
3A with the mast in a fifth disposition;

Figure 4A  a rear view of the vehicle of Figure 1A with the post driver
of Figure 2A mounted thereto, the post driver being
disposed to one side of the vehicle;

Figure 4B  the vehicle and post driver of Figure 4A with the post
driver disposed to the rear of the vehicle;

Figure 4C  the vehicle and post driver of Figure 4A with the post
driver disposed to another side of the vehicle;

Figure 5  a detail view of the front of the vehicle in a configuration
in which a tow hitch is mounted;

Figure 6A  a detail view of the front of the vehicle in a configuration
with a carrier mounted;
Figure 6B a detail view of the front of the vehicle in a configuration with an alternate carrier mounted;

Figure 7A a side view of the vehicle in a configuration in which an operator’s seat is in a forward facing configuration;

Figure 7B a side view of the vehicle in a configuration in which the operator’s seat has been rotated into a rearward facing configuration;

Figure 8 a perspective view of part of the vehicle in a configuration with wire dispensers mounted;

Figure 9 a lower perspective view of the front of the vehicle;

Figure 10 a detail view of the front of the vehicle; and

Figure 11 a detail view of a portion of the turntable and chassis of the vehicle of Figure 1, with a locking mechanism in a non-engaged configuration; and

Figure 12 a detail view of the portion of the turntable and chassis of Figure 11, with the locking mechanism in an engaged configuration.

DETAILED DESCRIPTION OF DRAWINGS

Referring initially to Figures 1A to 1F, there is illustrated a vehicle, generally designated 5, for use in the present invention. The vehicle 5 comprising a chassis 10, mobile means such as an engine (not shown), first and second (left and right) tracks 15, a driver's/operator's area in the form of a cab 20, and a turntable 25. The turntable 25 is substantially parallel with a rear portion 30 of the chassis 10, and is rotatable by drive means (not shown) through 180° from one side 35 of the vehicle 5 to another side 40 of the vehicle 5 via the rear 45 of the vehicle 5.
Referring now to Figure 2A to Figure 4C, there is illustrated a post driver, generally designated 100, according to an embodiment of the present invention, and including the features of the "Summary of Invention". The post driver 100 is mounted on the turntable 25 (shown in outline in Figure 2A) of the vehicle 5 for movement with the turntable 25.

The post driver 100 comprises positioning means comprising first moving means 105 comprising at least one first movable member 110 and means 115 for slidably receiving opposing ends of the at least one first movable member 110, and second movable means 119 comprising at least one second movable member 120 and means 125 for slidably receiving the at least one second movable member 120, wherein the means for slidably receiving the at least one second movable member 120 moves with the first movable member 110. The first moving means 105 are moved via hydraulic means 126, while the second moving means 125 are moved by further hydraulic means (not shown), e.g. located beneath the means 125 for slidably receiving the at least one second movable means.

The first moving means and the second moving means may be disposed or disposable in symmetrical or H-shaped relation to one another.

The at least one first movable member and the means for slidably receiving the at least one second movable member may be fixed to one another in symmetrical or H-shaped relation to one another.

The first moving means 105 comprise a forward/backward shift. The second moving means 110 comprises a "side" shift. It will be appreciated that the terms "forward/backward" and "side" are relative terms, non-limiting in this context.

The first moving means 105 and second moving means 110 are disposed and move substantially perpendicular to one another, in use. The first moving means 105 comprises first and second first movable members 110a,110b.
The means 115 for slidably receiving opposing ends of the at least one first movable member 110 comprise means for slidably receiving opposing ends of a first movable member 110a or 110b. The means 115 for slidably receiving opposing ends of the at least one first movable member 110 comprise at least one pair of female members.

In a preferred embodiment there are provided a pair of first moving means 105, which are spaced in substantially parallel spaced in relation from one another.

The means 125 for slidably receiving the at least one second movable member 120 is connected or attached to at least one and in this embodiment each of the first moving means 105.

The means 125 for slidably receiving (an end of) the at least one second movable member 120 comprise at least one and one further female member 130.

The further female member 130 is disposed substantially orthogonally to the each of the first moving means.

The at least one/four further female member is connected to or operatively associated with at least one/each first movable member.

In use, each first movable member moves/slides in synchronisation with each other first movable member. The first and second moving means together are disposed in or comprise a symmetrical arrangement. The first and second moving means together are disposed or comprise an "H" shaped arrangement. There are provided first means for moving the first movable members, e.g. first hydraulic moving means. The first moving means move the further female member and thereby the first movable members. There are provided second means for moving the second movable member, e.g. second hydraulic moving means.

There is provided a mast tilt ram bracket. A first end of the tilt mast ram bracket is connected to the second movable member, e.g. at an upper planar surface at one end of the second movable member.
The mast tilt ram bracket extends adjacent the further female member, and is slidable relative thereto, e.g. within a groove on an upper surface of the further female member.

In this embodiment the first movable member is square in cross-section, e.g. around 90 mm x 90 mm. Further, the second moveable member is rectangular in cross-section, and typically has a width at least twice and advantageously around four times its height, e.g. around 300 mm x 75 mm.

The post driver comprises a mast adapted to allow a weighted member to travel substantially up and down.

There are provided first means for pivoting or tilting the mast relative to the first moving means. There are provided second means for pivoting or tilting the mast relative to the second moving means. The first and second pivoting/tilting means comprise third and fourth hydraulic means. The first tilting means tilts the mast in a first plane, while the second tilting means tilts the mast in a second plane, the first plane and the second plane being orthogonal to one another.

An arm is pivotably attached to an end of the second movable member.

Beneficially the second pivoting means is rotatably connected to (an end of) the arm and to an end of the mast tilt ram bracket. The first pivoting means is hingeably/rotatably connected rotatably to (an end of) the arm and to the mast or a bracket fixed or connected to the mast. The arm is rotatably connected to the mast.

The post driver comprises a counter-weight. The counter-weight may, in use, acts to counter the weight of the mast and/or weighted member 200. The counter-weight is provided on one side of the positioning means and the mast is provided on another (opposite) side of the positioning means.

The post driver is provided on a turntable or rotational means. The turntable rotates the post driver in a plane of the positioning means.
The turntable is capable of rotating the post driver through 180°. In this way the post driver can be deployed from either side (or from a rear) of a vehicle upon which the post driver is mounted.

The post driver is mounted or provided on the vehicle in this embodiment on the turntable of the vehicle. Preferably the vehicle comprises a tracked vehicle, e.g. having (preferably solely having) first and second (left and right) tracks. The tracks can typically be rubber tracks.

In this embodiment the vehicle comprises means for moving the vehicle, e.g. motive means, e.g. an engine.

The positioning means allows the positioning of the mast to be optimised and adapted for alignment with a post to be driven, and comprises a back/forward shift and a side shift. The back shift and the side shift may comprise the first and second moving means, respectively.

The back shift and side shift allow the mast to be moved laterally and longitudinally without having to move the frame itself or the connected vehicle.

The back shift and side shift are at substantially 90° to one another, thereby allowing the mast to be moved over a full range of directions. The back shift and side shift are hydraulically operated thereby allowing easy and accurate adjustments of the position of the mast to be made. The back shift and side shift may each have a range of travel of about 100 mm to 1,000 mm. The back shift and side shift each comprise telescopic members.

The mast can be telescopic thereby allowing a range of types of post to be driven.

The weighted member can be a hammer which may have a weight of about 100 kilograms to 1,000 kilograms.
The post driver can optionally comprise one or more legs which may allow the post driver to have a stable configuration during use. The legs can be mechanical or hydraulically operated.

The post driver can comprise one or more pulleys which allow the weighted member to travel at least part of the length or the full length of the mast.

There is provided a mast tilt ram bracket which is slidable in and out into the side shift and which is not attached to outer blocks of a side shift slide.

The post driver comprises first means for positioning the post driver in a first direction and a second positioning means for positioning the post driver in a second direction, wherein the first and second positioning means are disposable in a symmetric relation.

The post driver comprises a mast and means for tilting or pivoting the mast in first and second planes. The first and second planes may be substantially orthogonal to one another.

The vehicle comprises a post driver mounted thereto. Advantageously the vehicle comprises a tracked vehicle, e.g. such as similar to those available under Trade Name CANYCOM. The vehicle comprises a driver cab. The post driver is mounted to the vehicle at or on a rear portion thereof, i.e. behind the driver’s cab. The post driver is mounted on a rear portion of the vehicle.

The post driver can be mounted on a rotatable turntable of the vehicle or can be fixed in position relative to the vehicle.

The post driver 100 comprises a first set of controls 1020 comprising a plurality of hydraulic control levers 1020a for operating the post driver 100, e.g. for side shift 110, forward/backward shift 105, mast tilt, rotation of the turn table 25, and lift/drop of the weighted member 200. Advantageously, as shown in Figures 2A, 2B, 2C, and 4C, the first set of controls 1020 also includes additional controls 1020b for operating the motive means of the vehicle 5 and thereby the tracks 15 in order to move and turn the
vehicle 5. The first controls 1020b are linked to the motive means via a hydraulic connection (not shown), although it will be appreciated that a cable connection may be used in alternative embodiments.

A second set of controls 1005 is provided in the cab 20 of the vehicle. The second set of controls 1005 includes a pair levers 1010a, 1010b for selectively operating the motive means of the vehicle 5. In particular, the levers 1010a, 1010b of the second set of controls 1005 are arranged such that pushing or pulling a left hand one of the levers 1010a forwards or backwards operates a left hand track 15 forwardly or backwardly respectively and pushing or pulling a right hand one of the levers 1010b forwards or backwards operates a right hand track 15 forwardly or backwardly respectively. As shown in Figures 7A and 7B, the second set of controls 1005 are physically coupled to an operator’s chair 1015 such that the operator’s chair 1015 and the second set of controls 1005 are rotatable together, e.g. at least through 180° and optionally through other angles of rotation such as 360°. In this way, the operator can rotate the chair 1015 in any direction and at the same time still operate the vehicle 5 using the second set of controls 1015.

The first set of controls 1020 is remote from the second set of controls 1005. In particular, the first set of controls 1020 are mounted such that they move and rotate/slew with the mast 1025. For example, the first set of controls 1020 in one embodiment are mounted on an arm 1030 that extends from the second movable member 120.

In this way, a single operator can simultaneously operate the vehicle 5, move the mast 1025 and operate the post driver 5, i.e. the weighted member 200, using the first set of controls 1020. This also provides a greater degree of freedom in positioning the mast 1025 for post driving operations. In addition, since the vehicle 5 and the post driver can all be controlled from a position near the mast 1025, it is possible to have a
better line of sight, looking down the fence line, when positioning and orienting the mast 1025 and post.

As shown in Figures 1A, 1B and 5 to 9, the vehicle 5 is provided with a weighted ballast 1035 in the form of a transversely extending elongated metal member at the front of the vehicle 5. The weighted ballast 1035 is rigidly connected to a chassis of the vehicle 5. The mast 1025 is predominantly arranged toward the rear of the vehicle 5 and as such the weighted ballast 1035 is provided at an opposite end of the vehicle 5 (e.g. the front) in order to improve the weight distribution and balance of the vehicle 5.

As shown particularly in Figure 5, the vehicle 5 is provided with a bracket 1040 for mounting a tow hitch 1045, such as a ball type hitch or clevis-type hitch or a combination of both. In the particular embodiment of Figure 5, the bracket 1040 for mounting the tow hitch 1045 is provided on the weighted ballast 1035, but in other embodiments it may be located elsewhere. The tow hitch 1045 can be bolted on to the bracket 1040, for example, or is otherwise suitably mountable. Optionally, the bracket can be provided in other locations such as on a carrier 1055. In embodiments, the tow hitch 1045 or bracket 1040 can be pivotably mounted, swingable upwards or otherwise reconfigurable to minimise the possibility of it contacting the ground during operations on rough terrain or sharply varying gradients.

As shown particularly in Figures 1A, 1B, 6A, 6B, 7A and 7B, the vehicle 5 is provided with mounts 1050 for mounting a carrier 1055 at the front of the vehicle 5. In this embodiment, the mounts 1050 comprise a pair of steel hollow box section members for receiving corresponding box section mounting members 1060 extending from the carrier 1055. Both the mounts 1050 on the vehicle 5 and the mounting members 1060 of the carrier 1055 are provided with holes 1065 or other receptacles for receiving a pin (not shown) or other fixing mechanism in order to secure the carrier 1055 in position. In the embodiment shown in Figure 6A, the mounts 1050 for
mounting the carrier 1055 are conveniently provided on the weighted ballast 1035. However, it will be appreciated that in other embodiments the mounts 1050 could be provided elsewhere.

The carrier 1055 can act as additional ballast in order to better balance the vehicle 5. In addition, it is possible to place removable ballast onto the carrier 1055 in order to variably control the weight distribution of the vehicle 5. The carrier 1055 also provides a convenient carrier for items such as posts, rolls of wire or netting, strainers and other objects used in the construction of fencing. Although in alternative embodiments the carrier may be fixedly mounted to the vehicle, by having a releasably mounted carrier 1055 it is possible to vary the weight distribution of the vehicle 5 by selectively removing / mounting the carrier and/or to remove the carrier 1055 in order to avoid the vehicle 5 getting stuck when operating in sharply varying gradients and/or to reduce the overall length of the vehicle 5 for manoeuvring in tight spaces, for example. In addition, removal of the carrier 1055 can optionally allow other components such as the tow hitch 1045 to be mounted to the weighted ballast 1035.

The carrier 1055 in the embodiment shown in Figure 6A comprises a platform 1070, wherein a front 1075 and rear 1080 edge of the platform 1070 are provided with uprights 1085 having retainers 1090 transversely extending between the uprights 1085. The sides 1095 of the platform 1070 are left open to allow materials to be placed on the platform 1070 from the side and to allow the materials to overhang the side edges 1095 of the platform 1070 to allow long items such as posts to be carried. The uprights 1085 and the retainers 1090 retain the materials in place. Protrusions 1100 on the uprights 1085 facilitate stacking of the materials, such as the posts or rolls of wire or netting. As shown in Figure 7, the uprights 1085 can be vertical or obliquely vertical as long as they extend generally upwards from the platform 1070. In this way, the carrier 1055 is effectively in the form of a cradle.
In an alternate embodiment shown in Figure 6B, the carrier 1055' is in the form of two separate retainers 1090’. The retainers 1090’ are individually mountable side by side on the vehicle 5. Each retainer 1090’ defines a space 1091 into which respective parts of elongated items can be placed such that they are supported by both retainers 1090’. Each retainer 1090’ comprises a pair of generally upwardly extending sections 1092, each section being provided at respective ends of the retainer 1090’, with a generally horizontally extending section 1093 provided in between, such that the retainer 1090’ defines a generally U-shaped profile. Each retainer 1090’ is provided with a mounting member 1060’ that inserts inside one of the mounts 1050 to releasably mount each retainer 1090’ to the vehicle 5. The retainer 1090’ can then be locked in position, e.g. using a pin.

The carrier 1055 of Figure 6A provides a convenient platform 1070 that can be used to carry a wide range of tools, equipment and materials and allows the carrier to be fitted as a single unit. However, the carrier 1055’ of Figure 6B may be lighter, less bulky and allow better visibility when unloaded. Each carrier 1055, 1055’ may be better suited to different jobs.

Additionally or alternatively, the vehicle 5 may be provided with, or configured to receive, at least one carrier system that extends longitudinally with respect to the vehicle. Particularly, whilst the carriers 1055, 1055’ carry elongated items so that they extend in the width direction of the vehicle 5, in some instances it may be preferred to carry certain items such that they extend in the long direction of the vehicle (e.g. in the front-back direction). This may allow the vehicle 5 to carry particularly long items such as posts, poles, timbers and the like yet still pass through narrow gaps. The carrier system(s) may be provided, for example, on top of the vehicle 5, e.g. at least partially on top of the engine and/or beside the driver’s or operator’s station or cab 20, and/or along one or both sides of the vehicle 5. The carrier systems may comprise one or more racks or cradles that are preferably releasably attachable to corresponding
mounts on the vehicle. The items to be carried can then be placed in or on the racks or cradles in order to support the items on the vehicle 5. Preferably, the carrier systems may extend 60cm or less, e.g. 30cm or less, from the side of the vehicle in order to have better stability of the vehicle. The carrier systems may be configured to allow the items to be stacked in the vertical direction, to have better vehicle stability.

As shown in Figure 8, the vehicle 5 is provided with dispenser mounts 1105 for selectively/releasably mounting one or more dispensers 1110 for dispensing materials such as wire, barbed wire, netting, rope and/or the like.

As shown in Figures 9 and 10, the vehicle 5 is provided with a sub-frame 1115 for removably mounting a dozer blade 1120 to the front of the vehicle 5. The sub-frame 1115 comprises a pair of forwardly extending mounting members 1125. The dozer blade 1120 comprises a corresponding pair of hollow members 1130 into which the forwardly extending mounting members 1125 of the sub-frame 1115 can be received in order to releasably mount the dozer blade 1120 to the sub-frame 1115. However, in other embodiments, it will be appreciated that the members 1130 of the dozer blade 1120 may instead be receivable inside the mounting members 1125 of the sub-frame 1115. The hollow members 1130 and the forwardly extending mounting members 1125 are provided with through holes 1135 for receiving a pin (not shown) or other locking mechanism to fix the dozer blade 1120 in place. In this way, the dozer blade 1120 can be removed when not in use, e.g. to prevent contact between the dozer blade 1120 and the ground when operating in rough terrain or on sharply varying gradients.

The sub-frame 1115 is mounted to the chassis of the vehicle 5 from below. In particular, a rearward end of the sub frame 1115 is mounted to the chassis via a pivoting connection 1140. The sub-frame 1115 is also connected to the chassis via a pair of hydraulic rams 1145 provided forwardly of the pivoting connection 1140. In this
way, the hydraulic rams 1145 are operable to pivot the sub-frame 1115 around the
pivoting connection 1140 to thereby raise and lower the dozer blade 1120.

In an embodiment illustrated in Figures 1C, 1D, 1E, 11 and 12, the turntable 25
is provided with a locking mechanism 1205, which is advantageously a mechanical
locking mechanism. The locking mechanism is operable as a secondary or additional
locking mechanism that is operable to selectively secure the turntable 25 against
rotation. The drive means are operable to rotate the turntable 25 and are also operable
to hold the turntable in position. As such, the drive means may be operable as a first
locking mechanism. However, the drive means generally comprise one or more
hydraulic rams, which may be subject to a degree of play or movement, even when the
intention is to hold the rams/turntable 25 fixed. Some examples of possible problems
associated with this include accelerated wear of the turntable mechanism due to
unwanted movement and/or a reduction in accuracy of the impact on the post during
use.

The locking mechanism 1205 comprises at least one first engaging part or
aperture 1210 provided in or through the turntable 25 and at least one corresponding
engaging part or aperture 1215 provided in a fixed part of the vehicle 5, such as the
chassis 10. The engaging parts or apertures 1210 and 1215 are arranged such that
one engaging parts or apertures 1210 can be brought into alignment or register with a
corresponding engaging parts or apertures 1215 in at least one corresponding
rotational position of the turntable 25. Advantageously, the engaging parts or apertures
1210 and 1215 are arranged such that at least one of the engaging parts or apertures
1210 of the turntable are aligned or in register with at least one of the engaging parts or
apertures 1215 of the fixed part of the vehicle 5 when the turntable 25 is rotated into a
position in which the mast 1025 is located or locatable laterally of the vehicle, i.e.
positioned to the left or right sides of the vehicle 5.
When at least one set of corresponding engaging parts or apertures 1210, 1215 are aligned or in register, a pin 1220 may be inserted through both the engaging part or aperture 1210 in the turntable 25 and the corresponding engaging part or aperture 1215 in the fixed part of the vehicle 5. In this way, the turntable 25 and thereby the mast 1025 can be selectively locked against rotation relative to the fixed part (e.g. chassis 10) of the vehicle 5, as shown in Figure 12. It will be appreciated that the pin 1220 may simply be withdrawn from one or both of the apertures 1210, 1215 in order to allow use of the turntable 25, as shown in Figure 11.

In this way, the locking mechanism 1205 is operable to securely hold the turntable 25 and thereby the mast 1025 in position, e.g. in the preferred operating position laterally of the vehicle 5. The locking mechanism 1205 eliminates or mitigates any play or unintended movement in the drive means and thereby the turntable 25. As a result, wear in the turntable 25 mechanism may be reduced and/or the mast may be more accurately retained in position, which may be particularly beneficial during post driving operations, e.g. to increase the accuracy of the post riving operation.

Although the locking mechanism 1205 is described in relation to the vehicle and post driver of Figures 1 to 10, it will be appreciated that this mechanism may be applicable to other post drivers, particularly but not exclusively those having turntables or other rotation mechanisms. Indeed, it will be appreciated that the above locking mechanism 1205 could be applied to any two or more movable members in which some undesirable play or slippage between the two or more members may be present.

According to an embodiment of the invention the vehicle has a post driver and means for selectively deploying the post driver from at least two of one side of the vehicle, another side of the vehicle, and a rear of the vehicle.

In this embodiment the post driver can be selectively deployed from any of the one side of the vehicle, the another side of the vehicle, and the rear of the vehicle.
According to an embodiment of the invention the vehicle is a tracked vehicle comprising a post driver.

According to an embodiment of the invention the post driver comprises a mast and means for tilting or pivoting the mast in first and second planes. The first and second planes are substantially orthogonal to one another.

The invention provides a unique combination comprising a mast attached to a sidershift/backshift/foreshift combination, with a mast tilt in and out, connected by a hydraulic cylinder attached to the mast, and a supporting member that supports the other end of the cylinder which is attached to the sidershift feature.

Furthermore, the mast tilt forward and back is in the form of a main swivel pivot which allows the mast to pivot about a central point and through the suitable positioning of a hydraulic cylinder the mast can be allowed to tilt in an arc left/right/forward/back depending on which way the machine is viewed.

The forwardshift/backshift is unique in that it allows this feature to operate in confined dimensions where the sidershift can be left in the central position giving movement forwards or backwards, allowing precise alignment between post driver mast and post without having to move the tractive vehicle. In the past, operators needed to move the tracked machine forward or back to get alignment between mast and post. This slows down output. Also, importantly when driving posts on sloping ground that is wet and slippery, movement of the tracked vehicle can result in the vehicle sliding very slightly up or down hill, depending on the slope, resulting in post alignment down the fence line being disturbed necessitating the sidershift having to be used to correct the vertical alignment of the post, causing unnecessary loss of time and operator fatigue.

An important feature of this invention is that the backshift is mounted central to the main frame, and can be moved forward and back from the centre point. This helps to maintain stability on what is generally a small tractive machine. Other systems
require the backshift to move in one direction only, and when operating at the extreme of one direction the balance of the machine can be upset.

This machine can be mounted on any fixed frame, or preferably a frame comprising a 180° swivelling carriage, allowing the post driver to operate anywhere in an arc through 180°. It can also be mounted on tracked or wheeled vehicles.

It will be appreciated that the embodiment of the present invention hereinbefore described is given by way of example only, and is not intended to limit the scope of the invention. Various modifications may be envisaged which fall within the scope of the invention.

According to the invention, with a swivel/slew-type vehicle, a high output post driver can be installed at or near to the central load-carrying point. By doing this one helps to keep stability and safety, while at the same time have the performance and output of a much larger machine, e.g. in a small tractive vehicle.

The disclosed embodiment features an "H" pattern configuration, which when attached to or mounted on the rotatary turntable, the slew mechanism gives a low centre of gravity, and the stability required on a post driver with sideshift, backshift, mast tilt forward and back, and mast tilt in and out, enabling accurate positioning of the post driver. A notable feature of the "H" pattern design is that the backshift combined with the sideshift, mast tilt forward and back, and mast tilt in and out, moves forward and back as one unit from a central position maintaining stability and weight distribution of the donor machine.
CLAIMS

1. A post driver comprising or being mounted on or mountable to a vehicle, the vehicle comprising motive means or a traction system for moving the vehicle, wherein the post driver is provided with one or more first controls for controlling the motive means and/or traction system of the vehicle.

2. A post driver as claimed in claim 1, wherein the vehicle comprises one or more second controls for controlling the motive means and/or traction system of the vehicle.

3. A post driver as claimed in claim 2, wherein the first controls is/are remote from the second controls.

4. The post driver as claimed in any of claims 1 to 3, comprising a mast assembly and a mast positioning system for moving the mast assembly, the mast assembly comprising a mast adapted to allow a weighted member to travel substantially up and down and an actuation mechanism for moving the weighted member relative to the mast; wherein the first controls comprise controls for operating the mast assembly and/or the mast positioning system.

5. The post driver as claimed in any preceding claim, wherein the first controls are mounted or coupled to the post driver, mast assembly and/or mast positioning system, e.g. for movement therewith.
6. The post driver as claimed in claim 4 or 5, wherein the mast positioning system comprises one or more of: a front shift, a back shift, a side shift, a rotation system for rotating the mast assembly and/or a tilt system for tilting the mast assembly, which are controllable using the first controls.

7. The post driver as claimed in any of claims 4 to 6, wherein the first controls comprise one or more controls for controlling the actuation mechanism to thereby control movement of the weighted member on the mast.

8. The post driver as claimed in any preceding claim, wherein the first set of controls are linked or linkable, e.g. hydraulically linked or linkable, to a vehicle control system for controlling motion of the vehicle.

9. A vehicle comprising or being configured to receive a post driver as claimed in any of claims 1 to 8.

10. The vehicle as claimed in claim 9, wherein the vehicle comprises a/the one or more second controls for controlling the motive means and/or the traction system of the vehicle.

11. The vehicle as claimed in claim 9 or claim 10, wherein the vehicle comprises a driver or operator station, such as a cab or seat, and the second controls are provided at or in the driver or operator station and the first controls are provided outwith the driver or operator station.

12. The vehicle as claimed in any of claims 9 to 11, wherein the second controls are rotatable or swivel mounted.
13. The vehicle as claimed in claim 12, wherein the vehicle comprises at least one rotatable or swivel mounted seat and the second controls are rotatable and/or swivel with the seat, e.g. the seat and the second controls may be mounted on a turntable.

14. The vehicle as claimed in any of claims 9 to 13, wherein the vehicle comprises a tracked vehicle having first and second tracks, wherein each track is individually operable in order to move the vehicle forward, backward and/or to selectively turn the vehicle responsive to operation of the first and/or second controls.

15. The vehicle as claimed in any of claims 9 to 14, wherein the vehicle comprises or is configured to receive a carrier and/or counter-ballast mounted or mountable on an end of the vehicle that is opposite to the mast assembly and/or a front or cab end of the vehicle.

16. The vehicle as claimed in claim 15, wherein the counter-ballast is in the form of an elongate member extending transversely with respect to the vehicle.

17. The vehicle as claimed in claim 15 or claim 16, wherein the carrier is removably mounted or mountable to the vehicle.

18. The vehicle as claimed in any of claims 15 to 17, wherein the carrier comprises a platform with one or more retaining members protruding from the platform.

19. The vehicle as claimed in claim 18, wherein the retaining members extend generally upwardly from a front and/or rear edge of the platform.
20. The vehicle as claimed in claim 19, wherein one or both sides or side edges of the platform are left open / accessible.

21. The vehicle as claimed in any of claims 18 to 20, wherein the retaining members are provided with one or more protrusions.

22. The vehicle according to any of claims 9 to 21, wherein the vehicle is provided with a carrying system extending in the longitudinal direction of the vehicle and/or configured to carry items longitudinally of the vehicle and/or along or parallel to a long axis of the vehicle.

23. The vehicle as claimed in any of claims 9 to 22, wherein the vehicle is provided with or configured to receive a tow hitch.

24. The vehicle of claim 23 when dependent on any of claims 15 to 22, wherein the tow hitch is mounted or mountable to the counter-ballast and/or the carrier.

25. The vehicle as claimed in any of claims 9 to 24 provided with one or more dispensers such as netting, mesh and/or wire dispensers, and/or mounts therefor.

26. The vehicle as claimed in any of claims 9 to 25, comprising or configured to receive a dozer blade.

27. The vehicle as claimed in claim 26, wherein the dozer blade is removably mounted or mountable to the vehicle.
28. The vehicle as claimed in claim 26 or claim 27, wherein the vehicle is provided with a sub-frame for receiving the dozer blade, wherein the sub-frame is pivotably mounted to a chassis of the post-driver.

29. A vehicle comprising or being configured to receive a post driver as claimed in any of claims 1 to 8, the post driver comprising or being mounted on or mountable to a vehicle via a turntable, the turntable or rotation means being optionally selectively lockable in position using one or more mechanical locking mechanism.

30. The vehicle as claimed in claim 29, wherein the at least one or more or each locking mechanism comprises a lock pin or member that is configured to engage or pass through an engaging portion or aperture in the rotation means or turntable and engage or pass through an engaging portion or aperture in another or fixed portion of the vehicle.

31. The vehicle as claimed in claim 29 or claim 30, wherein the rotation means or turntable is rotatable using at least one rotation driver or hydraulic ram and the at least one locking mechanism is a second or additional locking mechanism that is additional to location of the rotation means or turntable in position using the rotation driver or hydraulically.

32. The vehicle as claimed in any of claims 29 to 31, wherein at least one of the locking mechanisms is configured to lock the rotation means or turntable in a position where the post driver or mast is positioned to a side of the vehicle.
33. The vehicle as claimed in any of claims 8 to 28, comprising the features of any of claims 29 to 32.

34. A removable carrier for fitting to the vehicle as claimed in any of claims 9 to 31.

35. A removable dozer blade for fitting to the vehicle as claimed in any of claims 9 to 31.

36. A post driver apparatus comprising a post driving arrangement and a motive means or traction system, wherein the post driver apparatus is provided with one or more first controls for controlling the motive means and/or traction system.

37. A post driver apparatus as claimed in claim 36, wherein the one or more first controls is/are operable by a person positioned, such as standing, adjacent the post driver apparatus.

38. The post driver apparatus as claimed in either of claims 36 or 37, wherein the first controls is/are provided at or adjacent a side or rear of the post driver apparatus or on the post driving arrangement.

39. A post driver as described herein with reference to the accompanying drawings.

40. A vehicle as described herein with reference to the accompanying drawings.
Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

<table>
<thead>
<tr>
<th>Category</th>
<th>Relevant to claims</th>
<th>Identity of document and passage or figure of particular relevance</th>
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<tr>
<td>X</td>
<td>1-33, 36-38</td>
<td>Bryce Suma, &quot;LGP Bryce Fencemaster Tracked Fencing Machine including HD180&quot;, brysuma.co.uk, available at: <a href="http://www.brycesuma.co.uk/index.php?page=tracked-fencing-machine">http://www.brycesuma.co.uk/index.php?page=tracked-fencing-machine</a> [online] accessed April 2016 (and available at archive.org from October 2012) See list entitled &quot;Many options available&quot;, noting option &quot;walk behind with dual controls&quot;, as well as figures demonstrating this. Also see Figures which appear to provide evidence of disclosure of the invention at agricultural shows in 2012.</td>
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<tr>
<td>X</td>
<td>1, 4-9, 14-33, 36-38</td>
<td>DE102004018385 A1 [RATIONELLE] See Figures and abstract, noting post setting and loading control units controllably coupled to drive operations.</td>
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<td>X</td>
<td>1, 4-9, 14-33, 36-38</td>
<td>US2010/0089602 A1 [TANNER] See Figures, abstract and paragraphs 3, 38 and 40, noting control box 34 having controls 36 for both ram and wheels.</td>
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<tr>
<td>X</td>
<td>1, 4-9, 14-33, 36-38</td>
<td>WO2012/010133 A2 [SCHLETTER et al.] See Figures and WPI abstract accession no. 2011-Q18537, noting all control devices arranged at 4, on the post driver.</td>
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<td>1, 4-9, 14-33, 36-38</td>
<td>US5772362 A1 [ACLIS] See Figure 5, abstract and column 3 lines 59-60, noting all control levers located adjacent operator.</td>
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<td>X</td>
<td>1, 4-9, 14-33, 36</td>
<td>CN102587376 A1 [HEFEI] See Figure 8 and abstract, noting post driver with controls mounted on platform 202, the platform mounted on vehicle 1.</td>
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Categories:

- **X**: Document indicating lack of novelty or inventive step
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Worldwide search of patent documents classified in the following areas of the IPC
E02D, E04H
The following online and other databases have been used in the preparation of this search report
EPDOC, WPI, INTERNET

International Classification:

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