

[54] **AUTOMOBILE HOIST**
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 187/8.54, 8.59, 8.67, 8.74, 8.75, 8.77

[57] **ABSTRACT**

A vehicle hoist equipped with runways onto which a car may be driven to be hoisted, and linkage for releasably coupling said runways to the elevating piston of the hoist so as to be lifted thereby; the runways being thereafter temporarily supportable on telescopic props while the piston is de-coupled and lowered to render the vehicle bottom wholly accessible for repairs or analogous services.

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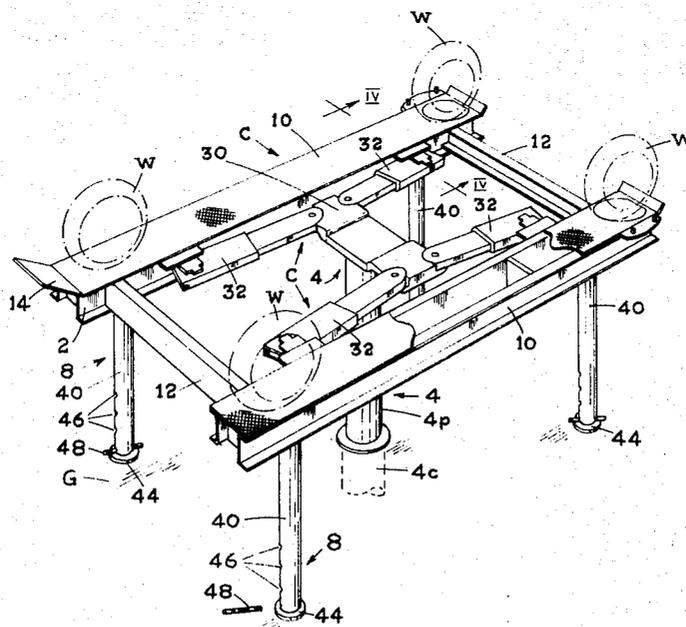
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11 Claims, 9 Drawing Figures



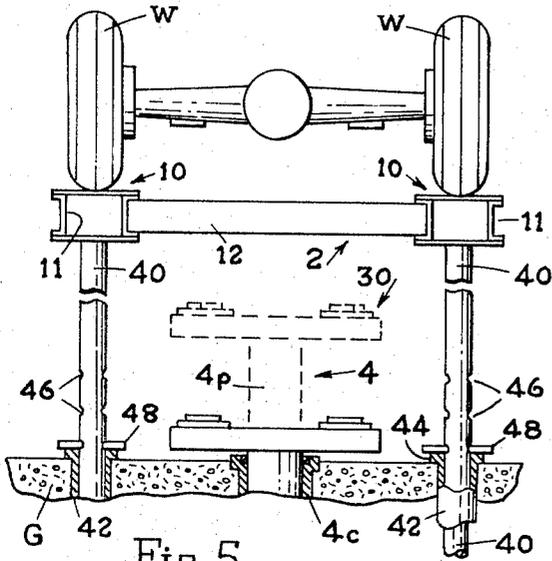


Fig. 5.

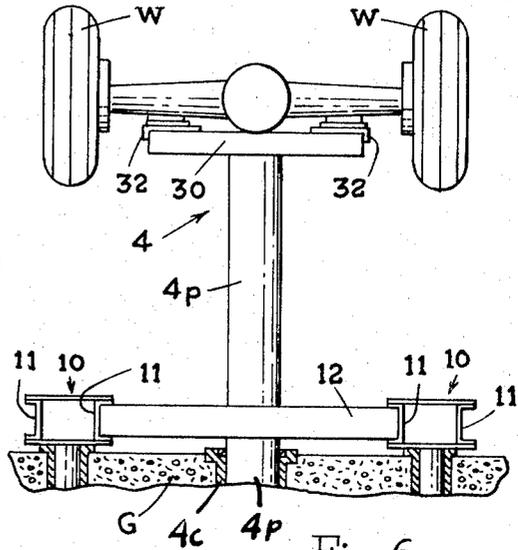


Fig. 6.

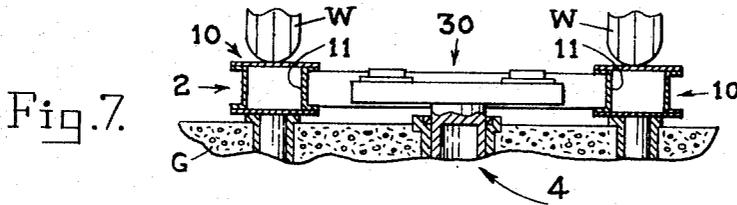


Fig. 7.

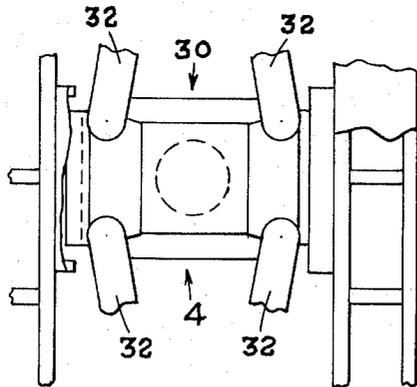


Fig. 8.

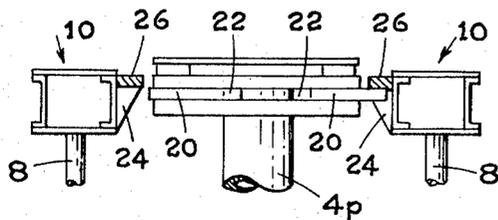


Fig. 9.

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AUTOMOBILE HOIST

This invention relates to improvements in stationary hoists as used, for example, in automobile repair shops for raising and lowering vehicles to enable repair or maintenance services to be carried out on the underneath portions, or bottoms, thereof.

Broadly stated, hoists for such purposes are commonly equipped with one or the other of two types of lift supports or, as they are sometimes called herein, carriers, on which a vehicle is supportable for lifting as aforesaid; one type of carrier being the "peripheral" or wheel lift support which engages the vehicle peripherally — e.g. by its wheels —; the other type of carrier being the frame lift support which engages the vehicle by its frame members intermediately of the wheels.

In practice, a carrier as aforesaid is associated with elevating or lifting equipment which may be, for example, the familiar piston and cylinder combination.

The frame carrier is usually constituted by retractable arms provided on the lift itself which are jointed and extendible to engage convenient portions of the car frame or chassis and the peripheral carrier is typically comprised of spaced apart runways attached to the lifting equipment and providing tracks onto which a car may be driven. For reasons of accessibility, which will be obvious and need not be explained in detail herein, each type of carrier is particularly favored over the other for specific uses.

In the circumstances and having regard to the prior art, the invention seeks broadly and generally to provide a stationary hoist which includes means for raising a vehicle to an elevated work position and for supporting the vehicle in such position independently of the lift and after removal of the lift to a non-obstructing or neutral position.

In particular, the invention seeks to provide a wheel carrier — i.e. for lifting a vehicle by its wheels — equipped with means for supporting the carrier and its burden at an elevation while the lift itself is removed to a neutral, non-obstructive position to permit repairs to be carried out on the bottom of the vehicle; the entire structure namely, the carrier and the lift, being capable of being lowered to unobstructing ground level position when not in use.

Still another object of the invention is to provide a stationary hoist equipped with carriers selectively operable to lift vehicles either by their wheels or by their frames, as well as to provide refinements in apparatus of this nature capable of being embodied in various vehicle hoists presently existing to adapt them to the purposes of the invention.

The foregoing and other unstated but obvious objects of the invention are achieved by the provision of a carrier having means for disengageably engaging a vehicle, a lift reciprocable between an elevated and a lowered position, linkage operable to couple said carrier and said lift enabling the lift to raise and lower the carrier and the vehicle engaged thereby when reciprocated as aforesaid, and means for optionally supporting said carrier and vehicle at a raised position independently of said lift. Preferably, the carrier is provided with runways for engaging the vehicle by its wheels, the runways being spaced to permit access to the bottom of the vehicle while supported as aforesaid.

The lift may, expediently, be positioned between the runways, while the linkage may operate between the lift and the runways to couple and de-couple the lift and the carrier.

In accordance with the preferred embodiment of the invention, the hoist includes a second carrier having means for disengageably engaging the vehicle, the lift and linkage being co-operable to effect raising and lowering of the vehicle by each said carrier alternately. Preferably, one of the carriers has facilities, such as runways, for engaging the vehicle by its wheels, while the other has facilities, such as foldable arms, for engaging the vehicle by its frame.

The invention is exemplified by the preferred embodiment thereof which is illustrated in the annexed drawing and hereinafter described by way of example only. In the drawing wherein like reference devices refer to like parts of the invention throughout the several views:

FIG. 1 is an isometric view of a hoist as contemplated by the invention incorporating two carriers;

FIG. 2 is a section along the line II—II of FIG. 3;

FIG. 3 is a plan view of one of said carriers with some parts broken away and other omitted to reveal structural details;

FIG. 4 is a section along the line IV—IV of FIG. 1;

FIG. 5 is an elevational view of one carrier in elevated position with the lift on the ground, an intermediate position of the lift being shown in dotted lines;

FIG. 6 is a view corresponding to FIG. 5 but with the carrier of FIG. 5 lowered to the ground and the lift with the alternate carrier both elevated;

FIG. 7 is a cross sectional view of a present hoist completely lowered to the ground;

FIG. 8 is a plan view of the central portion only of the present hoist particularly showing one type of linkage, and

FIG. 9 is a section along the line IX—IX of FIG. 8.

In the present preferred embodiment, the invention contemplates a carrier C engageable with a vehicle (not shown) for lifting purposes. Within the context thereof, a vehicle is deemed to be so engaged either when it is mounted on the carrier or grasped by it so as to be lifted and lowered thereby.

In addition, there is contemplated a conventional lift capable of vertical reciprocation between elevated and lowered positions, linkage L operable to couple the carrier C and the said lift so that when the latter is reciprocated as aforesaid, it will also lift and lower the carrier C and the vehicle engaged thereby. In particular, the invention further contemplates means for supporting the vehicle at a height to which it has been elevated by the lift while the lift itself is disengaged from the carrier C and removed to render the bottom of the elevated vehicle accessible to service as aforesaid.

In FIG. 1 the preferred embodiment of the present hoist is shown to be provided with a carrier 2, a lift 4, linkage generally identified by the letter L operable to couple carrier 2 and lift 4 for raising and lowering of carrier 2 with a vehicle engaged thereby or supported thereon, as the case may be, and means for optionally supporting carrier 2 and the vehicle at a raised position independently of lift 4. In this instance, said supporting means include props 8 which will be discussed in

greater detail in a subsequent portion of this description.

The carrier 2 shown in FIG. 1 may be of the wheel support variety — i.e. adapted to engage a vehicle by its wheels W for lifting purposes. To this end, carrier 2 may be provided with a pair of spaced runways 10—10 joined together, as is this embodiment, by crossbeams 12—12 integrally connected thereto by rivets, welding, or the like. For reasons which will duly appear, the crossbeams 12—12 are preferably channel-shaped in cross section. Ramps such as shown at 14 secured to and depending from an end of a runway 10 may be provided to permit the vehicle to be driven onto carrier 2 in the conventional manner when the latter is in its lowered position on the ground G of a repair shop as in FIG. 7. As best shown in FIGS. 1 and 5 of the drawings and as is common, said runways 10—10 are spaced to permit access to the bottom of the vehicle while supported as aforesaid on props 8 as will be realized from FIG. 5.

Lift 4 is reciprocal between the elevated position of FIG. 5, for example, and a lowered position as shown in full lines in FIGS. 5 and 7. As will be understood, it is capable of lifting and lowering both carrier 2 and a vehicle supported thereon or engaged thereby. As illustrated in FIGS. 5 and 6, lift 4 is positioned between runways 10—10 and may comprise the familiar piston or column 4p, extending out of and co-operating with a buried cylinder 4c which is operable by fluid pressure to procure reciprocation of the column 4p between a lowered position in which its top is in a neutral location on the ground G as in FIG. 7 and an elevated position as in FIG. 5 in which the bottom of the vehicle has been raised to that level at which repairs may be conveniently performed thereon. Obviously such level will vary according to pertinent factors.

Depending upon local circumstances, preferences and like special considerations, any of a variety of linkages L may be effectively employed and which are operable to couple and de-couple carrier 2 and lift 4; such linkages being particularly shown in FIGS. 1, 3 and 8. Before dealing with these variations, however, it should be observed and made clear that, in the context of the present submission, reference numeral 10 denotes the entire runway structure comprised not only of the actual surface plate which accommodates the vehicle wheels W but also the girders, e.g. channel beams 11—11, which reinforce that plate to enable a vehicle to be supported thereon.

In one situation, the linkage L may be attached to the runways 10—10 and may extend retractably therefrom to engage lift 4. An example of this type of linkage L is shown in FIGS. 3 and 4 of the drawing as constituted by a bar 16 attached to each said runway 10; said bar being attached as aforesaid by cantilever facilities including telescopable guide posts 18—18 and motor means of the piston-cylinder type M which may be operated to de-couple the carrier 2 from lift 4 by retracting the bar 16 to a stand-by position alongside the runway 10 as shown on the right-hand side of FIGS. 3 and 4 or to couple the carrier 2 and lift 4 by extending bar 16 into a suitable channel 19 at the top of lift column 4p as at the left-hand sides of the same views. Preferably, the bar 16 spans the space between crossbeams 12—12 and its ends 16a—16a are engaged in the

crossbeam channels. Thus, the lifting effort of column 4p would not only be applied to runways 10—10 through the intermedium of the guide posts 18—18 but would likewise be communicated thereto mainly by engagement of the bar 16 in the crossbeams 12—12.

As will be observed, the linkage L just described is comprised of linkage elements which are carried by the runways 10—10 and are extendible into engagement with lift 4 to couple it to the carrier 2. In an alternative construction, the linking elements may be carried by the lift 4 instead from which they may be extendible for engagement with carrier C. For example, they may be constituted by tongues 20—20 which are slidably disposed in channels 22—22 provided at the top of lift column 4p and which tongues 20—20 may, in turn, be extendible as at the right-hand sides of FIGS 8 and 9 to engage runways 10—10 at keepers 24—24, which include ledges 26—26 extending in overhanging fashion from each runway 10 towards lift column 4p, said tongues 20—20 being shown in retracted position at the left-hand sides of said FIGS. 8 and 9. While each of the aforesaid linkages L may have certain advantages over the other, either may be used for the purposes of the invention.

Ideally, the versatility and utility of the stationary hoist just described may be significantly enhanced by adding to it a second carrier 30 which is also illustrated in FIG. 1. The hoist will thus be provided with one carrier of the wheel lift type as identified in this view, for example, by reference numeral 2 and the second carrier which would therefore be of the frame lift type as shown at 30 in the same view.

Said carrier 30 may be of the conventional frame lift type which comprises four arms 32 swivably attached to the top of lift column 4p; each said arm 32 being suitably jointed to enable it to be positioned for engaging the frame of the vehicle at a suitable point as in FIG. 6. This type of structure and its function being well known in the art, it is not deemed necessary to expatiate thereon or to show the vehicle frame in the annexed drawing.

Thus, in the use of the invention as heretofore described, the frame lift carrier 30 may be selectively brought into service by extending and positioning its arms 32 to engage the frame of a vehicle standing on runways 10—10 after which the lift column 4p may be operated to raise the vehicle by its said frame as in said FIG. 6; the linkage L being disposed in retracted neutral position whereby the companion carrier 2 is decoupled from lift 4.

Conversely, carrier 2 may be coupled to lift 4 by any of the linkages L shown, enabling the vehicle stationed thereon to be raised by its wheels W notwithstanding that the second carrier 30 will be also be raised at the same time as suggested for example, in FIG. 5.

Indeed, a third linkage L may be provided simply by disposing the arms 32 of carrier 30 to engage carrier 2 much as shown generally schematically in FIG. 1 of the drawing.

It will be recalled that the invention contemplates means for supporting a carrier C at a raised position independently of lift 4 in order to enable work to be performed underneath a vehicle carried thereby.

Such supporting means may be provided by the props 8 aforesaid which are interposable between the

carrier C and the ground G to prop the former at its said raised position.

In this preferred form of the invention, each of said prop 8 is constituted by a stilt 40 and an associated guide element 42 co-operating therewith, in effect, to form and provide an extendible prop 8 capable of adjustment to correspond to the height of the carrier C above ground G or other prop base.

The device illustrated in FIG. 5 is an acceptable example of a prop 8 according to the invention, being comprised of a cylindrical stilt 40 slidably disposed within guide sleeve 42.

Said stilt 40 is preferably attached to carrier C to depend therefrom into ground G through said guide sleeve 42 which is buried in the ground to its flange 44. Said stilt 40 is associated with stop means to fix it at desired elevations. As an example, it may be transversely perforated at intervals 46 to accommodate a pin 48 which is too long to enter guide sleeve 42 and is hence intercepted by flange 44 to limit the descent of stilt 40 into ground G. Obviously, the pin 48 may be installed in any of the perforations 46 whereby to permit a greater or lesser descent of stilt 40 into ground G and so, in turn, to fix the height at which carrier C is supported thereby.

Expediently, each said prop 8 will be attached to carrier C —, in the present instance, either to the crossbeams 12 or to the runways 10 adjacent the ends of the latter on carrier 2.

In use, assuming that it is desired to lift a vehicle by its wheels W, the said vehicle will be driven onto runways 10—10 over ramps 14 while they are lowered and then suitably chocked. Linkage L will then be operated to couple the runways 10—10 and lift 4 and the latter then operated, in turn, to raise wheel carrier 2 and the entrained vehicle.

When a suitable elevation has been attained, pins 48 will be inserted into appropriate stilt perforations 46 and the lift 4 operated to lower carrier 2 (and stilts 40) until the pins 48 engage guide flanges 44 and take over the load of the carrier 2 and its burden.

At that point, the linkage L may be operated to decouple carrier 2 from lift 4; the latter being then lowered to the ground as in FIG. 5 thus clearing the way for service to the bottom of the vehicle.

When desired, as upon completion of such service, lift 4 may again be raised, coupled to carrier 2 and further raised to release pins 48 which may then be withdrawn to permit lift 4 to lower carrier 2 to the ground. As will be appreciated the lift 4 can also be utilized to lower heavy parts — a transmission, for example — to the ground.

It will be appreciated that the arms 32 of carrier 30 should be swung together as suggested in FIG. 8 to avoid interference with the raising and lowering of lift 4 when carrier 2 is propped as aforesaid.

To lift a vehicle by frame lift support or carrier 30 it is, of course, expedient to ensure that the lift 4 and carrier 2 are de-coupled after which arms 32 are positioned and lift 4 operated in the conventional manner.

While FIG. 7 shows the present hoist as disposed completely above the ground when completely lowered, it will be understood that this is done for the sake of clarity only; there being no reason why the present device cannot be recessed into ground G in the well known conventional manner if so desired.

Above all it is stressed and should be understood that the present hoist in its completed form may be regarded as a synthesis of two fairly common hoists of the prior art with linkage L and propping means added thereto to enable realization not only of the function served by each of the said prior hoists but the additional advantageous function of providing a clear and virtually unobstructed space below a vehicle for service purposes.

What I claim is:

1. In a stationary hoist for a vehicle having wheels and a frame,

a wheel carrier having means for disengageably engaging said vehicle by its wheels to be lifted and lowered by and with said wheel carrier;

a lift reciprocable between an elevated and a lowered position;

a frame carrier attached to said lift having means for disengageably engaging the vehicle by its frame to be lifted and lowered by and with said frame carrier;

linkage operable to couple said wheel carrier to said lift enabling the lift to raise and lower the wheel carrier and the vehicle engaged thereby when reciprocated as aforesaid;

means for supporting said wheel carrier and vehicle at an elevated position independently of said lift;

said linkage being also operable to de-couple said wheel carrier from said lift enabling the lift to reciprocate as aforesaid independently of said wheel carrier.

2. A stationary hoist for a vehicle as set forth in claim 1 wherein:

the means for disengageably engaging said vehicle by its wheels consist of runways.

3. A stationary hoist for a vehicle as set forth in claim 2 wherein:

the runways are spaced to permit access to the bottom of the vehicle while supported as aforesaid.

4. A stationary hoist for a vehicle as set forth in claim 2 wherein:

said lift is positioned between the runways.

5. A stationary hoist for a vehicle as set forth in claim 4 wherein:

the linkage operates between said lift and said runways to couple and de-couple the lift and said wheel carrier.

6. A stationary hoist for a vehicle as set forth in claim 4 including:

crossbeams joining the runways, and bars interconnecting said crossbeams between the runways;

said bars forming part of the linkage aforesaid and being movable while connected to said crossbeams to couple and de-couple the wheel carrier to and from said lift.

7. A stationary hoist for a vehicle as set forth in claim 6 including:

cantilever facilities securing said bars to said runways;

the cantilever facilities being extendible and retractable to couple and de-couple the lift and wheel carrier as aforesaid.

8. A stationary hoist for a vehicle as set forth in claim 7 wherein:

said cantilever facilities include piston-cylinder motor means for effecting coupling and decoupling of the said lift and wheel carrier.

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9. A stationary hoist for a vehicle as set forth in claim 2 wherein:

the vehicle frame engaging means on said frame carrier comprise arms by which the vehicle frame is engageable as aforesaid and which are foldable to be disposed and to lie wholly between the two runways.

10. A stationary hoist for a vehicle as set forth in claim 2 wherein:

said lift is disposed between the runways; said frame carrier is permanently mounted on said lift and co-movable therewith, and said linkage is constituted by tongues mounted on

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said lift; each said tongue being extendible and retractable to engage and disengage a said runway.

11. A stationary hoist for a vehicle as set forth in claim 9 wherein:

said lift is disposed between the runways; said frame carrier is permanently mounted on said lift and co-movable therewith, and said arms also constitute linkage disengageably engageable with the wheel carrier for coupling it to the lift.

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