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2,517,318

VEHICLE HOIST

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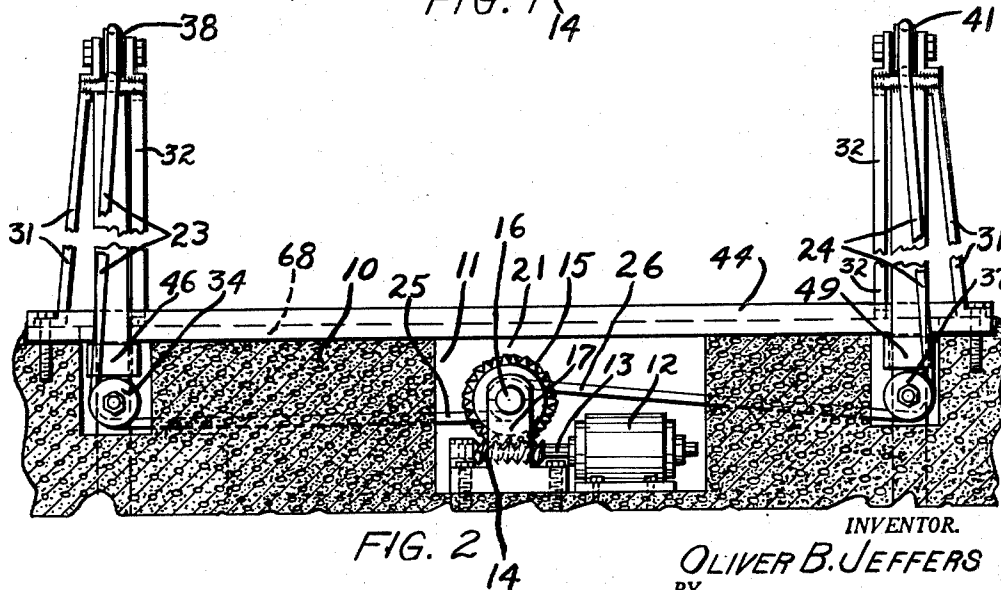
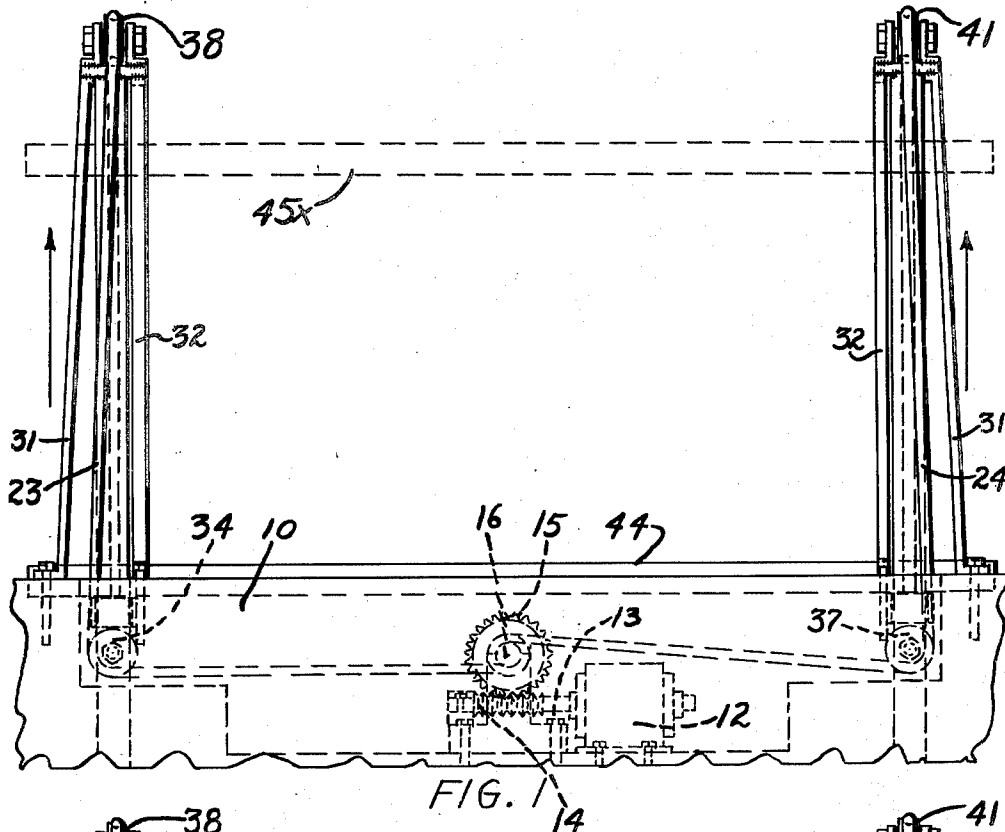


FIG. 2

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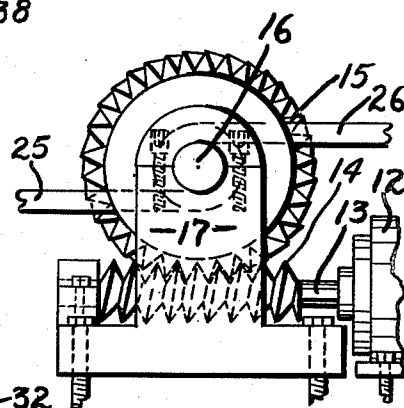
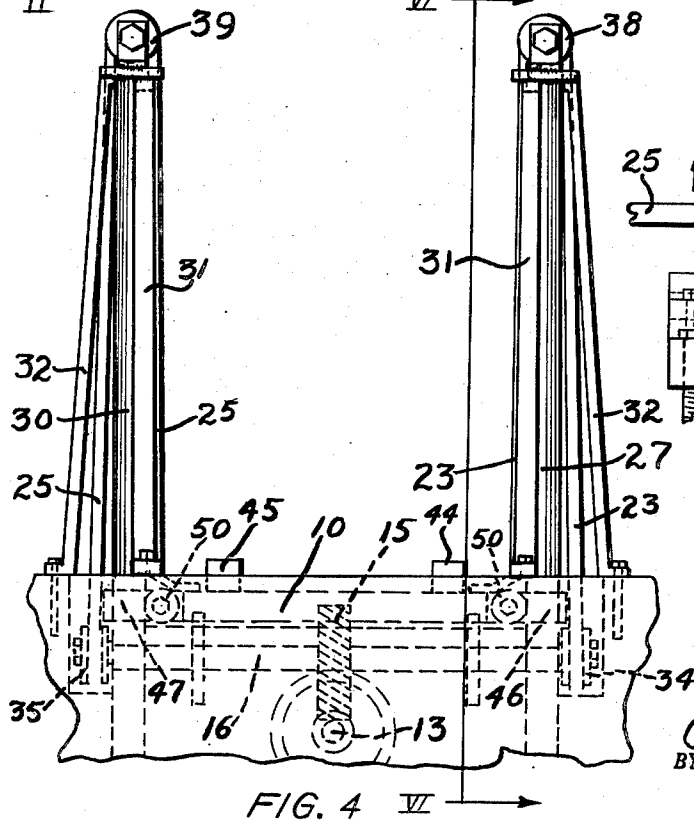
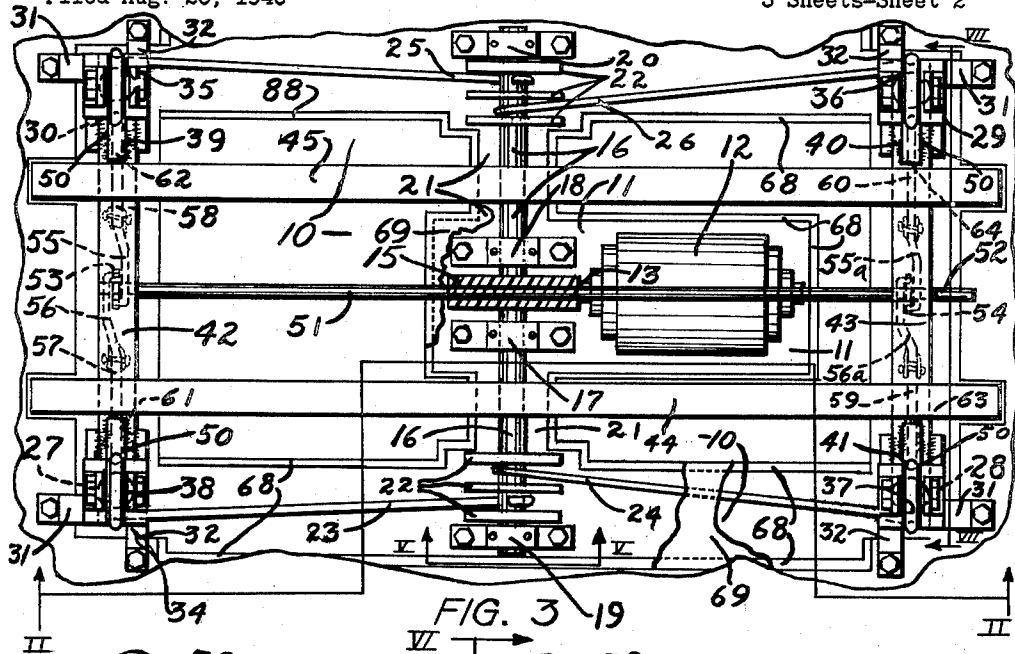
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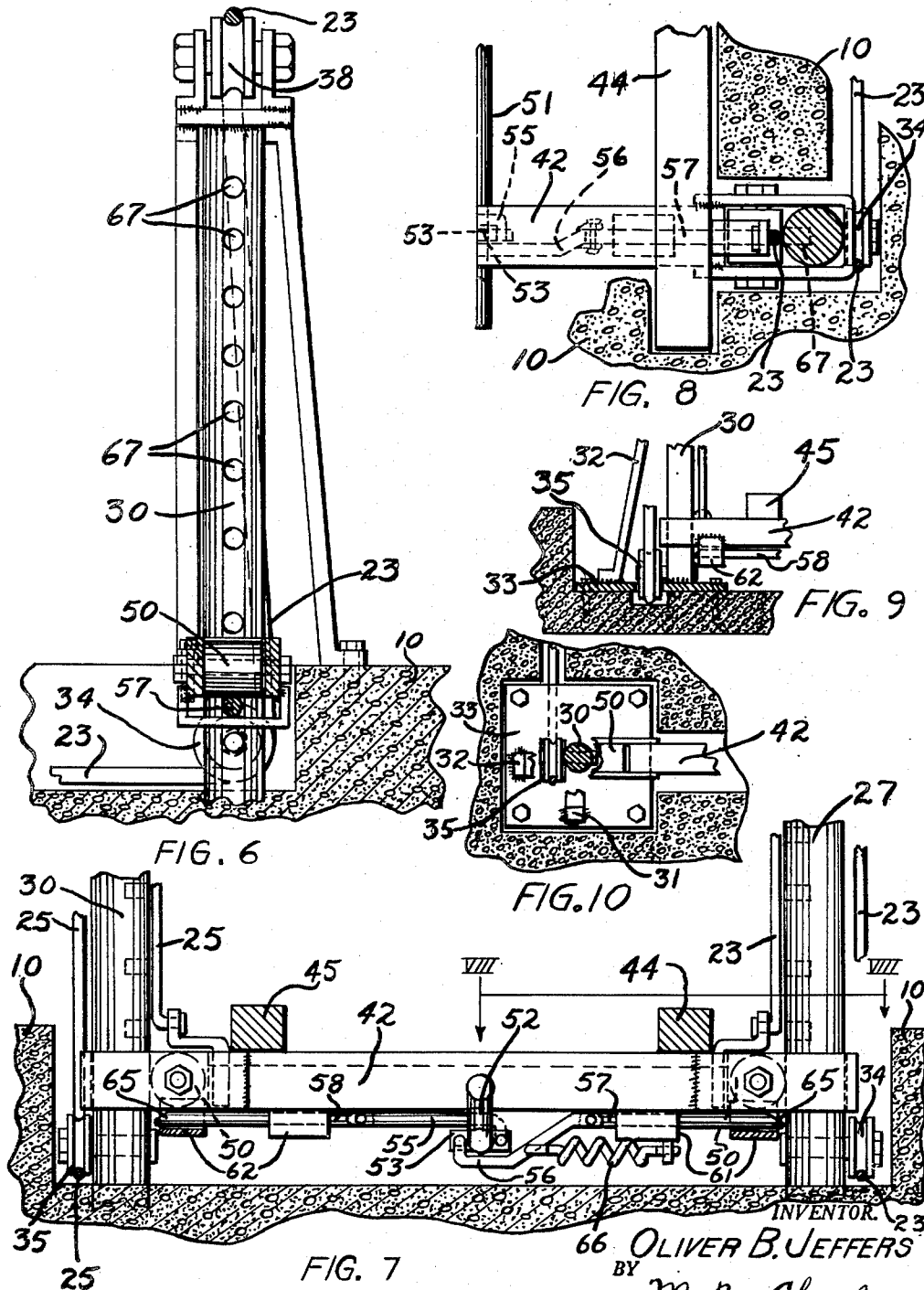
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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VEHICLE HOIST

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2 Claims. (Cl. 254-144)

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My invention relates to an improvement in vehicle hoists. The object of my invention is to provide a hoist of the kind mentioned that is inexpensive to build, one that is strong and durable, one that is simple and easy to operate, one that embodies a safety means that will prevent any possibility of dropping a vehicle after it has been hoisted, one that is open so that there is no possibility of catching opened doors or other parts of the vehicle as it is being raised by the hoist. These and other objects will be more fully described as this description progresses.

Now referring to the accompanying drawings in which similar numerals of reference designate the same parts throughout the several figures of the drawings;

Fig. 1 is a side view of the hoist.

Fig. 2 is a detail side and sectional view of the hoist, the view being taken along the line II—II in Fig. 3 and looking in the direction of the arrows.

Fig. 3 is a top plan view of the hoist.

Fig. 4 is an end view of the hoist.

Fig. 5 is an enlarged detail side view of the driving mechanism for the hoist, the view being taken along the line V—V in Fig. 3 and looking in the direction of the arrows.

Fig. 6 is an enlarged detail side view of one of the corner standards of the hoist, the view being taken along the line VI—VI in Fig. 4 and looking in the direction of the arrows.

Fig. 7 is an enlarged detail sectional view of the hoist, the view being taken along the line VII—VII in Fig. 3 and looking in the direction of the arrows.

Fig. 8 is an enlarged detail plan view of one of the corner parts, the view being taken along the line VIII—VIII in Fig. 7.

Fig. 9 is a rear view of one of the rack supporting standards and showing a modified form of its mounting on the concrete base of the device, the concrete being shown in section for clearness of the illustration.

Fig. 10 is a plan view of the portion of the device shown in Fig. 9.

In the drawings the hoist is shown as having a concrete floor as base portion 10 in the central portion of which is formed a shallow pit 11 in which is located a power unit, preferably an electric motor 12. The motor 12 is provided with a rotatable drive shaft 13 on which is rigidly mounted a driving worm 14 that is in mesh with a worm gear 15 that is rigidly mounted on a shaft 16 the central portion of which is revolvably carried in bearings 17 and 18, located one on

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either side of the worm gear 15 and being rigidly carried on the concrete floor of the pit 11. The outer ends of the shaft 16 are carried in bearings 19 and 20 that are rigidly mounted on the concrete base 10. The concrete base 10 is grooved as at 21 and the shaft 16 is positioned therein and below the surface of the base 10. Each end of the shaft 16 is provided with three guide disks 22 that are spaced apart and are rigidly attached to the shaft 16, this structure comprises a device commonly known as a winch. In the spaces between the guide plates 22 are positioned one end of four cables 23, 24, 25 and 26, each of which are rigidly attached to the shaft 16 and are adapted to be wrapped thereon for pulling purposes as will later be described.

At each corner of the base 10 is positioned a standard 27, 28, 29 and 30, the bottom portion of which is set in the concrete as a rigid mounting for the standard. Each standard 27, 28, 29 and 30 is provided with two brace elements 31 and 32, the lower ends of which are bolted to the base 10 and the upper ends of which are preferably welded to the top or upper portion of their respective standard 27, 28, 29 or 30. As shown in Figures 9 and 10, the lower end of the standards 27, 28, 29 and 30 are each welded to a plate 33 that rest on and are bolted to the base 10, and the lower ends of the braces 31 and 32 are welded to the plate 33.

Revolvably attached to the lower portion of each standard 27, 28, 29 and 30 is a pulley 34, 35, 36 and 37, and revolvably mounted on the top of each standard 27, 28, 29 and 30 is another pulley 38, 39, 40 and 41.

Lying between the standards 27, 28, 29 and 30 is a hoisting frame that is composed of the cross members 42 and 43, on which rests and are rigidly attached thereto a pair of parallel and spaced apart hoist members 44 and 45. Looped or U-shaped members 46, 47, 48 and 49 are positioned one around each standard 27, 28, 29 and 30, and the ends or legs of the U-shaped elements are rigidly attached, preferably welded, to their respective cross member 42, or 43. Between the legs of each U-shaped member 46, 47, 48 and 49, and between the ends of the cross members 42 and 43, and the standards 27, 28, 29 and 30 is revolvably mounted a roller such as shown at 50, and each roller 50 engages and rolls against its respective standard 27, 28, 29 or 30 to act as a guide for the hoisting frame as it is raised and lowered between the standards 27, 28, 29 and 30.

One end of the cable 23 is rigidly attached to one end of the cross member 42 and extends up-

wardly and over the pulley 38 and thence downwardly and under the pulley 34, thence to and attached to the shaft 16 at a point intermediate the two outside disks 22; similarly, one end of the cable 24 is rigidly connected to one end of the cross member 43 and extends upwardly therefrom and thence over the pulley 41 and thence downwardly and under the pulley 37 and thence to and rigidly connected to the shaft 16 at a point intermediate the two inside disks 22; also, one end of the cable 25 is rigidly connected to the other end of the cross member 42 and extends upwardly therefrom and over the pulley 39 and thence downwardly and under the pulley 35 and to and is rigidly connected to the other end of the shaft 16 at a point intermediate the two outside disks 22; and similarly, one end of the cable 26 is rigidly connected to the other end of the cross member 43 and extends upwardly therefrom and over the pulley 40 thence downwardly and under the pulley 36 and to and is rigidly attached to the end of the shaft 16 at a point intermediate the two inside disks 22.

A shaft 51 is revolvably carried in bearings, not shown, on the bottom side of the cross members 42 and 43, and one end of the shaft 51 is bent to form a crank 52 by which the shaft 51 may be revolved as and for the purposes that will later be described. Rigidly attached to each end of the shaft 51 is one of a pair of lever bars 53 and 54 the ends of which extend equidistant on opposite sides of the shaft 51. To corresponding ends of the bars 53 and 54 is pivotally connected one end of rods 55, 55a, and 56 and 55a, and the other end of the rods 55, 55a, and 56 and 55a are each connected to the inner end of latch bars 57, 58, 59 and 60, each of which are slidably carried in bearing elements 61, 62, 63, and 64. The outer end of each bar 57, 58, 59 and 60 is bevelled as shown at 65 and the outer end of each latch bar 57, 58, 59 and 60 bears against its respective standard 27, 28, 29 and 30 under pressure provided by a spring 66, one end of which is connected to one of the bearing blocks 61 and the other end of the spring 66 is connected to the rod 56. Each standard 27, 28, 29 and 30 is provided with a series of holes 67 that are spaced apart equally apart up the face of each standard 27, 28, 29 and 30 and in alignment with the latch bars 57, 58, 59 and 60 in their vertical movement as the hoisting frame 42-43-44-45 raises the latch bars 57, 58, 59 and 60 will slide into the holes 67 and ratchet from one to the other as a positive means of holding the frame 42-43-44-45 in any of its elevated positions independent of the cables 23, 24, 25 and 26.

The upper edge or corner of the pit and grooves in which the motor 12, drive mechanism 15, shaft 16, and cables 23, 24, 25 and 26 are made in the form of a countersunk ledge 68 on which cover plates 69 are supported.

The power unit, preferably an electric motor 12, is a standard reversible electric motor and may be operated by any standard reversing control switch which is not shown. The operation of the device is as follows.

To hoist a vehicle the vehicle is rolled onto the platform or base 10 with the wheels of the vehicle astraddle the two frame members 44 and 45. This having been done, the electric motor 12 is started, whereupon the worm 14 drives the worm gear 15 to revolve the shaft 16, whereupon the cables 23, 24, 25 and 26 will be wound around the ends of the shaft 16 to pull the outer ends thereof to raise the hoist frame

42-43-44-45 to an elevated position such as indicated by the dotted lines 45x, and as the frame 42-43-44-45 raises the longitudinal members 44 and 45 thereof, will engage the axle members of the vehicle and thereby raise the vehicle to an elevated position so that the under parts of the vehicle are easily accessible for greasing purposes or to be worked on.

As the hoist frame 42-43-44-45 raises, the outer ends of the latch bars 50 will ratchet in and out of the holes 67 to finally be seated in one of the holes 67 when the frame 42-43-44-45 is no longer being raised and the latch bars 50 will then function to support the frame 42-43-44-45 when the motor 12 is stopped. This is a safety measure in case the load on the frame 42-43-44-45 is enough to revolve the worm gear 15 and worm and motor 14-12 in the reverse direction to lower the frame 42-43-44-45, or to prevent the falling of the frame 42-43-44-45, in case of damage or breakage of one or more of the cables 23, 24, 25 or 26.

Now to lower the frame 42-43-44-45 the crank 52 may be rocked to turn the lever bars 53 and 54 to the position shown in Fig. 7, whereupon the latch bars 50 will be held from engagement with the standards 27, 28, 29 and 30. This having been done the motor 12 may be started in the reverse direction, whereupon the frame 42-43-44-45 will be lowered until the vehicle is carried by its wheels on the platform or base 10 at which time the vehicle may be rolled from the hoist and the hoist is then ready for use in raising another vehicle in the manner as above described.

Such modifications of my invention may be employed as lie within the scope of the appended claims without departing from the spirit and intention of the invention. Now having fully shown and described my invention, what I claim is:

1. In a vehicle hoisting device of the kind described; said device comprising, in combination, four posts arranged, one at each corner of a rectangular base element, each of said posts being rigidly attached to a bearing plate and having a pair of guy rods therefor, the upper ends of said pairs of guy rods being rigidly attached to the upper end of their respective post and the lower ends of each pair of guy rods being rigidly attached to the bearing plate of their respective post at a point outside the rectangle defined by the said posts, each of said posts having a pulley at the top and bottom thereof, the pulleys at the bottom of said posts extending below the said bearing plates of the posts, four cables and a winding device for receiving said cables thereon, said winding device being positioned within the rectangle defined by said posts and below the bottom of said posts, and means for covering said winding means, a vehicle hoisting element, said vehicle hoisting element having spaced apart elements thereon for engaging and lifting the axle elements of a vehicle, and supporting cross members beneath and at the ends of said spaced apart elements, and means on the ends of said cross members passing around their respective adjacent post defining the said rectangle as a guide and stabilizing means for the said vehicle hoisting element, said winding device having a shaft revolvably carried in bearings and being positioned between the pairs of posts at each end of the aforementioned rectangle, and controlled power means for rotatably driving said shaft in either direction, one end of each

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of said cables being attached, one to each end of said cross members, the other ends of said cables being attached to each end of said revolvable shaft, and plural ratchet latch means carried, one on the outer end of each of said cross members, each of said latch means being spring actuated to engage in openings in their respective adjacent afore mentioned post, as the hoisting element rises, as a safety supporting means for the elevated adjusted positions of said hoisting element, and manually operated means for simultaneously disengaging said ratchet elements from said posts.

2. In a vehicle hoisting device of the kind described; the combination defined in claim 1, said combination being further characterized by the ratchet elements being bevel ended rods, the bevel portion of each of said rods being engageable with the portions of material of said posts immediately above the afore mentioned openings in said posts to move the rods from said openings as the vehicle elevating element moves upwardly, and spring means connected with said rods to move the beveled rod ends into the next succeeding opening in said posts as the vehicle hoisting device moves upwardly and so on to the top of the posts, a second shaft, said second shaft being revolvably carried in bearings carried at the mid-portion of the said cross members, a crank on said

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shaft, and a pair of cantilevers rigidly mounted on said shaft, the other end of each of the said bevel ended rods being pivotally connected, one to each end of the said cantilevers so that upon the turning of the second said shaft the said bevel ended rods will be withdrawn from engagement with the said corner posts, said spring means for moving the said bevel ended rods being a tension spring, one end of said spring being connected to one of the said bevel ended rods and the other end of the spring being connected to a cross member of the structure and being so tensioned as to move the bevel ends of the said rods toward the said corner posts.

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