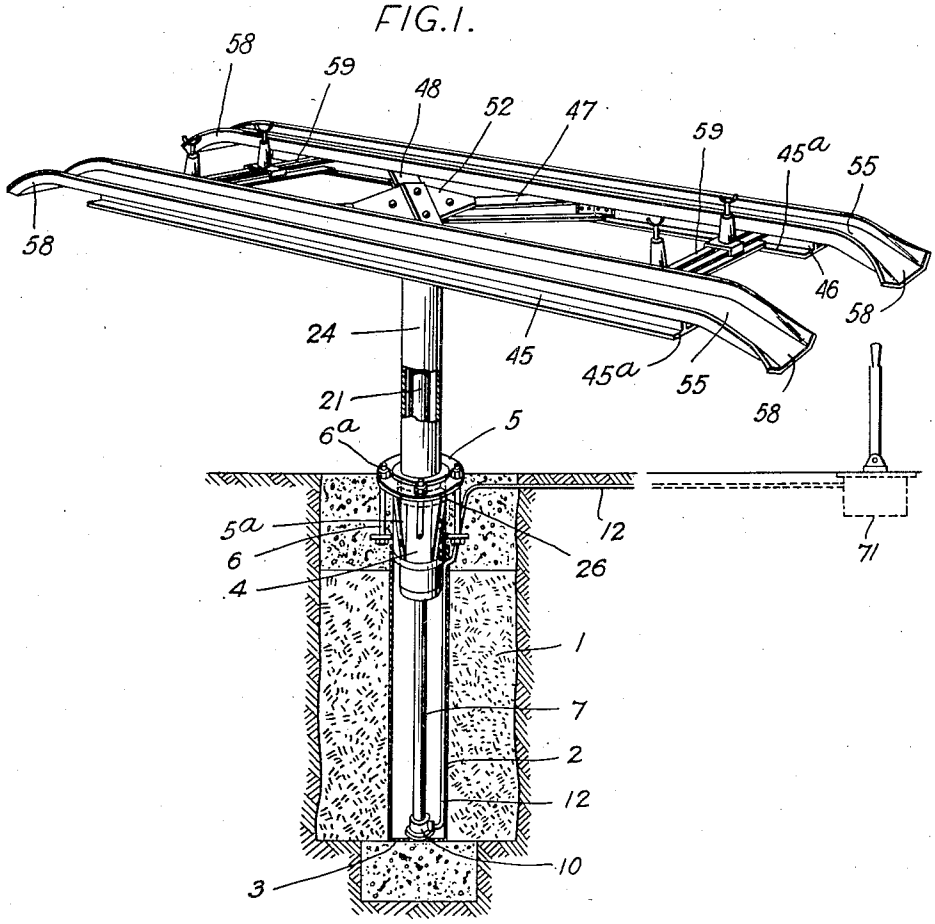
June 20, 1933. A. I. LOGETTE ET AL 1,915,024

LIFTING APPARATUS

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FIG. 1.



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FIG. 2.

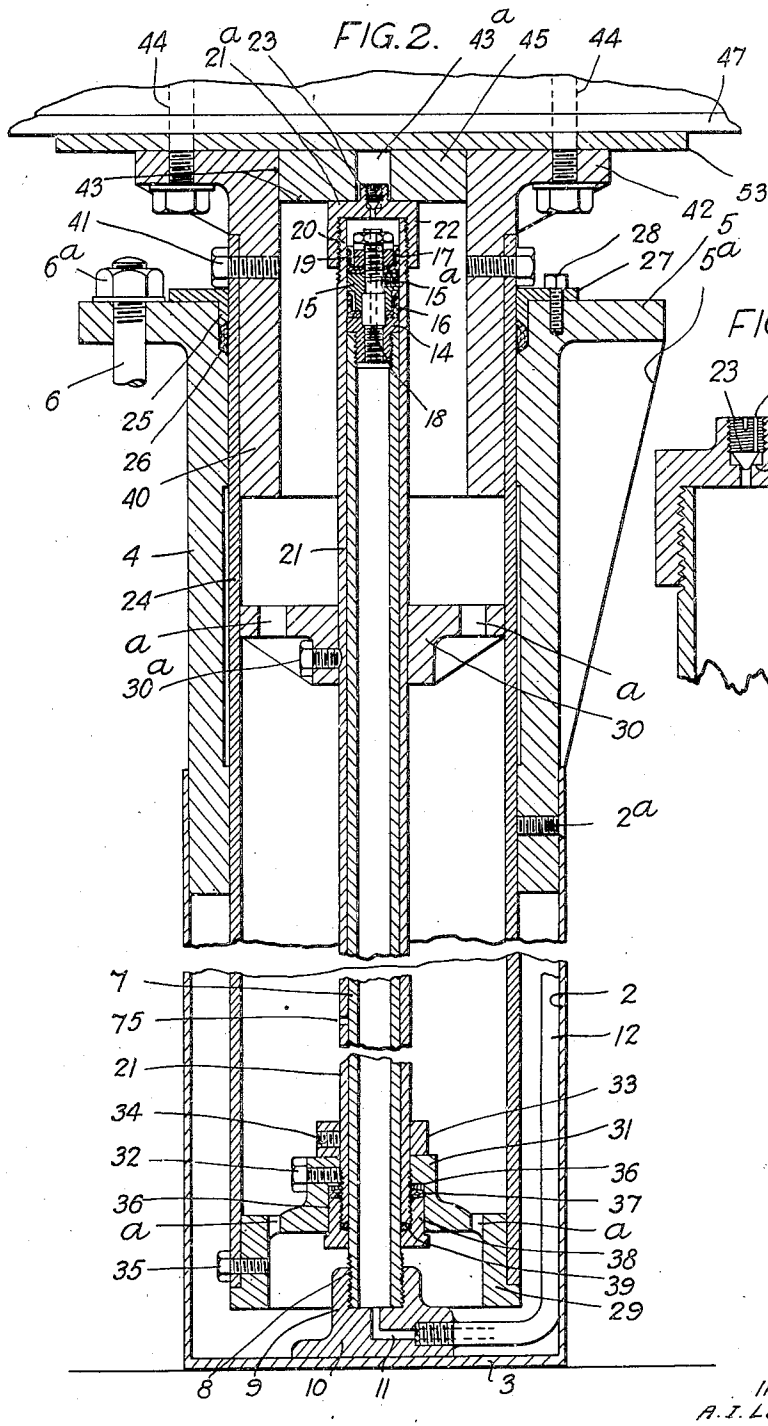
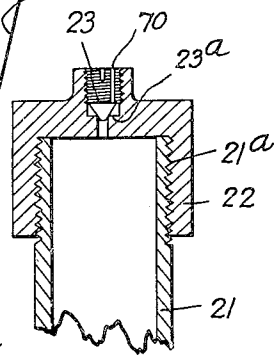


FIG. 3.



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LIFTING APPARATUS

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FIG. 4.

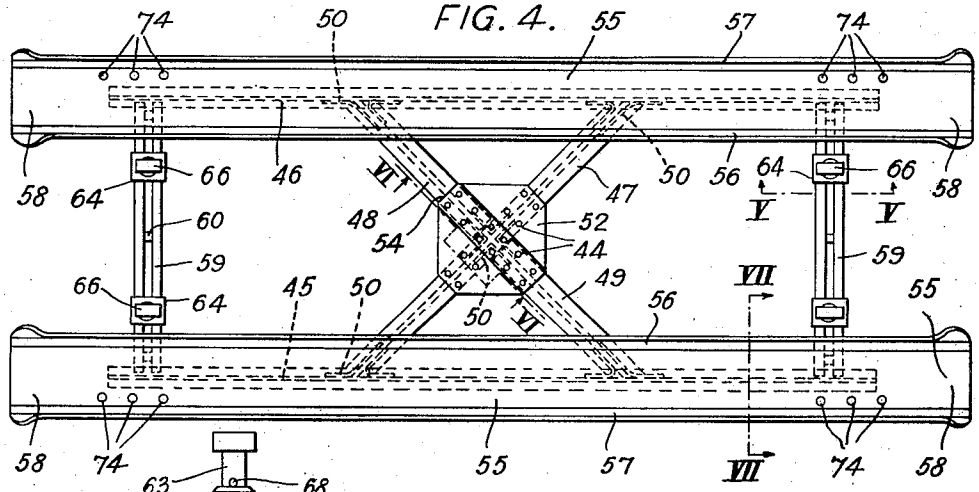


FIG. 7.

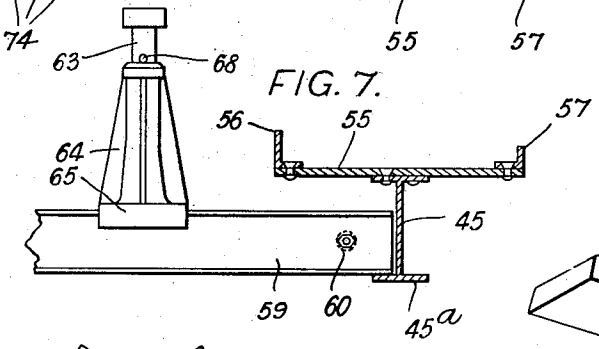


FIG. 8.

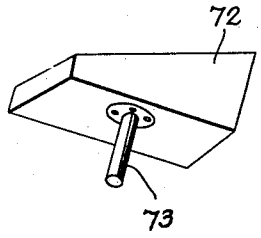


FIG. 5.

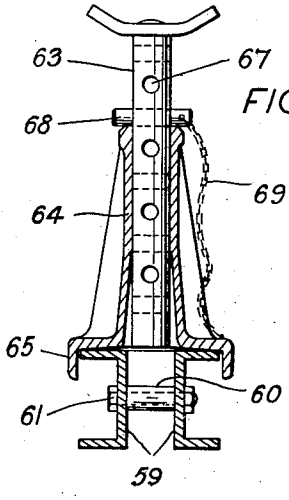
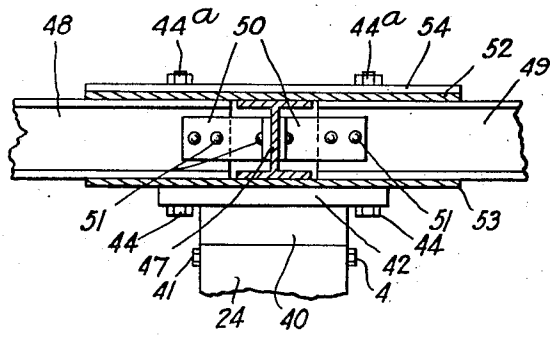


FIG. 6.



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UNITED STATES PATENT OFFICE

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LIFTING APPARATUS

Application filed July 28, 1930, Serial No. 471,270, and in Great Britain November 9, 1929.

This invention relates to hydraulic lifting devices for vehicles of the kind comprising a pressure cylinder and ram which are housed in a pit below the floor or ground level, and a lifting platform furnished with trackways which platform is secured to the head of the ram so that when the latter is lowered the platform rests on the floor or ground to enable a vehicle to be run thereon and then raised by means of the ram in order to afford access to the chassis and underbody for inspection, repairs, cleaning and so forth.

The object of the present invention is to provide an improved, quick-acting, simple and compact construction of rotatable hydraulic lift of the kind referred to which greatly facilitates the handling and repair of motor vehicles and in which bending stresses on the lifting ram are reduced to a minimum.

According to this invention a hydraulic lifting device of the kind referred to comprises rotatable tubular lifting and guiding rams which are disposed concentrically of the pressure cylinder by which the lifting ram is operated, and a lifting platform which is adapted to carry removable fittings comprising cross beams furnished with adjustable supports for carrying the vehicle so as to enable the wheels, springs etc., to be removed and replaced while the vehicle is on the lifting platform, and also allow safe access to the chassis and underbody thereof generally.

According to a further feature of the present invention duplicate cup leathers or like packing are arranged between the lifting ram and its pressure cylinder so that in the event of one cup leather or the like failing while the lifting ram is under load the other cup leather or like packing operates to prevent leakage of the motive fluid that supports such ram.

In a preferred construction the tubular lifting ram is closed at its upper end and is adapted to work over the exterior of the pressure cylinder disposed vertically in the ram pit, the lower end of such cylinder being closed and connected to the force pump and release valve mechanism, while its upper end is open and is furnished with duplicate cup leathers over which the tubular lifting ram works fluid-tight.

The tubular guide ram is of robust construction and is preferably of considerably larger diameter than the lifting ram and works through one or more fixed guides arranged in the ram pit.

The lower end of the guide ram is connected by a distance-piece to the lifting ram and is also supported by intermediate distance-pieces mounted on the latter.

The upper end of the guide ram is furnished with a heavy tubular head which is externally flanged and is closed by means of a perforated plug that seats upon the closed end of the lifting ram, the centre of the lifting platform being bolted to the flanged tubular head of the guide ram so that the closure plug in the head of the latter is held down by the centre of the lifting platform.

The lifting platform consists of flange longitudinal girders which carry trackways of channelled section and are connected together by flanged diagonal girders secured together by plates that form the platform centre which is bolted to the flanged head of the tubular guiding ram.

The flanged longitudinal girders of the lifting platform form guides and supports for the removable cross beams on which are mounted adjustable prop jacks or other suitable supports for carrying the vehicle so as to enable the wheels and other parts to be removed and replaced while the vehicle is on the platform.

The invention is further described with reference to the accompanying drawings which illustrate a preferred embodiment thereof.

Figure 1 is a perspective view with parts broken away illustrating a lifting device made and arranged in accordance with the present invention.

Figure 2 is a fragmental vertical section drawn to an enlarged scale further illustrating the construction and arrangement of the

concentric lifting and guiding rams and parts associated therewith.

Figure 3 is a detail view drawn to an enlarged scale of the closed upper end of the lifting ram.

Figure 4 is a plan view of the lifting platform showing the removable fittings for supporting the vehicle so as to enable the wheels, etc., to be removed and replaced.

Figure 5 is a detail view in cross section on the line V—V (Figure 4) drawn to an enlarged scale, showing one of the adjustable vehicle supports.

Figure 6 is a cross section on the line VI—VI (Figure 4) drawn to a larger scale, further illustrating the construction of the centre of the lifting platform.

Figure 7 is a cross section on the line VII—VII (Figure 4) drawn to an enlarged scale, further illustrating one of the trackways and the manner in which the removable fittings are supported in the lifting platform.

Figure 8 is a perspective view illustrating an adjustable scotch block presently referred to.

As illustrated in the drawings the ram pit 1 is lined with a sheet metal casing 2, the closed lower end 3 of which rests upon a concrete footing while its open upper end receives the lower end of a tubular guide 4 to which the casing is secured by screws 2*a*—see Figure 2.

The tubular guide 4 is of heavy construction and is formed with an external flange 5 and with stiffening webs 5*a*, such guide being anchored in the concrete filling of the ram pit by holding down bolts 6 and nuts 6*a* secured in perforations in the flange 5.

7 indicates the pressure cylinder for the lifting ram which cylinder is disposed vertically in the ram pit, its lower end 8 being externally screw-threaded and secured in the internally screw-threaded socket 9 of a pedestal bearing 10 which rests on the lower end of the ram pit casing 2 and is arranged centrally thereof, as indicated at Figure 2.

The pedestal bearing 10 is bored out to form a duct 11 which connects the lower end of the pressure cylinder 7 to a motive fluid circulating pipe 12 that is screwed into the pedestal bearing as indicated at 13 (Figure 2), which pipe is connected to a source of motive fluid as presently referred to.

The upper end of the pressure cylinder 7 is furnished with two tubular piston ends 14 and 15 which carry two cup leathers 16 and 17.

The tubular piston end 14 is screwed in known manner into the upper end of the pressure cylinder 7 and carries a tubular bolt 18. The cup leather 16 is passed over the bolt 18 together with the piston end 15, which latter is secured to the bolt 18 by a stub screw 15*a* so as to clamp the cup leather 16 in position. The second cup leather 17 is then mounted on the tubular bolt 18 on which it is secured by means of a washer 19 and nut 20.

The tubular lifting ram 21 is assembled to the exterior of the pressure cylinder 7 and works fluid tight over the cup leathers 14 and 15 thereof, its lower end being open while its upper end is closed by a heavy internally screwed cap 22 which is furnished with a priming valve 23 and is secured on the externally screwed upper end 21*a* of the tubular lifting ram.

24 indicates the tubular guiding ram which is of considerably larger diameter than the lifting ram 21 and is arranged concentrically thereof so as to work through the fixed tubular guide 4 in the upper end of the ram pit, such guide being recessed to form a stuffing box 25 which is furnished with packing 26 and a gland 27 that is secured to the tubular guide by screw studs 28 so as to form a fluid tight joint through which the guide ram 24 works.

The tubular guide ram 24 is connected at its lower end to the lifting ram 21 by a recessed circular distance-piece 29 and is also supported by intermediate circular distance-pieces such as 30 which are secured to the exterior of the lifting ram by one or more screws 30*a*—see Figure 2, the webs of such distance-pieces being perforated as indicated at *a*.

The recessed distance-piece 29 is provided with a boss 31 that is secured by screws 32 to the exterior of the lifting ram 21 so as to abut a collar 33 secured to the latter by screws 34, while such distance-piece is also secured to the guide ram 24 by screws 35.

The distance-piece 29 is bored out to form a stuffing box 36 that is furnished with packing 37 and receives a gland 38 which carries a packing 39 and is internally screw-threaded so as to screw on to the counterpart external screw thread on the lifting ram 21 and thus form a fluid tight sliding joint between the open end of such ram and its pressure cylinder 7.

A heavy tubular head 40 is secured by screws 41 in the upper end of the tubular guide ram 24, which head is formed with an external flange 42 and is closed by a removable plug 43 in which a central perforation 43*a* is formed, such plug being adapted to seat upon the cap 22 on the upper end of the lifting ram 21 so that its upper surface 45 is flush with the adjacent surface of the tubular head 40 of the guide ram.

The flanged head 40 of the guide ram carries the lifting platform, the centre of which is secured thereto by bolts 44 which pass through bolt holes in the external flange 42 of the guide ram head 40.

In the construction shown the lifting plat-

form comprises a girder frame formed by two longitudinal girders 45 and 46 and three diagonally disposed girders 47, 48 and 49, all of which are of H cross section and are connected together by angle irons 50 that are secured by rivets 51 to the webs of the adjacent girders.

The diagonal girders 47, 48 and 49 are also connected at their centre by top and bottom plates 52 and 53 which are riveted to the flanges of the girders, an additional fish plate 54 being arranged across the junction of the divided diagonal girders 48 and 49 so as to stiffen the same.

The longitudinal girders 45 carry trackways of channel cross section, which trackways in the construction shown each consists of a plate 55 on which lateral flanges are formed by angle irons 56 and 57 that are riveted along the longitudinal edges of each plate. Such plates are riveted to the upper flanges of the longitudinal girders 45 on which they are mounted, while their opposite ends are bent down to form inclines as indicated at 58 (Figure 1).

The lifting platform is secured to the flanged head 40 of the guide ram 24 by the bolts 44 which pass through perforations in the top and bottom flanges of the diagonal girders 47, 48 and 49, and also through perforations in the top and bottom plates 52 and 53 and the fish plate 54 by which such girders are connected at their centre, the bolts 44 being secured by nuts 44*a* so that the centre of the platform is firmly anchored to the flanged head 40 and also seats upon the removable plug 43 thereof.

The flanged longitudinal girders 45 of the lifting platform form guides and supports for removable cross beams 59 which serve to carry adjustable prop jacks for supporting a vehicle on the lifting platform so as to enable the wheels etc. to be removed when required.

In the construction illustrated the removable cross beams 59 are each formed by a pair of channel irons which are arranged back to back and spaced apart by sleeves 60 carried by bolts 61 by means of which the channel irons are secured together to form the cross beams.

The cross beams 59 so formed are adapted to slide on the lower flanges 45*a* of the longitudinal girders 45 and 46 of the lifting platform, and also serve to carry adjustable prop jacks as indicated at Figures 4 and 7.

Such prop jacks each comprises a pillar 63 which is slidably mounted in a tubular base 64 that is furnished with lateral flanges 65 and is adapted to seat upon one of the cross beams 59, as illustrated at Figure 5.

The pillar 63 is furnished with a crutch 66 and is provided with a series of perforations 67 which are adapted to receive a removable pin 68 so that the pillar can be raised and secured at any required height in its base by means of such pin which is preferably attached to the jack base by a chain 69 to prevent the same being lost.

The pressure cylinder 7 and pipe 12 are filled with oil or other motive fluid before the lifting platform is secured to the head 40 of the guide ram 24. For this purpose the priming valve 23 is unscrewed so as to raise the same from its seat 23*a* in the cap 22. The pump is then operated to fill the pressure cylinder with the oil or other motive fluid and expel the air therefrom, the expelled air escaping through the vertical grooves 70 formed in the body of the priming valve 23 and when the oil escapes through the priming valve the latter is closed and the lifting platform is then bolted to the head 40 of the guide ram 24.

The pressure cylinder 7 is connected by the pipe 12 (Figures 1 and 2) to a source of motive fluid such as oil through a force pump indicated at 71 (Figure 1) which may be either hand or power driven, while a suitable release valve is arranged in known manner in the motive fluid pressure circuit.

When the concentric lifting ram 21 and guide ram 24 are lowered the lower flanges of the longitudinal girders 45 of the lifting platform rest upon the floor or ground and likewise the lower edges of the inclined ends 58 of the trackways so that a vehicle can be readily run on to the trackways of the lifting platform and is retained thereon by means of scotch blocks 72 (see Figure 8) each provided with a pin 73 that is adapted to take into one or other of a series of holes 74 formed towards the ends of the trackways, as indicated at Figure 4, thus enabling the scotch blocks to be readily adjusted on the trackways so as to be engaged with the wheels of the vehicle and thus prevent the same running off the platform.

To raise the platform the pump is operated so as to force the motive fluid into the pressure cylinder 7, the pressure of the motive fluid being transmitted to the closed upper end of the lifting ram which is consequently raised together with the lifting platform and the guide ram.

When the lifting ram 21 has reached the limit of its lift the safety vent 75 therein is uncovered by the cup leather 15 on the pressure cylinder so that the motive fluid can escape therefrom and run through the perforations *a* in the distance-pieces 30 and 29 into the ram pit, from which it can be pumped if desired.

The platform is lowered by operating a release valve arranged in known manner in the motive fluid pressure circuit, which enables the motive fluid to be returned to

its reservoir by the pressure of the descending load.

For the purpose of carrying the vehicle on the lifting platform independently of its wheels the cross beams 59 are conveniently assembled one to each end of the platform and the prop jacks placed thereon so that the flanged bases of the jacks engage the lateral edges of the cross beams, as indicated at Figures 1 and 5.

The cross beams are adjusted on the flanges 45*a* of the longitudinal girders 45 and the vehicle raised by means of a screw or other suitable jack placed upon the cross beam 59. The prop jacks are then adjusted as required on the cross beams and the pillars 63 thereof raised so that the crutches 66 on such pillars engage the axle or underframe of the vehicle, the pillars being secured in the raised position by their cross pins 69 so as to carry the vehicle when the lifting jack is removed, and thus enable the wheels or other parts to be removed and replaced while the vehicle is supported by the prop jacks.

The vehicle is lowered by means of the lifting jack which is replaced on the cross beam 59 and extended so as to take the weight of the vehicle from the prop jacks which are then lowered, after which the vehicle is lowered by means of the jack so that its wheels again rest upon the trackways of the lifting platform.

The angle irons 57 riveted along the outer longitudinal edge of each of the trackway plates 55 are shallower than the angle irons 56 on the inner longitudinal edges of such plates (see Figure 7), so that it is only necessary to jack up the vehicle on the platform sufficiently for its wheels to clear the shallow angle irons 57 of the trackways to enable the wheels to be removed from and replaced on the vehicle.

We claim:—

1. A hydraulic lifting apparatus of the class described, comprising a fixed tubular guide, a fixed pressure cylinder arranged vertically in the center of said tubular guide and having its lower end connected with a source of motive fluid and its upper end provided with packing means, a tubular lifting ram closed at its upper end, open at its lower end and slidably fitted on the fixed pressure cylinder, a tubular guiding ram of greater diameter than the said lifting ram and slidably fitted in said fixed tubular guide, distance pieces secured on the lifting ram and connecting the same with the guiding ram and a head secured in the upper end of the guiding ram and also secured to the upper end of the tubular lifting ram.

2. Hydraulic lifting apparatus of the class described, comprising a fixed pressure cylinder having its lower end connected with a source of motive fuel and its upper end provided with a packing, a tubular lifting ram open at its lower end, provided with a closure at its upper end and slidably fitted on said pressure cylinder and having a vent opening at a point intermediate its ends, said packing having a bore establishing communication between the pressure cylinder and the closed upper end of the lifting ram, and said closure at the upper end of the lifting ram having a priming duct and a closure therefor.

3. Hydraulic lifting apparatus as claimed in claim 2, in which the closure for the priming duct is removable and adjustable.

In testimony whereof we affix our signatures.

ABRAHAM ISAAC LOGETTE.
EDGAR HARRY DAINTON.