The following statement is a full description of this invention, including the best method of performing it known to us:

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This invention relates to vehicle hoists used for servicing motor vehicles and in particular to a unit construction hoist capable of being installed with the minimum amount of initial preparation.

It is customary for a vehicle hoist to comprise a platform supported by a central vertical hydraulic ram requiring a deep excavation and only suitable for installation on a ground floor.

It is an object of the invention to produce a vehicle service hoist capable of being secured to any flat floor without previous preparation.

The invention may include as one of its features a vehicle hoist having the lifting means located above ground. It is customary for a hoist to comprise a platform on to which the vehicle is driven, and when it becomes necessary to take the weight off the wheels, packing pieces are placed between the platform and convenient parts of the vehicle frame before it is raised.

It is a further object of the invention to eliminate loose packing pieces by using supporting pads directly attached to the lifting means, which can be moved aside to permit the vehicle to enter or leave the hoist.

The invention may include as a further feature each lifting carriages located on either side of the vehicle to be raised, each carriage having retractable arms with supporting pads at their free ends.

The invention may but not necessarily comprise a
a pair of vertical spaced columns attached to a shallow base member, a lifting carriage on each column, said lifting carriages being guided for simultaneous vertical movement, a pair of lifting arms extending outwardly from each lifting carriage, each said lifting arm being adjustable in length, vertical pivot means connecting the lifting arms of each said pair of arms to the respective said lifting carriage, vehicle support means on each arm, lifting means connected to both carriages, and safety means preventing downward movement of the carriages on failure of the lifting means.

An embodiment of the invention is described hereunder with reference to and is illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of the hoist,

Fig. 2 is a cross-sectional elevation through one of the columns,

Fig. 3 is a cross-section plan view of a column, and

Fig. 4 is a diagrammatic view of the hoist showing the lifting means.

A vehicle hoist 10 according to this embodiment comprises a pair of vertical columns 11 attached to a common shallow base member 12, a pair of lifting carriages 13, each carriage being guided for vertical movement on one of the said columns, a pair of retractable and adjustable lifting arms 14 attached to each carriage, supporting pads 15 on the free ends of all arms, hydraulically operated lifting means 30 connected to both carriages.
and safety means 32 preventing downward movement of any carriage due to failure of the lifting means.
The columns 11 are each of rectangular cross-section.
steel with rigid feet 17 of extended size for attachment to the shallow base member 12. The opposing faces of the columns are parallel and the columns house internally, carriage support members 20 of rectangular cross-section having guide rollers 21 and 22 attached thereto at all corners, rollers 21 and 22 being arranged to rotate on axes perpendicular to each other, the said rollers engaging all of the inner faces of the columns to permit free movement of the carriage support member up and down the column. Each carriage 13 is attached to its respective support member 20 by arms 23 extending through a vertical parallel slot in the opposing face 25 of the column. The base comprises an elongate rectangular frame 12 of channel section steel with sloping sides 30 of length sufficient to accommodate the width of a vehicle between the lifting carriages, and with end members 27 exceeding the width of the frame by an amount which ensures that the supporting pads 15 when positioned under the largest vehicle to be lifted do not extend substantially beyond the ends of the said end members 27. The said end members 27 are provided with floor attachment means 28 at the extreme ends. The frame is merely set on the floor, the said sloping sides having a slow rise and constituting ramps. The inwardly opposing faces of the carriages 13, each carry a pair of pivots 34 with vertical axes for the attachment of lifting arms having freedom to swivel in a horizontal plane, the pivots being supported between horizontal jaws.

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Each lifting arm 14 comprises a rectangular portion 35 engageable between the said jaws and having a circular aperture engageable with one of the said pivots 34 and an outer hollow rectangular section horizontal arm 36 engageable telescopically with an inner elongate member 37 on horizontal at its outer end. The pad 15 is provided having a flat supporting pad 15 with a threaded stem 38 screwed into the pad 15 facing upward when inserted in the inner member 37. The inner member 37 has limited angular movement within the outer member 36. The length of the telescopic members are such that when a vehicle is driven between the columns the supporting pads can be positioned beneath the vehicle by a simple swivelling and sliding movement.

The hydraulically operated lifting means comprises a hydraulic ram 31 having the cylinder 32 mounted inside of one of the columns 11, the free end of the ram extending vertically upwards and having a pulley 40 pivotally attached thereto for rotary motion about an axis transverse of the axis of the ram. A cable 41, attached at one end to the adjacent carriage support member 20, passes over the pulley 40 and is secured at the other end 42 to the column. A second cable 44 attached at one end 45 to the same carriage 20 passes downward, round a pulley 46 mounted at the bottom of the column, across beneath the base member 12, round a second pulley 47 mounted at the bottom of the second column, vertically upwards inside the said second column, round a third pulley 48 mounted at the top of the second column and downward to the second
In operation the first carriage moves twice the distance moved by the pulley 40 on the end of the ram 31 and by means of the second cable, 44 both carriages move upward or downward by the same amount.

An electrically driven pump not shown supplies hydraulic fluid at constant pressure to a manually operated valve the pump suction being connected to a fluid reservoir and the delivery to a pressure raising valve, surplus fluid being returned to the reservoir.

To ensure safety of the operator in the event of failure, (either of the pressure supply or the cables,) spring loaded ratchets 50 on each of the carriage support members 20 engage a series of upward facing projections 51 on a vertical elongate member attached at top and bottom to each column and located in the slots between the carriage attachment arms 23, the ratchets being held out of engagement by the tension of the cables compressing the springs 52 and the projections are so shaped with upward sloping top faces that the ratchets can not be disengaged without the carriages being raised.

The ratchet 50 is of bell crank shape with central pivot 53, the other end of the ratchet being engageable with an abutment member 54 attached to the cable and having a helical spring between the opposite side of the abutment member and the carriage support member 20, release of compression due to broken cables or the like forcing the ratchet into engagement with the upward facing
projections while normal lowering is not restricted while there is a load on the cables. (not illustrated) and two cables are utilised.

In a second embodiment, the ram carries two pulleys, the second cable being secured at one end to the base of the first column, passing over the second pulley on the ram and down to the said pulley in the base of the column before continuing as in the first embodiment. (not illustrated).

In yet a further embodiment, the ram is mounted horizontally in the base member, operating one or both carriages by cables as in the first two embodiments, while in a further embodiment, two separate horizontal rams in parallel arrangement in the base member but operating in opposite directions are connected by cable to independent carriages and the assembly may include compensating means to provide equal movement of both carriages. (not illustrated).

In yet a further embodiment, each carriage is directly connected to a separate vertical ram which may be a simple cylinder and ram where height is not restricted or alternatively the cylinder may comprise two or more concentric cylinders telescoping into each other permitting a large stroke to be obtained for a minimum overall length. (not illustrated).

In yet a further embodiment, the lifting means comprises electrically operated winches with cables attached to the carriages as in the previously described embodiments.
The claims defining the invention are as follows:—

1. A vehicle hoist of unit construction comprising a pair of vertical spaced columns attached to a shallow base member, a lifting carriage on each column, said lifting carriages being guided for simultaneous vertical movement on the opposing faces of the columns, a pair of lifting arms extending outwardly from each lifting carriage, each said lifting arm being adjustable in length, pivot means with vertical axes connecting each lifting arm of each said pair of arms to its respective said lifting carriage, vehicle support means on the outer end of each arm, lifting means connected to both carriages, and safety means preventing downward movement of the carriages on failure of the lifting means.

2. A vehicle hoist according to claim 1 wherein each of the lifting arms comprises at least two telescopic members, one member being attached to the carriage and pivoted at one end for rotation in a horizontal plane, the other member having said support means attached to its outer end.

3. A vehicle hoist according to either claim 1 or claim 2 further comprising a carriage support member housed within a respective column and guided for vertical movement therein and attachment means securing each said carriage to its corresponding support member, said attachment means passing through an opening in the column.

4. A vehicle hoist according to any preceding claim wherein the lifting means comprises a system of cables and pulleys housed within said columns, at least one of the said cables passing through or beneath the base member.
5. A vehicle hoist according to Claim 4 wherein the lifting means comprises a hydraulic ram housed within one of the columns and operably connected to the said cables and pulleys.

6. A vehicle hoist according to either Claim 4 or Claim 5 wherein the lifting means comprise a hydraulic ram housed in the base member and operably connected to the said cables and pulleys.

7. A vehicle hoist according to either one of Claims 5 or 6 wherein the said ram is hydraulically connected to an electrically driven constant pressure fluid supply mounted on the hoist.

8. A vehicle hoist according to Claim 4 wherein the lifting means comprises an electrically operated winch operably connected to the said cables.

9. A vehicle hoist according to Claim 4 and any succeeding Claim wherein the safety means comprise restraining means engageable with fixed projections attached to the columns and held out of engagement by tension in the said cables.

10. A vehicle hoist according to any preceding Claim wherein the shallow base is provided with end members of sufficient length to ensure that the supporting pads do not extend beyond the said end members when supporting the largest vehicle to be lifted.
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A vehicle hoist substantially according to embodiment described in the specification with reference to and as illustrated in the accompanying drawings.

Dated this 9th day of August, 1972.

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By his Patent Attorneys,
R.K. MADDERN & ASSOCIATES.

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