Dec. 25, 1951 H. K. HECKER 2,580,091

ALIGNING MEANS FOR VEHICLE HOISTS

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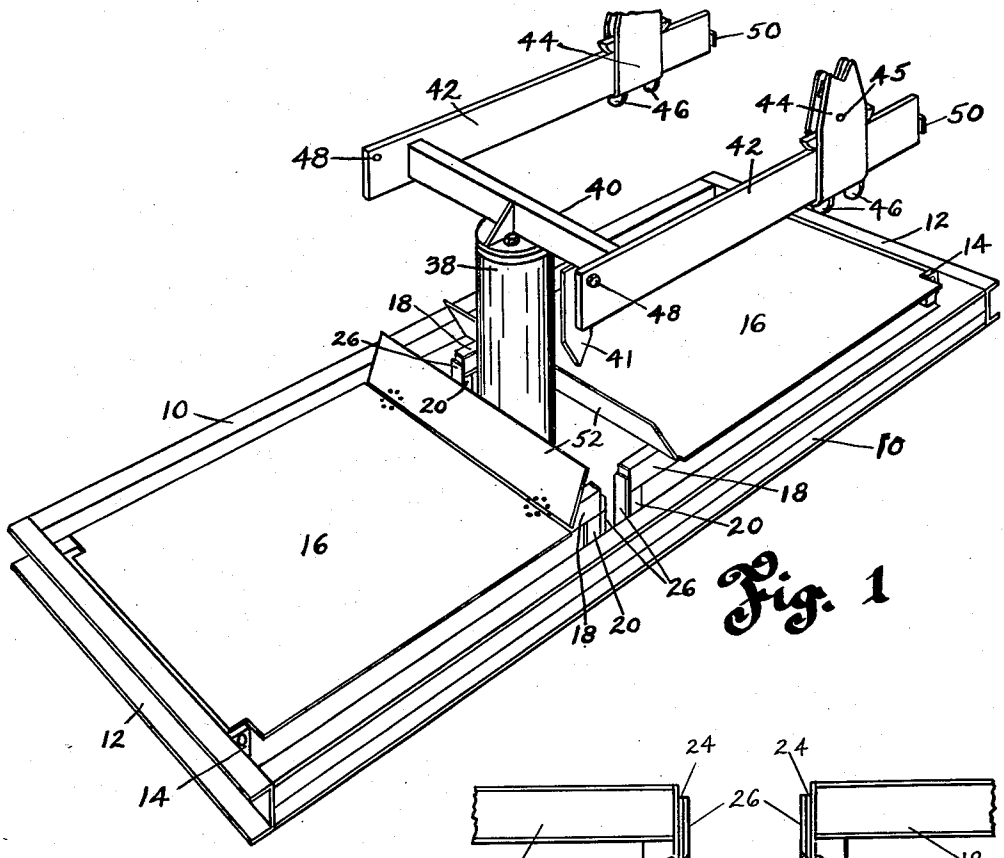


Fig. 1

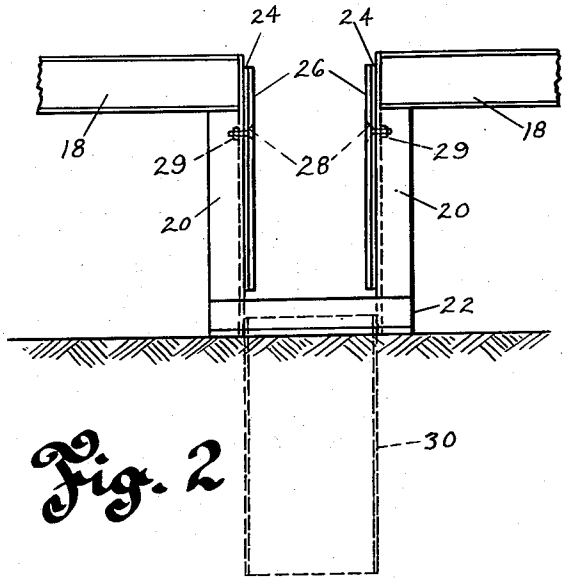


Fig. 2

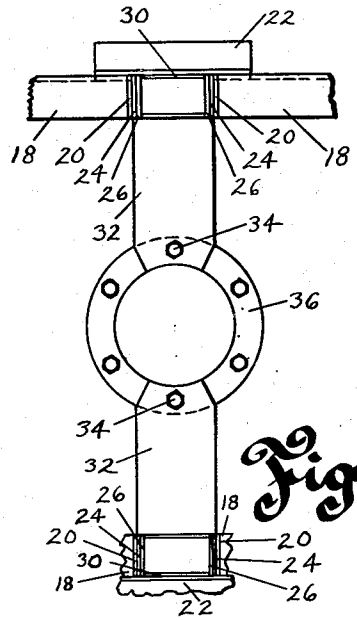


Fig. 3

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ALIGNING MEANS FOR VEHICLE HOISTS

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10 Claims. (Cl. 254—93)

1

This invention relates to improvements in lifting devices. More particularly, this invention relates to improvements in lifting devices that can be used to elevate automotive vehicles.

It is therefore an object of the present invention to provide an improved lifting device that can be used to elevate automotive vehicles.

In the installation and operation of lifting devices that can be used to elevate automotive vehicles, the lifting devices are frequently set below the level of the floor of the structure in which the devices are to be operated. In such cases, a pit or recess is usually provided in that floor to receive the superstructure of the lifting device; fixed or movable closures often being provided to partially or completely cover the pits or recesses. Where the closures are movable and completely cover the pits or recesses, the clearances between the edges of the pits or recesses and the superstructures of the lifting devices can be made quite large. Where, however, fixed closures cover only part of the pits or recesses, clearances must be kept small to avoid unduly large open areas in the floor of the structure. The small clearances necessitate precise alignment of the superstructures with the open areas in the floors whenever the superstructures emerge from or enter the pits or recesses. The present invention makes it possible to employ very small clearances by providing a simple but positive aligning element that holds the superstructure of a lifting device in precise alignment with the open areas in the floor as that superstructure enters or emerges from the pit or recess. It is therefore an object of the present invention to provide a simple but positive aligning element that holds the superstructure of a lifting device in precise alignment with the open areas of the floor whenever that superstructure enters or emerges from the pit or recess.

In the installation of lifting devices within recesses, it is necessary to align the recesses and lifting devices so the superstructures of those devices can enter and emerge from the recesses without hindrance. The present invention provides a simple but certain way of aligning the recess and lifting device, and it thus assures unhindered movement of the superstructure of the lifting device. The present invention does this by providing receptacles that can be bolted to and centered by the opposite sides of the cylinder of the lifting device, and by providing a unitary frame-like structure which will engage and be centered by the receptacles; the frame-like structure defining the recess for the lifting device and

2

aligning that recess with that device. The frame-like structure has spaced stanchions that abut the ends of the receptacles to center the structure; and those stanchions also guide the superstructure of the lifting device, as by receiving an aligning element on that superstructure. The receptacles also perform a dual function since they form recesses, in the concrete around the lifting device, into which the aligning element on the superstructure can pass when in lowered position. It is therefore an object of the present invention to provide receptacles which can be bolted to opposite sides of the cylinder of the lifting device to receive a unitary frame-like structure and also to form recesses, in the concrete around the lifting device, into which the aligning element on the superstructure can pass.

In many instances the lifting devices and the frames that support the closures are embedded in concrete or cement, and sometimes the workmen shift the frames while setting them. To compensate for any such shifting, the present invention provides guide surfaces which are backed up with shims; and the shims can be adjusted to enable the guide surfaces to receive the aligning element on the superstructure of the lifting device and hold it precisely in the desired position. It is therefore an object of the present invention to provide a lifting device with guide surfaces that are backed up with shims that can be adjusted to enable the guide surfaces to provide precise guiding of the superstructure of the lifting device.

The guide surfaces are secured to stanchions within the recess in such a way that the upper ends of the guide surfaces are below the upper ends of the stanchions. This arrangement is very desirable since it causes most of the initial aligning to be done by the stanchions, thus saving the guide surfaces from undue stresses and wear. It is therefore an object of the present invention to secure guide surfaces to stanchions in such a way that the upper ends of the guide surfaces are below the upper surfaces of the stanchions.

Other and further objects and advantages of the present invention should become apparent from an examination of the drawing and accompanying description.

In the drawing and accompanying description a preferred embodiment of the present invention is shown and described but it is to be understood that the drawing and accompanying description are for the purpose of illustration only and do not

limit the invention and that the invention will be defined by the appended claims.

In the drawing,

Fig. 1 is a perspective view of a lifting device and a frame-like structure usable with that lifting device.

Fig. 2 is a side elevational view of a portion of the construction shown in Fig. 1, and

Fig. 3 is a plan view of a portion of the construction shown in Figs. 1 and 2.

Referring to the drawing in detail, the numeral 10 denotes a pair of longitudinally-extending, spaced channels which constitute the side elements of a frame-like structure. These side elements 10 are spaced apart by transversely-extending channels 12 which are welded or otherwise rigidly secured to the longitudinally-extending channels 10. The channels 10 and 12 are so dimensioned that they can be used to define the perimeter of a recess in which a lifting device can be installed.

The transverse channels 12 have pivot blocks 14 secured to their inner surfaces; and while only two blocks 14 are shown in Fig. 1 because of the perspective view, four of those blocks are provided. These blocks rotatably support closure plates 16 which extend inwardly from the transverse channels 12 and terminate with their inner ends spaced apart in confronting relation. The plates 16 are narrower than the channels 12, and they form slots with the channels 10. The closure plates 16 are supported by L-shaped supports which have horizontal portions 18 that underlie the plates 16 and have stanchions 20 that extend downwardly from the inner ends of the horizontal portions 18 and are suitably secured to the portions 18 by welding or other suitable means. The outer ends of the horizontal portions 18 of the L-shaped supports are bolted, welded or otherwise secured to the transverse channels 12; and the portions 18 are dimensioned so their inner ends are spaced apart a distance less than the distance between the confronting inner ends of plates 16. The spacing of portions 18 apart causes the stanchions 20 to be spaced apart; but the lower ends of each pair of stanchions are connected by connecting plates 22. The plates 22 are preferably angles, and they are disposed at the sides of the spaces between the stanchions 20. With this arrangement, the L-shaped supports are directly secured to the transversely-extending frame elements 12 and to each other; and the channels 10 and 12, the L-shaped supports, and the connecting plates 22 form a rigid and sturdy frame-like structure. This structure is strong enough to support the weight of vehicles driven upon the plates 16.

The stanchions 20 of the L-shaped supports are provided with shims 24, and these shims space guide surfaces 26 from the stanchions 20. Removal or insertion of the shims 24 provides adjustment of the distance which the guide surfaces 26 project beyond the confronting faces of the stanchions 20 of the L-shaped supports. The guide surfaces 26 and the shims 24 are shorter than the vertical dimensions of the L-shaped supports, and the tops and bottoms of those L-shaped supports extend above and below the tops and bottoms of surfaces 26 and shims 24. The guide surfaces 26 and the shims 24 are held in assembled relation with stanchions 20 by means of nuts 29 and bolts 28; the bolts being seated in countersunk openings in the guide surfaces 26.

A hollow receptacle 30 is at each side of the cylinder of the lifting device, and these receptacles are preferably the same in form and size. Each of the receptacles 30 is dimensioned to fit between and be engaged by the lower ends of two of the stanchions 20 and by one of the connecting plates 22. Each receptacle is coextensive with only a small part of the surfaces of the abutting stanchions 20 and a connecting plate 22; the greater part of the receptacles extending below the lower edges of stanchions 20 and plates 22. The receptacles 30 are of generally rectangular shape, and they will provide oppositely disposed recesses in the cement or concrete in which the cylinder for the lifting device is held. The receptacles 30 have flanges 32 which extend inwardly from the receptacles and are secured to the gland 36 at the upper end of a hoisting cylinder by means of cap screws or bolts 34. Bolting of the flanges 32 on receptacles 30 to the gland 36 precisely locates the receptacles 30 relative to the hoisting cylinder; and thereafter it is only necessary to place the stanchions 20 with their lower portions abutting the receptacles 30. Thereupon, the entire frame-like structure will immediately be aligned with the lifting device.

In installing the hoisting cylinder, the two receptacles 30 are bolted to the gland 36, as shown in Fig. 3; and then the lower end of the cylinder is set within an opening in the ground and the receptacles 30 are set on an axis precisely perpendicular to the intended axis of the vehicle to be elevated. Thereafter, the lower end of that cylinder is cemented within that opening in the ground, dirt is placed around the sides of the cylinder, and then the upper end of the cylinder is cemented or concreted in place; due care being taken in each instance to insure the cylinder being plumb and properly set. Once this has been done the unitary structure which consists of the longitudinally-extending channels 10, the transversely-extending channels 12, the L-shaped supports, and the angles 22 is set in place; the setting of this structure being very simple since all that need be done is to fit the confronting edges of stanchions 20 against the ends of receptacles 30 and to fit the inner faces of channels 22 against the sides of those receptacles. The receptacles 30 positively position the structure longitudinally and the angles 22 positively position that structure laterally. Thereafter, cement can be used to complete the recess framed in by the unitary frame-like structure.

A piston 38 is reciprocably mounted in the cylinder, and that piston carries a transverse bar 40. This cross bar is provided at its outermost ends with longitudinally-extending arms 42 which coact with bar 40 to form a rigid superstructure. The rod 40 is dimensioned to fit between the confronting edges of plates 16, and the arms 42 are dimensioned to fit within the slots between plates 16 and the channels 10. The parallel, spaced arms 42 support movable chocks 44; and those chocks have spaced walls that are welded or otherwise secured together. The walls of the chocks extend above and below the arms 42, thereby positively holding the chocks against separation from those arms. The chocks 44 will slide back and forth along the length of the arms 42, and they can be adjusted to compensate for wheel bases of various lengths on the vehicles to be elevated. An opening 45 is provided in each chock 44, and these openings make it possible for a poker to engage and move the chocks; the poker entering the openings 45 of the chocks. The chocks 44 have semi-circular projections 46 depending therefrom, and the chocks and their

projections are dimensioned to fit within the slots formed by plates 16 and the channels 10. Stops 48 and 50 are provided at opposite ends of the arms 42 to limit movement of the chocks 44 along the lengths of the arms 42, but between those stops the chocks can be adjusted to any desired position.

By having the arms 42 eccentric of the plunger 38, the short arms can accommodate vehicles of widely varying wheel bases. When a long vehicle is to be elevated the plunger 38 is set so the arms 42 extend away from that vehicle; and when a short vehicle is to be elevated, the plunger 38 is set so the arms extend toward that vehicle. In each position of plunger 38, the aligning element 41 carried by the bar 40 will be in register with one of the receptacles 30; and this permits full retraction of the bar 40 and arms 42 within the recess.

The space required by the cross bar 40 and the plunger 38 is quite wide, and that space is covered by openable doors 52. The space required by arms 42 and chocks 44 is narrow and can be left open at all times. The doors 52 are hinged to the inner ends of the plates 16, and those doors will be opened by the plunger 38 when it moves upwardly; and those doors will be held open by the sides of plunger 38 whenever that plunger extends above the level of the floor. When the plunger is in retracted position, the doors 52 will rest upon the horizontal portions 18 of the L-shaped supports.

The doors 16 constitute inspection and repair plates which can be raised upwardly when desired. Ordinarily however, the plates 16 will rest on the horizontal portions 18 of the L-shaped supports and will not be open. The doors 52 will however open and close each time the device is operated.

The aligning element 41 is dimensioned so it fits between the guide surfaces 26 on the stanchions 20. In most instances those guide surfaces will be in exactly the right position just as soon as the frame-like structure is centered by the engagement of stanchions 20 and angles 22 with receptacles 30. In those instances, however, where that structure has been shifted while being set in position, it is possible to obtain precise alignment between the superstructure and that frame-like structure by removing or inserting shims 24. The proper shimming of guide surfaces 26 will enable the aligning element 41 to hold the arms 42 in precise registry with the slots between the plates 16 and the channels 10.

In the retracted position of the superstructure, the aligning element 41 will be at least partially disposed within one or the other of the receptacles 30, but the upper end of that element will be disposed between the guide surfaces 26. As the plunger 38 moves upwardly to carry the superstructure into engagement with the vehicle to be elevated, the aligning element 41 will be confined by the guide surfaces 26 until after the arms 42 and chocks 44 have risen completely out of the slots between plates 16 and channels 10. During all of this movement, the aligning element 41 holds the arms 42 precisely aligned with the slots; and by the time the lower end of aligning element 41 has moved out of engagement with the guide surfaces 26 and has been freed for horizontal movement, the chocks 44 will be in engagement with the vehicle to be elevated. This engagement will prevent unlimited rotation of plunger 38, and thus the aligning element 41 will be held generally aligned with the guide surfaces 26. However, any slight rotation of the plunger 38 as the vehicle is elevated or lowered will not prevent unhindered retraction of the superstructure within the recess because the aligning element 41 will re-align the superstructure as it approaches the recess. The element 41 does this principally by the engagement between its tapered lower end and one or the other of the stanchions 20, which engagement forces the aligning element 41 toward the approximate center of the receptacle 30. Further downward movement of plunger 38 will cause further alignment of the aligning element 41 and receptacle 30; and by the time the tapered lower end of that element passes below the upper ends of stanchions 20, the superstructure will be largely in register with the slots adjacent plates 16. Still further downward movement of plunger 38 will bring the tapered end of aligning element 41 into engagement with one of the guide surfaces 26, and that engagement will provide the required precise aligning of the superstructure.

The engagement of aligning element 41 with the stanchions 20 before its engagement with guide surfaces 26 is very desirable because the stanchions 20 are very sturdy and can better resist the forces involved in the aligning operation. The guide surfaces are also sturdy, but they can be made more readily removable from stanchions 20 where they do not carry the brunt of the forces involved in the aligning operation.

It is necessary to have guide surfaces 26 on all four of the stanchions 20 since the superstructure of the lifting device can be set in either of two positions, spaced one hundred and eighty (180) degrees apart, and since the aligning element 41 can engage either of two guide surfaces 26 on each of those positions. This arrangement insures accurate alignment of the superstructure with the recess, whether that superstructure is set to support a vehicle with a long wheel base or is set to support a vehicle with a short wheel base. Additional alignment of the chocks 44 with the slots between plates 16 and channels 10 will be provided, if ever needed, by the semi-circular projections 46 on the bottoms of those chocks.

The aligning element 41 is spaced inwardly of the arms 42, and thus the chocks 44 can be moved freely along those arms without striking that element. The element 41 will, in either of the two positions of the superstructure of the lifting device, be in register with a receptacle 30 and with the guide surfaces 26 on stanchions 20. This assures positive and accurate alignment of that superstructure with the slots between plates 16 and channels 10 under all conditions of operation.

Whereas a preferred embodiment of the present invention has been shown and described in the drawing and accompanying description it should be obvious to those skilled in the art that various changes may be made in the form of the invention without affecting the scope thereof.

What I claim is:

1. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground and has a cylinder in the ground, the improvement which comprises an aligning element supported on and movable with said superstructure, said aligning element having a tapered lower end, horizontally-spaced guiding elements with surfaces that selectively receive and guide said aligning element, shims that are disposed adjacent said guiding elements to de-

termine the position of said surfaces relative to said aligning element, said guiding elements being supported by stanchions but having their upper edges disposed below the upper edges of said stanchions, a receptacle dimensioned to receive said aligning element, said receptacle being engageable by said stanchions to facilitate precise setting of said stanchions relative to said aligning element, and a flange on said receptacle securable to the cylinder of said lifting device.

2. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground and has a cylinder in the ground, the improvement which comprises an aligning element supported on and movable with said superstructure, a receptacle that is dimensioned to receive said aligning element, a spacing element on said receptacle that is securable to the cylinder of said lifting device, said aligning element extending below the superstructure of said lifting device and being adapted to extend into or separate wholly from said receptacle, a frame structure that defines a recess for said lifting device, and spaced guiding elements with surfaces on said structure that abut said receptacle to center said structure relative to said lifting device.

3. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground, the improvement which comprises an aligning element supported on and movable with said superstructure, a receptacle that is dimensioned to receive said aligning element, said aligning element extending below the superstructure of said lifting device and being adapted to extend into or separate wholly from said receptacle, a frame structure that defines a recess for said lifting device, and spaced guiding elements with surfaces on said structure that abut said receptacle to center said structure relative to said lifting device, said guiding elements extending above said receptacle to receive and center said aligning element.

4. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground, the improvement which comprises a frame structure, a plurality of supports secured to said frame structure, closures for said recess that overlie part of said recess and coact with said frame structure to define slots that can receive said superstructure, said closures being held in position by said supports, an aligning element carried by said superstructure, and a receptacle in said recess for said aligning element, said supports being spaced apart a predetermined distance and being disposed on opposite sides of said receptacle, said aligning element being so disposed relative to said superstructure and said supports being so disposed relative to the slots defined by said closures and said frame structure that the engagement of said aligning element and said supports can align said superstructure with said slots.

5. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground, the improvement which comprises a receptacle in the recess, an aligning element that is carried by said superstructure and is registerable with said receptacle, horizontally-spaced guiding elements with surfaces oppositely disposed of said receptacle, and shims adjacent said guiding elements, said guiding elements overlying said receptacle and being dimensioned so said surfaces can protect said receptacle from engagement with said aligning element.

6. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground and has a cylinder in the ground, the improvement which comprises an aligning element supported on and movable with said superstructure, said aligning element having a tapered lower end, horizontally-spaced guiding elements with surfaces that receive and guide said aligning element, said guiding elements being supported by stanchions but having their upper edges disposed below the upper edges of said stanchions, a receptacle dimensioned to receive said aligning element, said receptacle being engageable by said stanchions and a flange on said receptacle securable to the cylinder of said lifting device, said flange being so dimensioned that said aligning element is registerable with said receptacle, whereby disposition of said stanchions adjacent said receptacle can align said stanchions and said aligning element.

7. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground and has a cylinder in the ground, the improvement which comprises an aligning element supported on and movable with said superstructure, said aligning element having a tapered lower end, horizontally-spaced guiding elements with surfaces that receive and guide said guiding element, a receptacle dimensioned to receive said aligning element, and a flange on said receptacle securable to the cylinder of said lifting device, said flange being so dimensioned that said aligning element is registerable with said receptacle, said horizontally-spaced guiding elements being disposable adjacent said receptacle to place them in registry with said aligning element.

8. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground, the improvement which comprises a transversely extending bar, longitudinally-extending arms secured to the ends of said bar, chocks movably mounted on said arms, an aligning element carried by said bar, closures that define slots which can receive said bar, said arms, said chocks, and said aligning element, and spaced guiding elements with surfaces below the ground that receive said aligning element, said chocks having rounded bottoms engageable with said closures to facilitate passage of said chocks through said slots, said aligning element being spaced inwardly of the ends of said bar so said chocks can move throughout the lengths of said arms, said aligning element engaging said guiding surfaces only when said arms are adjacent or below the ground.

9. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground and has a cylinder in the ground, the improvement which comprises an aligning element supported on and movable with said superstructure, said superstructure being rotatable one hundred and eighty (180) degrees, a receptacle that is dimensioned to receive said aligning element, a spacing element on said receptacle that is securable to the cylinder of said lifting device to space said receptacle a predetermined distance from said cylinder, said align-

ing element extending below the superstructure of said lifting device and being adapted to extend into said receptacle when said superstructure is at one end of its one hundred and eighty (180) degrees of travel, a second receptacle that is dimensioned to receive said aligning element, and a spacing element on said second receptacle that is securable to said cylinder of said lifting device to space said receptacle said predetermined distance from said cylinder, said second receptacle being disposed adjacent the other end of said one hundred and eighty (180) degrees of travel of said superstructure so it can receive said aligning element when said superstructure is at said other end of its travel.

10. In a lifting device that can extend above the ground and can be retracted below the ground and has a superstructure disposable within a recess in the ground, the improvement which comprises a frame structure, and an aligning element supported on and movable with said superstructure, said superstructure being rotatable one

hundred and eighty (180) degrees, said frame structure having spaced guiding elements with surfaces adjacent one side thereof that are adapted to receive and align said aligning element, and having additional spaced guiding elements with surfaces adjacent the opposite side thereof that are adapted to receive and align said aligning element, said receptacles lying on the diameter of the one hundred and eighty (180) degrees path of travel of said superstructure, said superstructure carrying said aligning element into selective registry with said receptacles.

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